

Jeff Peppersack 48
Should be placed in w/ file.

Gary 2/13/2009

Hal ✓
Gary ✓
File ✓

MEMORANDUM

36-7130

36-8094

TO: DAVE TUTHILL; HAL ANDERSON; GARY SPACKMAN
FROM: STUART VAN GREUNINGEN
SUBJECT: GEO-THERMAL TURBINE NOZZLE CHANGE AT PRISTINE SPRINGS
DATE: 2/12/2009
CC: BRIAN PATTON

On February 3rd, 2009 I went to Pristine Springs to watch/participate in the changing of the nozzle on the geo-thermal turbine to reduce the flow from 7 cfs to 4.5 cfs. The change was to take place at 1:00 p.m. and scheduled to last 1 ½ to 2 ½ hours dependent upon what was encountered during the change out process.

Upon arriving I located Brian Tadlock to verify that everything was on schedule. Brian was adjusting the water to the fish to get them adapted for the reduction in warm water. At that time we were still waiting on Scott Kaster of Hydro Plus to arrive as he was the one who would be doing the change.

When Scott arrived the first thing he did was to shut down a valve on one of the intakes to the turbine. There are two lines that run to the turbine to balance the pressure on the turbine's bearings, generally when this is done it shuts the system down but this time it did not which may have been attributed to the previous mentioned adjustments made by Brian but we were not sure. After the closing of this valve we checked the output/flow and mainline pressure into the turbine. The flow prior to closing the valve was 7.07 cfs (3180 gpm) and after closing was at 4.5 cfs (2056 gpm) with no change in pressure it remained at approximately 140 psi. The desired flow had been achieved without changing the nozzle or shutting down the system. Figures 1 and 2 below show valve and flow change.

The ramifications of what would happen if the turbine was to continue to run in this configuration were discussed. It was concluded that the bearings would be loaded to one side but no other effect should be seen. A general consensus was reached that rather than do the nozzle change we would allow the turbine to run like this and monitor for problems. Brian checked the fish to verify that they were alright with the change and they seemed happy at the time I left.

The on going actions that will be taken are to continue to monitor the operation of the turbine and fish's well being, if and when problems occur we will address them at that time. Scott suggested that we may want to change the nozzle at a future date when normal maintenance is done.



Figure 1. Geo-thermal turbine showing the valve that was



Before
Picture taken November 2008



After
Picture taken February 2009

Figure 2. Before and after picture of the flow meter. Flow reads in gallons per minute.