



Akutan Town Creek Hydro Improvements

Prepared for:

City of Akutan

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1 Controls Recommendation

The controls for the hydro consist of a hybrid system that incorporates the Thompson and Howe “Product G” governor (load bank control) with a PLC for automation and integration with the existing diesel generator. The Product G governor provides the speed control capability of the hydro by using a resistive load bank. The produce G will quickly add/remove energy being diverted to the load bank to respond to load changes in the system, thus maintaining a fixed frequency. This is done by use of SCRs and control of the firing angle of those SCRs. The Product G governor was part of the original installation of the hydro product. In 2003, the controls were modified to incorporate a GE PLC that would allow automation of the hydro along with the ability to operate the hydro generator in parallel with the hydro plant diesel generator. The PLC allows the Product G to control the unit when it is in isochronous mode. When the unit is in parallel mode, the PLC takes control of the needle valves, load bank and deflector to maintain a fixed load on the hydro. The PLC will control load on the generator depending on the available water and load on the diesel.

The manufacturer of the hydro turbine (Canyon) was contacted to discuss options for replacing the existing controls. The manufacturer indicated the product G is still being used on this size unit. There would be little or no benefit to replacing the existing controls as they would be replaced with a similar system with the same functional control. EPS recommends proceeding with improvements on the existing control system.

The improvements recommended by EPS will focus on improving the operator interface. It has been noted that the difficulties with operation of the plant is typically due to a lack of information being passed back to the operator. Additional points will be added to the HMI that notify the operator of conditions that need to be met prior to issuing a start command to the hydro.

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EPS has identified the following areas of improvement in the existing controls:

1. Upgrade HMI/Server to include screen at hydro plant. Upgrade will include a system with flexibility to easily add additional screens at places such as the diesel plant, future Loud Creek Hydro, etc. - \$40,000
2. Modify control screens for simpler operation and provide additional training. - \$10,000
3. Add control points (valves, control switches, etc) to the HMI for sequential start sequence/instructions for the operators and complete automation of the hydro. - \$25,000
4. Replace radio connection with fiber (fiber installed as part of the distribution upgrades) - \$5,000
5. Purchase spare parts; Product G governor, PLC cards, relays, etc. - \$30,000
6. On-Site training and installation of the above. - \$40,000

The total recommended estimated cost for the above upgrades is \$150,000.