McCloud Community Services District
Attachment 6 – Project Monitoring

The project will be monitored for water conservation, energy generation and green house gas (GHG) reduction. The two main metrics that will be monitored are flow (MG/yr) and electricity generation (kWh). Water and pressure meters will verify that the new 18-inch pipeline is delivering the full allotment of flow to the hydroelectric station. The hydroelectric turbine-generator systems will contain flow, pressure and power metering that will be controlled by PLC and viewed through an on-line viewing tool. A third-party Performance Data Provider will verify monthly generation and report to the California Energy Commission through the Western Renewable Energy Generation Information System (WREGIS).

- Flow will be monitored via an ultrasonic water meter at the connection point between the new 18-inch pipeline and the existing 14-inch ductile iron pipeline. Additionally, a separate flow meter will be sited at the hydroelectric station to monitor water flow in the new pipeline to verify water savings through the replacement of the redwood stave pipe. It is estimated that the new pipeline will save 68,000,000 MG/yr to 95,000,000 MG/yr (210 Acre ft to 290 Acre ft).

- Annual hydroelectric generation (kWh) will be monitored by a power meter provided by a CEC-approved Performance Data Provider[1]. MCSD analyzed historical pressure and flow data to determine the applicable turbine and the estimated annual generation. Based on pressure and flow data from 2011 and 2012, it is estimated that the system will generate approximately 2,900,000 kWhs per year. In addition to the amount of GHG reduction will be derived by converting generation by the hydroelectric unit to metric tons of green house gas saved based on the EPA conversion factors. Based on 2,900,000 kWhs annually the system is expected to save 2,000 metric tons of greenhouse gases or 275 homes electricity use for one year. [2]

Quarterly and annual reports will be available calculating the amount of water saved from leakage and amount of generation (and equivalent GHG reduction) generated from the hydroelectric units.

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[1] www.gosolarcalifornia.com

[2] http://www.epa.gov/cleanenergy/energy-resources/calculator.html

MCSD Intake Spring
Water Loss Calculation
4-Dec-14

Minimum Loss		Maximum Loss
130	**US Gallons per Minute (gpm)**	**180**
Equivalents		**Equivalents**
7,800	US Gallons per Hour (gph)	10,800
187,200	US Gallons per Day (gpd)	259,200
68,328,000	**US Gallons per Year (Gal/Yr)**	**94,608,000**
0.574458683	Acre-Foot/Day	0.795404331
209.7	**Acre-Foot/Year**	**290.3**