

## *Don Johns Engineering Control System – The Complete Solution*

### **Tank Level Control Application**

Here is an example of a solution provided to a customer seeking to maintain a constant level in an 18 ft outdoor, hot asphalt tank. This process is a recirculation application where the asphalt is continually pumped in to – and out of – this surge tank. Other materials such as ground-up, recycled automobile tires are also added to the process.

The Don Johns Engineering (DJE) Control System controls the speeds of the In Pump and the Out Pump in order to keep the tank at a setpoint level. The PLC-based system also interlocks the controls of these motors (plus the Tank Mixer Motor) based on the tank level “Low”, “High” and “High-high” setpoints as well as other PLC-generated alarms.

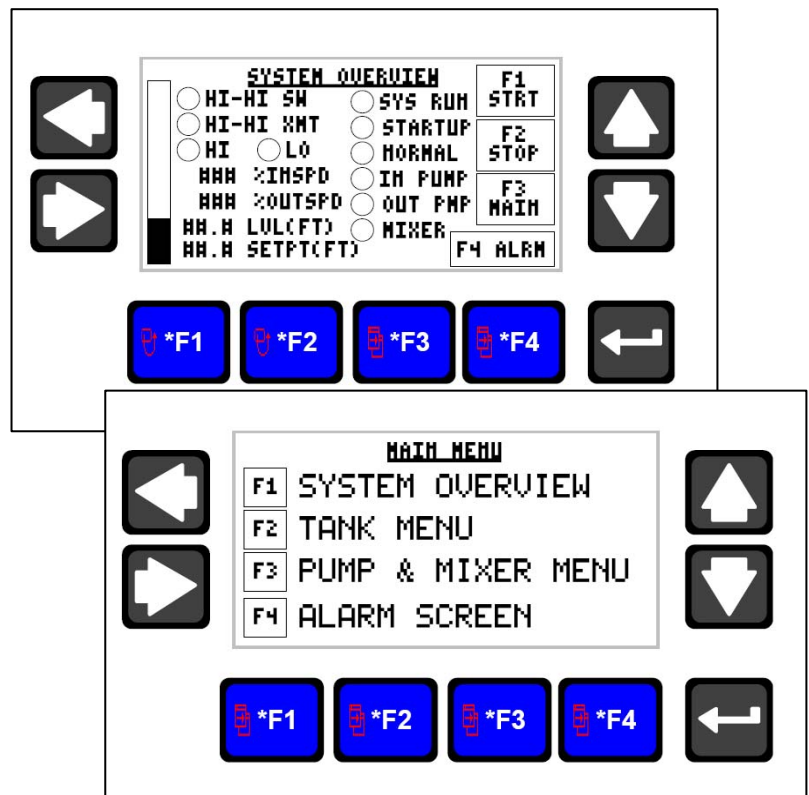
The DJE Control System consists of two control panels mounted near the tank: a PLC Control Panel, a Variable Frequency Drive (VFD) Motor Control Panel and associated radar tank level sensors. The outdoor panels were designed by DJE, keeping safety requirements and recommendations in mind.

### **Process Description**

The basic principle of controlling the tank level is:

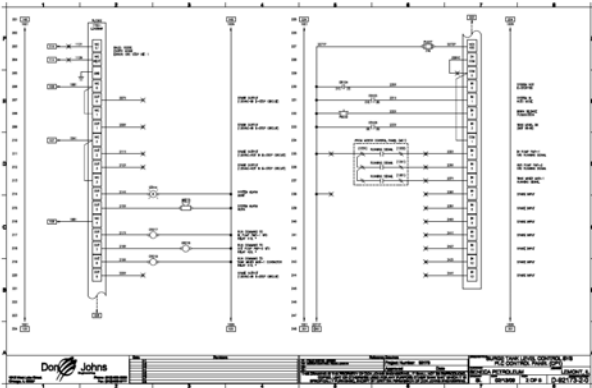
- monitor the tank level using the Emerson Rosemount TankRadar® Pro Radar Level Gauge, mounted on the top of the tank
- monitor the high-high tank level condition using a back-up Dwyer mechanical float switch mounted near the top of the tank
- program an Allen-Bradley PLC to generate low, high and high-high alarms and control the In Pump, Out Pump and Tank Mixer motors
- program the PLC to run the In Pump at a fixed speed and control the Out Pump speed using a PID algorithm, continually adjusting in response to load changes and flow conditions
- control the speed of pumps using Allen-Bradley Powerflex70 VFD's
- display status and control on Allen-Bradley HMI screens
- allow manual control of motors, in case of PLC failure

### *User-friendly and Intuitive HMI Screens*



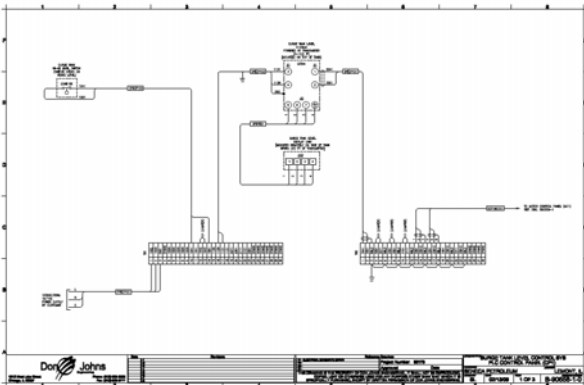
## What the Don Johns Engineering Solution gives you

### CAD Drawings



Electrical Schematics

### Field Wiring



*... A Solution aimed to meet and exceed Customer's expectations!*

- **Functional Description Document**, detailing the scope of work and a description of the way the system is to function
- **CAD Drawings**, including electrical schematics and field wiring diagrams
- **Fully-Documented PLC Code**, with tag descriptions and detailed rung comments to explain the logic to any programmer who views it
- **Easy-to-Understand Operator Display Screens** (HMI) to give access to users to monitor and control the process. Descriptive alarms to assist trouble-shooting.
- **Simulation PLC Logic**, to be able to complete a functional test before shipping fully-tested system to site
- **Start-Up Services** (after installation and wiring is completed by customer) to ensure a successful deployment of the system.

### Fully-documented PLC program

