

Development and Operation of a Small Hydropower Plant by an Irrigation District – A Case Study of the Orange Cove Irrigation District

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The Orange Cove Irrigation District (OCID) has owned and operated the Friant Fishwater Release Powerplant since 1990. The power plant generates hydroelectric power that is sold to a utility under a power purchase agreement. The power plant is located at the toe of Friant Dam, a Central Valley Project facility that impounds water from the San Joaquin River for diversion for irrigation, and municipal and industrial (M&I) purposes. The powerplant is located on United States Bureau of Reclamation (USBR) property and operated and maintained by OCID under a special use agreement.

The power plant generates electricity using a constant flow of 35 cubic feet per second (cfs) that is ultimately diverted to a fish hatchery. Maintaining a constant flow to the fish hatchery is crucial to ensure survival of the fish population. The OCID delivers water to the powerplant utilizing a non-consumptive water right. The power plant diverts water from two sources; a 96-inch penstock that discharges directly into the San Joaquin River and/or from a 40-inch penstock connected to the inlet to the Friant-Kern Canal. These two sources allow water to be withdrawn from different reservoir elevations so they can be blended to achieve optimum water temperatures for the hatchery. The power plant includes a horizontal Francis turbine capable of generating 523 kw, inlet valve, horizontal induction generator, bypass valve, controls, switchgear and unit substation.

The Fishwater Release Powerplant illustrates the benefits that a small hydropower project can bring an irrigation district in offsetting the operational costs of its primary function – irrigation delivery. The success of the project is demonstrated by the fact that all development costs were paid for in less than 5 years from revenue generated by the plant. The OCID has also successfully developed and operated a low-head hydropower facility on the Friant-Kern Canal and has investigated an expansion to the Fishwater Release Powerplant that could utilize mandated incremental environmental flows.