

# **APPENDIX D**

## **Eucalyptus Booster Station Control Strategy**

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## CONTROL STRATEGY

### PART 1 – GENERAL

The Remote Telemetry Unit (RTU) and Operator Interface Terminal (OIT) programming and configuration will be completed by the District. The Contractor shall coordinate the schedule for testing, start-up and commissioning with the District to ensure that the District has sufficient time to complete the RTU and OIT programming. The Contractor shall notify the District of tasks that require the District participation as identified in Section 00100 Special Conditions, as shown on the Contract Drawings, or required by these specifications.

#### A. Control Modes

Three control modes are available:

- HAND
- OFF
- AUTOMATIC

1. When the Hand-Off-Auto(HOA) selector switch at the reduced voltage Solid State starter (RVSS) is in the Hand position, the pump shall run at constant speed. When in the selector switch is in Hand position, commands from the RTU shall not be capable of controlling the pump.
2. When the HOA selector switch at the RVSS is in the Off position, the pump shall be stopped and shall not operate. When the selector switch is in the Off position, commands both locally and from the RTU shall not be capable of starting the pump.
3. When the HOA selector switch at the RVSS is in the Auto position, the pump shall be controlled by the RTU per the control narrative below. In all Auto control modes, the RTU shall be programmed with an operator adjustable time delay between pump starts. The delay shall prevent a pump from starting after the start of a previous pump for the duration of the time delay setpoint. The adjustable delay setpoint shall initially be 60 seconds such that after a pump is started another pump is prevented from starting for 60 seconds.

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#### B. Drive mode

Two Drive modes are available:

- Soft Start
  - Bypass
1. In tandem with the control modes of the HOA switch, pump motors 1 and 2 will start by one of the two methods:
    - a When the Solid State-Bypass switch (SS-BP) is in the Solid State position, the pump shall run via the RVSS.
    - b If the SS-BP switch is in the Bypass position, the pump RVSS will be bypassed and the pump shall run via the bypass contactors.

#### C. Control Narrative

1. The pumps shall be controlled through the RTU via commands and setpoints received from the District SCADA system through the telemetry communications.

The primary mode of control will be based on water surface elevation in the Oliver tank. The water surface elevation of the Oliver tank will be communicated to the local Eucalyptus RTU over the telemetry link.

Pumps 1, 2, and 3 control will be discrete On/Off. All three pumps will turn on based on tank level setpoints. Initially the pumps will operate as Lead, Lag, and stand-by. If a pump fails, the next pump in the operating order shall automatically start in its place and the pump designations shall automatically rotate.

Setpoints shall be either changed at the local OIT through the RTU or from SCADA. The I/O list is shown in electrical drawings.

2. The Suez Aquadapt optimization software energy management system, which is integrated into the District's SCADA system, monitors reservoir levels and selects the most energy efficient means to fill and maintain reservoir levels, and provides an overriding level of automatic pump control. The Suez program will not override alarms or pump emergency shutdown.

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3. If the Oliver tank is in service and providing its water surface elevation to the RTU, the level will trigger Lead and Lag pump to start and stop based on the Oliver tank water level set points, with override control by the Suez Aquadapt pump scheduling optimization program. Initial set points are shown in the tables below. Set points are intended for initial operation and may be revised by the District during testing, start-up and commissioning.
4. The bypass pressure relief valve shall be set to open when the discharge pressure exceeds the setpoint, initially 100 PSI. When the pressure drops below the valve close pressure setpoint, initially 95 PSI, the valve shall be set close.
5. Regardless of the control mode selected, if the Emergency Stop is pressed at the pump, the corresponding pump shall be immediately stopped. The pump shall be prevented from restarting until the Emergency Stop is pulled back out.

#### D. Initial Control Setpoints

<b>Primary Mode - Initial Set Points – Tank Water Surface Level</b>			
<b>Oliver Tank WSE (ft)</b>	<b>Oliver Tank Level (ft)</b>	<b>Action</b>	<b>Comments</b>
1,965	30		Tank Overflow Elevation
1,961	26	Lead Pump Stop	Initial Set Point
1,960.5	25.5	Lag Pump Stop	Initial Set Point
1,957	22	Lead pump start	Initial Set Point
1,956.5	21.5	lag Pump Start	Initial Set Point
1,935	0		Initial Set Point

Note: Oliver tank contains an altitude valve. Operating setpoint shall be coordinated with the altitude valve settings.

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E. Initial Operation Setpoints

<b>Equipment/Instrument Initial Pressure Set Points</b>			
<b>Equipment</b>	<b>Initial Set Point (PSI)</b>	<b>Action</b>	<b>Remarks</b>
Pressure Relief Valve	100	Valve Open	Initial Setting
Pressure Relief Valve	95	Valve Close	Initial Setting
PSL Suction (All)	30	Pump Stop	Initial Setting
PSH Discharge (All)	65	Pump Stop	Initial Setting

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