

CHAPTER 6

BUTTERFIELD WATER TOWER AND NORTH DELIVERY STRUCTURE

BACKGROUND

The Butterfield Water Tower and North Delivery Structure was built in 1997. The facility consists of a 500,000 gallon elevated steel water spheroid (Figure 6-1) and a CLCJAWA delivery structure located below grade in a vault in the interior of the tower base (Figure 6-2).



Figure 6-1
Butterfield Water Tower

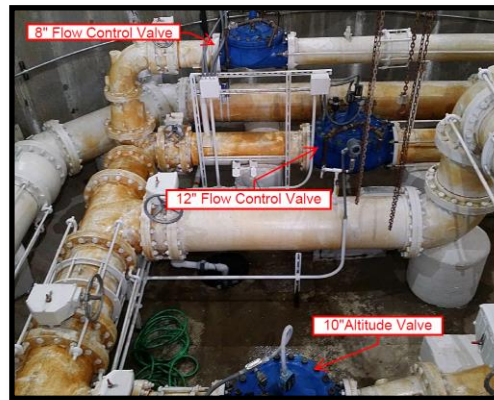


Figure 6-2
CLCJAWA North Delivery Piping

RECOMMENDATIONS

Electrical Equipment

The outdoor generator and associated transfer switch were evaluated for replacement due to concerns about age and the challenging environmental conditions presented by the concrete and aggregate yard located next to the property. Figure 6-3 shows the generator and the fence bordering the aggregate yard.

During the course of this evaluation, the viability of replacing the generator with an uninterruptible power supply (UPS) was also explored. A UPS would be located inside the



Figure 6-3
Existing Outdoor Generator

structure, thereby eliminating the environmental concerns raised by the existing generator. However, replacement of the generator with a UPS was found to be impractical due to cost and limited space available within the structure. The equipment price of a 15kVA UPS is around \$26,000, while the equipment price of a 35kW generator is about \$22,000. Installation would add another 50% to these prices. At the sizes that are needed for the electrical load located at the Butterfield Water Tower, replacement of the existing generator and its associated equipment is more economical than its removal and replacement with a UPS. The dusty environment should not require any special modifications to the generator set, however, during design consideration will be given to an improved air filtration system. Without any additional filtration system upgrades, maintenance intervals may need to be shortened in order to keep the unit running in optimal condition. Information on a replacement generator can be found in Appendix C.

Lighting

Contrary to the other structures that were evaluated, the Butterfield Water Tower facility already has LED fixtures. As such, the only upgrade suggested for the Tower's lighting system is the replacement of piston-style light switches with occupancy sensors. The Hubbell Occupancy Sensor is being recommended for consistency throughout the different water system facilities.

SCADA System

Figures 6-4 and 6-5 show the existing SCADA Control panel. The LCPWD installed a radio telemetry system in the Butterfield Water Tower in 2013 that transmits to the Master Control Panel located in the operations building of the Vernon Hills WRF. It consists of MDS/GE 900 Mhz spread spectrum radio and an Ethernet switch. Though the radio is operational and links back to the Vernon Hills WRF, there are no Programmable Logic Controllers (PLCs) or Remote Terminal Units (RTUs) connected to the radio. Switching over to the radio system will eliminate the need for the existing telephone line.

The existing panel includes controls for the 8- and 12-inch CLA-VAL flow control valves and the 10-inch CLA-VAL altitude valve shown in Figure 6-2. The control logic for these valves would be programmed into a new SCADA PLC panel.



Figure 6-4
Existing Control Panel Interior



Figure 6-5
Existing Control Panel Exterior

It is recommended that a new SCADA PLC panel be installed at the Butterfield Water Tower. The panel would include:

- Allen-Bradley CompactLogix L33ER PLC
- (4) 16-point digital input cards
- (2) 4-point analog input card
- (2) 16-point digital output card

The front of the panel would also include a 15-inch touchscreen that provides control and displays local data. A UPS will maintain PLC function and data transmission in the event of a power failure. The existing Ethernet switch will be utilized to connect the new PLC to the SCADA network to provide control, status monitoring, and alarm monitoring data to the Master SCADA PLC at the Vernon Hills WRF.