Forest View Acres Water District

Operations Report –August/September 2013
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Arapahoe Water Plant

- The diagnosis of the motor failure problems associated with the AWP is as follows:

We think it is very possible that harmonic distortion from the VFD is being attenuated over the long cable to the motor resulting in the motor failures. This may have become even more of an issue since we lowered the pump, therefore increasing the cable length. This is why we strongly encourage the installation of the VFD output filter. We still have not received a motor evaluation from Franklin on the most recent failure.

- Please see the following regarding the output filter and reflective wave phenomenon:

REFLECTIVE WAVE PHENOMENON

Voltage wave reflection is a function of the voltage rise time (dv/dt) and the length of the motor cables. The impedance on either end of the cable run does not match, causing voltage pulses to be reflected back in the direction from which it arrived. As these reflected waves encounter other waves, their values add, causing higher peak voltage. As wire length or carrier frequency increases, the overshoot peak voltage also increases.

Peak Voltages on a 460V system can reach 1200 to 1600V, causing rapid breakdown of motor insulation, leading to motor failure. On 575V systems, the peak voltages can easily reach 2100V. If this is left uncontrolled, insulation failure may occur.

- It is highly recommended that the filter be installed on the VFD for the well pump.
- It is also recommended that a surge protector be installed on the power coming into the plant.

Booster Station

- The power coming into the booster station does not have surge protection. It is highly recommended that surge protection be installed. This can be done for roughly $1,100.

Surface Water Plant

- The camera has disappeared from the inlet.
- The cracks in the piping at the inlet have been repaired.
- It is highly recommended that surge protection be installed on the power coming into the plant to protect the drives and booster pumps. This can be done for roughly $1,100.