



Engineered Efficiency successfully implements process control at chemical production plant.

Our Pulsar distributor for Australia, Engineered Efficiency, were asked to design and construct a system for neutralizing and storing waste water from a process control laboratory at a chemical production plant prior to disposal. The system had to be simple and automated as the laboratory did not have access to the plant Dynamic Control System (DCS), so they needed to provide a stand alone system.

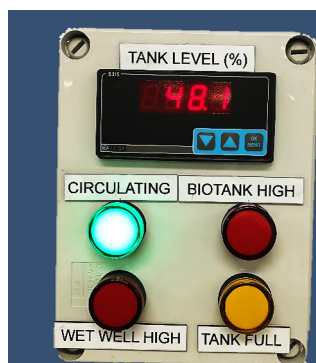
Chemical waste from the laboratory is collected in two underground pits. The waste is pumped from the pits to a combination neutralizing and storage tank. Each day, the tank is mixed using a recirculation pump and the pH in the neutralizing tank is corrected by the addition of acid or caustic. When the tank is close to full and the solution is at the correct pH, the solution is removed via road tanker for disposal at an

approved waste facility.

When Engineered Efficiency took on the project, the two underground pits were installed and the client had basic pump and control elements fitted as part of the civil and structural works for the laboratory building. However, there was no neutralizing or storage system designed or installed.

They developed the requirements for the control system based on the client's process requirements combined with the outcomes of the risk assessment. It was established that the critical elements were:

- **Ensuring the solution is generally maintained between a pH of 4 to 9 in the tank, and ideally between 5 and 8 for disposal**
- **Minimize the risk of overflow of the neutralizing tank and the underground pits**
- **Provide indication to laboratory personnel of the neutralizing tank level and alert when tank needed to be pumped out**
- **Prevent the recirculation pump from running dry if the neutralizing tank level was low**



“When Engineered Efficiency took on the project, the two underground pits were installed and the client had basic pump control.”

Engineered Efficiency decided to use the following Pulsar equipment:

- **Ultra 5 with dB3 level transmitter**
- **Pulsarpoint Signal Master float switches**

All five relays in the Ultra 5 were used to provide the required level of control. Relays 1 and 2 were used to control the recirculation pump. They were set in series, so relay 1 was set to a timer function to make the pump run for one hour per day and initiate the pH correction and relay 2 was set to be a level permissive to only allow the recirculation pump to run when the tank level is at a safe level to prevent damage to the recirculation pump.

Relay 3 was set to initiate an indicator light to alert laboratory personnel that the tank is close to it's limit and that a pump out should be arranged. Relay 4 was used to provide a permissive to the pumps in the underground pits to allow transfer of solution to the neutralizing tank. When a critically high level is reached, this permissive is removed and no further material can be pumped from the underground puts to the neutralizing tank.

Finally, relay 5 provides the high level alarm and local indication.

Engineered Efficiency also constructed a mimic panel to display the critical alerts in the laboratory, using the 4-20mA output from the Ultra 5 to display the tank level, using a loop powered 4-digit display mounted on the mimic panel.

Pulsarpoint Signalmaster float switches were added to the underground pits to provide high level indication for each of the pits. They also integrated the existing underground pit controls into a separate relay logic control panel that was specially constructed for this project to provide interlocking and feedback.

For this particular project, most of the control for the system was related to level. The Ultra 5 provided Engineered Efficiency with the versatility to meet their client's control requirements, without the need for a PLC, saving significant costs and set-up time.

If the underground pits were not already controlled, they could have instead used an Ultimate Controller, to create a fully integrated control system.



Featured Products



Pulsar dB3 level transducer



Pulsar Ultra 5 Wall Mount



Pulsar Signalmaster Float Switch



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