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Surface-Water Diversion Projects in The Geysers Known Geothermal Resource Area Environmental and Engineering Constraints and Opportunities

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ABSTRACT

Recent steam field pressure declines have and continue to decrease the efficiency and, in turn, increase the cost of electric power production at The Geysers Known Geothermal Resource Area (KGRA). One technical solution to the net loss of steam is the injection of water (a source of steam) directly into the steam field. An obvious source of injection water is Big Sulphur Creek and other streams traversing The Geysers KGRA.

Key factors limiting the quantity of surface water available for diversion and subsequent injection include hydrology, existing water rights and fisheries in stream flow requirements. The availability of water ultimately determines the type (dam and reservoir versus direct diversion) and feasibility of a given diversion project. However, other factors: geotechnical, location of diversion relative to the area of use and pressure/absence of cultural and/or significant biological resources (rare and endangered species and unique habitats) can also impact project feasibility.

Data collected by Harding Lawson Associates and others indicate that much of the divertable surface water in The Geysers KGRA is located in the Big Sulphur Creek basin. Dam and reservoir projects tend to be more feasible if located in the upper headwater areas of the basin, contrasted by direct diversion projects in the lower basin.