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State Of California

Natural Resources Agency

Memorandum

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To: Commissioner Karen Douglas, Presiding Member
Commissioner Janea Scott, Associate Member
Susan Cochran, Hearing Officer

From: **California Energy Commission - 1516 Ninth Street Sacramento, CA 95814-5512**
Joseph Douglas, Compliance Project Manager
Siting, Transmission and Environmental Protection Division

Subject: **HIGH DESERT POWER PROJECT (HDPP 97-AFC-01C) PETITION TO AMEND ISSUES REPORT TO COMMITTEE QUESTIONS**

Staff hereby files its Issues Report to answer High Desert Power Project Petition to Amend Committee questions as ordered in the July 12, 2016 Notice of August 11, 2016 Committee Status Conference and Related Orders.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
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PETITION TO AMEND THE
HIGH DESERT POWER PLANT

Docket No. 97-AFC-01C

Staff Responses to Committee Questions in the Notice of August 11, 2016 Committee Status Conference and Related Orders

Staff offers the following Issues Report answering questions concerning the five general topics outlined in the Notice of August 11, 2016 Committee Status Conference and Related Orders, filed by the Committee on July 12, regarding the High Desert Power Project (HDPP) Petition to Amend.

A. Recycled Water - In the 2000 HDPP Decision, use of recycled water was prohibited due to concerns about the effect of diversion of recycled water away from its discharge to the Transition Zone.

Q1. How would the re-direction of recycled water from the Transition Zone to HDPP affect the riparian habitat in the Transition Zone?

In the 2000 HDPP Decision, the Commission based its findings on evidence that pumping and recharge in the Alto sub-basin can create impacts on the Mojave River for decades after those activities occur.

Q2. What role does the current discharge of recycled water play in maintaining Mojave River flows and the health of the riparian habitat in the Transition Zone with the current and uncertain future base flow conditions?

Staff Responses:

A1 - A2. Staff did not conduct an environmental study to consider the environmental impact of diversion of recycled water on the Mojave River flows or the health of the riparian habitat. Staff relied on a Memorandum of Understanding (MOU) (CEC 2016) that was entered into between the California Department of Fish and Wildlife (CDFW) and Victor Valley Wastewater Reclamation Authority (VVWRA) in 2003 regarding discharge of a minimum amount of recycled water to the river.

The MOU was designed to ensure a minimum supply of recycled water would continue to be discharged to the Mojave River to maintain flow in the Transition Zone of the Alto subarea above 15,000 AFY pursuant to the final judgment in

the adjudication case. This flow was determined to be the minimum flow required to preserve the riparian resources. The MOU allows for delivery of excess recycled water beyond what the parties agreed was needed for riparian preservation.

In general, the current discharge of recycled water maintains Mojave River flows and the health of the riparian habitat in the Transition Zone. Sufficient water flows (as yet undefined in this context) contribute to the health of the ecosystem, and play an important role in lives of the plant and wildlife species that rely upon this ecosystem. Three special-status species, the federally and state endangered southwestern willow flycatcher (*Empidonax traillii extimus*), least Bell's vireo (*Vireo bellii pusillus*), and the Mojave tui chub (*Gila bicolor mohavensis*), are dependent upon the Transition Zone for their recovery in the area under the Endangered Species Act.

The Transition Zone is also suitable habitat for one federally threatened and state endangered species, the western yellow-billed cuckoo *(Coccyzus amencanus occidentalÿ*). Potential habitat for the both federally endangered and California Species of Special Concern arroyo toad (*Bufo califomicus*) may exist within this stretch of riparian area as well. The Transition Zone also supports populations of migratory birds and several California Species of Special Concern and a Watch List, including the Mojave River vole (*Microtus califomicus mohavensis*), southwestern pond turtle (*Emys marmorta pallida*), long-eared owl (*Asio otus*), summer tanager (*Piranga rubra*), vermiilion flycatcher (*Pyrocephalus rubious*), yellow-breasted chat (*Icteria virens*), the yellow warbler (*Dendroica petechia*) and the brown-crested flycatcher (*Myiarchus tyrannulus*).

Diverting recycled water from the Transition Zone to the HDPP could result in environmental effects on its riparian habitat, ranging from the indiscernible and benign to substantially adverse, depending on the magnitude of such diversions. The 2003 MOU between CDFW and the VVWRA requires that VVWRA discharge at least 9,000 acre-feet per year of "available recycled water" to the Transition Zone from the existing discharges at their Shay Road Treatment Plant in Victorville.

Since there has been very little use or diversion of recycled water from the treatment plant due to the lack of other users, the treatment plant has been discharging between 11,872 and 14,089 AFY between 2004and 2015, with available amounts to HDPP ranging between 2,856 and 8,813 AFY after satisfying the obligations of the MOU. This level of recycled wastewater discharge has contributed to the continued sustainability of riparian habitats in the Transition Zone. It is also likely there has been expansion of the riparian habitat since the baseline condition that was established at the time of the basin adjudication given the sustained discharge of recycled water beyond that needed to meet the terms of the MOU.

During periodic observations of the area in 2009 through 2016, the CDFW has observed that “Habitat conditions along the Transition Zone have remained fairly stable” and “…the area continues to support a large and fairly intact riparian corridor along the Mojave River.” (Murray 2016). Diverting more recycled wastewater to the HDPP and discharging less than the current minimum of 9,000 acre-feet per year to the Transition Zone could result in adverse effects, including death/dieback of riparian vegetation, loss of habitat for the Mojave tui chub, and loss of habitat for other endangered and threatened species that use the Transition Zone as habitat. These effects could be experienced by the entire ecosystem, as migratory birds, large mammals, and a host of non-listed, yet vital, species could be impacted by the degradation of the Mojave River riparian corridor, including migratory birds.

The riparian corridor in the Transition Zone is more than 3,800 acres in area (Murray, 2016), but without specific watershed balance data, it is difficult to quantify the spatial or temporal range of impacts if discharges were reduced below the 9,000 acre-feet per year required in the MOU. However, staff’s analysis and recommendations are predicated on the assumption that the minimum discharge of 9,000 AFY from the Shay Road plant to satisfy the MOU will be met and that any diversion of recycled water to HDPP would be beyond the amounts needed to satisfy the terms of the MOU.

An environmental study to assess the impact on the riparian habitat would involve collecting data on inflows and outflows for all sub-basins to determine the net inflow/outflow for each sub-basin as the difference between the two, as well as groundwater elevations. Correlating the net inflow/outflow with the groundwater elevation is anticipated to show a lag between the net flows and groundwater elevations. Groundwater elevations would then be correlated with the health of the riparian habitat to deduce a relationship between the net inflow/outflow in the basin and the health of the habitat and also what would be the minimum groundwater elevation needed to sustain the habitat.

MWA collects watershed balance data as part of an annual environmental study, conducted in accordance with the adjudication (see Subsection C, Staff Response A3). MWA is, therefore, the appropriate agency to study the potential impacts of reduced discharges. Staff previously drafted a potential scope of the water balance study for the sub-basin in relation to discharge of recycled water, and circulated the draft with the parties. CDFW has provided their input to the scope, and staff intends to present the proposed scope of work to MWA to determine whether or not MWA will be able to conduct, or at least contribute to, the watershed balance analysis.

B. Percolation of State Water Project (SWP) Water - The Petitioner proposes to add percolation as an additional method of banking SWP water for use at HDPP. The 2000 HDPP Decision limited water banking to injection. Because evidence leading up to the

2000 HDPP Decision showed that the impacts of groundwater pumping and injection on base flows to the Mojave River may continue for many years after pumping or injection has occurred, the Energy Commission imposed Conditions of Certification that account for the interaction of pumping and injection on base flows in the Mojave River, including the dissipation of banked water over time, through use of a superposition groundwater model. This superposition groundwater model allows the Energy Commission to isolate the specific effects of the project. With the imposition of these Conditions of Certification, the Energy Commission found that project pumping of injected water would never cause water levels in the Transition Zone to be lower than they would be without pumping. When considering percolation as a method of groundwater storage:

Q1. Are there other analytical methods that can be used to calculate the rate of dissipation of water banked through percolation (and the remaining amount water available for withdrawal over time)?

Q2. Have the Mojave Water Agency, Victor Valley Wastewater Reclamation Authority, or another entity performed environmental analyses that can be used to calculate the rate of dissipation of water banked by HDPP?

Q3. What modifications to Conditions of Certification governing withdrawal of banked water are required to more accurately address the availability of water banked by percolation? Specifically, how should evaporation and the distance between the percolation surface and the saturated zone be accounted for in determining the amount and timing of percolated water availability?

Staff Responses:

A1. The FEMFLOW3D groundwater model that was constructed for HDPP in the licensing proceeding can be used to calculate the rate of dissipation from injection and percolation, as long as the percolation areas are within the model boundaries, which cover the entire Alto sub-basin. If areas of percolation are outside the model boundaries, then the model would have to be modified by extending its boundaries to include any potential percolation areas. The modified model could be run by staff to determine the amount of groundwater which contributes to the flow in the Mojave River. By additionally considering the amount of discharge from the VVWRA plant, staff can use the model to determine the total flow in the river. While the river also receives some stormwater runoff, the amount is negligible.

A2. It is the duty of the Watermaster, MWA, to account for SWP water banked for HDPP via percolation. Energy Commission staff is not aware of any other, previously performed environmental analyses that calculate or estimate the rate of dissipation of SWP water banked for HDPP via percolation.

A3. Staff does not recommend changing the HDPP conditions of certification to address the availability of SWP water banked for HDPP via percolation. In discussions concerning interim relief for HDPP, staff proposed conditions of certification concerning the development of a groundwater bank for HDPP via

percolation, but did not propose conditions on the water after it is percolated. Determining how much of the percolated water is available to the project is part of the duties of the MWA appointed as the Watermaster for the adjudicated basin. The Watermaster has years of data collected across the basin and sub-basins, which could be utilized to determine the relationship between net inflow/outflow and the groundwater elevation, taking into consideration the spatial distribution of inflows and outflows.

Additionally, data is collected on any losses that occur during the percolation process, such as evaporation and dissipation to other basins or surface water bodies, such as the Mojave River. Points of percolation are determined by the Watermaster, who would then use their site specific information and data to calculate net water available to HDPP. The Watermaster would also address the short and long term effects of the banked water recovery for use at HDPP on the water balance in the basin.

C. Groundwater - The use of groundwater was not analyzed in the 2000 HDPP Decision.

Q1. What type of analysis is needed for the Energy Commission to assess whether impacts on base flow to the Mojave River in the Transition Zone are caused when HDPP pumps groundwater?

Q2. What action is the MWA required to take that affects base flows In the Mojave River at the Transition Zone?

Q3. What information is available about the effect of these MWA actions on base flow to the Mojave River in the Transition Zone?

Q4. Are there Conditions of Certification that the Energy Commission can impose that will ensure that base flow to the Mojave River in the Transition Zone will not decrease at any time as a result of the project's use of groundwater?

Staff Responses:

A1. Energy Commission staff can run the existing FEMFLOW3D groundwater model that was constructed during the licensing proceeding for HDPP to assess dissipation to the river as a result of injection activities. The model is set up with six injection points representing the injection wells; two of the injection wells were found to be inefficient, and were therefore abandoned by HDPP, but are still part of the model input. However, the input to the model can be modified so that more injection/withdrawal points may be added to represent any new recharge areas where percolation can be done, as long as those recharge areas are within the boundaries of the existing model, which roughly coincide with the boundaries of the Alto sub-basin.

A2. MWA was chosen by the Riverside County Superior Court in the adjudication proceeding in 1993 to be the Watermaster for the Mojave River Basin. It is part of

the duties of MWA as the Watermaster to ensure that withdrawals are balanced by recharge to the groundwater basin as well as the sub-basins. The Watermaster is authorized to procure water from different sources, such as the SWP, to replenish the groundwater basin in case withdrawals exceed input into the basin. Funds used to procure the water come from the pumpers that exceed their free production allowances. Since the Mojave River is primarily a groundwater river—that is, most of the baseflow comes from groundwater—maintaining the groundwater level, in effect, maintains the baseflow in the river.

A3. MWA, acting as the Watermaster, prepares an annual report about the recharges and withdrawals in the basin and the sub-basins and files the report with the Court. The information contained in the report describes the inflow and outflow in the sub-basins, determines any increase or decrease in a sub-basin's storage, and identifies water pumpers responsible for the purchase of water to cover any shortages.

A4. Imposing Conditions of Certification that require Petitioner to take independent action in the basin might interfere with the functions of the Watermaster. The MOU between VVWRA and CDFW ensures that a minimum amount of recycled water is discharged to the river. The Watermaster monitors basin recharge and withdrawal and procures water from outside the basin to make up deficits; this is to ensure that water levels in the basin do not decline. The total flow in the river is the sum of baseflow and discharge from the Shay Road plant. By maintaining the groundwater levels in the basin and sub-basins, which sustains the baseflow, and by maintaining the minimum discharge obligations of VVWRA's Shay Road plant, per the MOU, MWA ensures that the total flow in the Mojave River in the Transition Zone is sustained above the minimum flow needed to sustain the riparian habitat per the judgment in the adjudication case.

This minimum flow would be informed by the collection and analysis of watershed data and devising a correlation between groundwater elevation and the health of the habitat. Staff could revise the conditions of certification to require monitoring of the riparian corridor to ensure the estimated discharge and water levels needed to maintain the riparian corridor are effective. This could be accomplished by requiring the owner to work with MWA to obtain the necessary reports and demonstrate compliance. If changes due to project activities are exacerbating impacts, then Petitioner could be required to collaborate with MWA to take necessary actions to mitigate impacts.

D. Water Quality - In the 2000 HDPP Decision, the Commission required water treatment prior to injection of SWP water for banking. Although HDPP described the use of reverse osmosis (along with rapid mixing, adsorption clarifier with granulated activated carbon, and mixed media filtration) as its water treatment method, it ultimately elected, post-certification, to use another method.

Q1. Would the use of reverse osmosis – or any other alternative treatment method – allow the Petitioner to inject more SWP water for banking?

Q2. Would injection without water treatment allow banking of additional water?

Q3. What are the adverse impacts to the environment or the local or regional water supply, if any, if untreated SWP water were percolated into the groundwater system?

Staff Responses:

A1. No, staff concludes that more water treatment equipment or processes would not increase SWP water injection banking. Since only four of the original seven wells in the "bank area" are operating, it is unlikely that more water could be injection banked, even if more water treatment equipment or processes would increase SWP water throughput and process reliability. Further, HDPP cannot bank by injection and withdraw from the injection bank simultaneously, meaning that the logistics of injection, recovery, and process water blending for HDPP operational needs would limit injection banking to levels that are already being achieved. In addition, Petitioner is currently treating injection water based on the requirements of the RWQCB that injection activities should cause no net degradation in water quality compared to native groundwater. These water quality requirements limit Petitioner's options.

A2. Direct injection to the Alto sub-basin aquifer of SWP water without treatment would not be allowed because of the risk of introducing contaminants into the groundwater (See Subsection D, Staff Response A3 below). Direct injection of untreated SWP water has the potential to introduce contaminants to the higher-quality groundwater. One such contaminant is trihalomethane (THM), which is carcinogenic. THM is a disinfection by-product of chlorine treatment. This method of disinfection was previously used for injection at HDPP. Since the THM levels were too high after treatment of SWP, Petitioner was required to use Ultraviolet radiation treatment to eliminate this contaminant. The risk of contamination such as this is eliminated if the water is percolated because of the additional filtration effect of the sand, and the residence time, as the water flows through to the water table. The same is true for nitrogen emanating from septic tank wastewater in the region (Umari et al. 1995).

A3. Percolation of SWP will not have discernible impacts on the water quality of the Alto sub-basin or basin aquifers. MWA has a well-developed groundwater recharge program which focuses on infiltration of SWP water at locations throughout the watershed. This recharge program is used to maintain the local water supply and ensure compliance with the requirements of the adjudication. MWA conducts these activities in accordance with applicable LORS and would not be allowed to recharge groundwater through infiltration of SWP if there were significant impacts to water quality. In some areas where there is poor

groundwater quality the effects of recharge could actually enhance groundwater water quality.

Staff notes that groundwater in the basin has been contaminated with agricultural, military, and industrial land uses (State Water Quality Control Board 2016). For example, there have been approximately 150 documented releases of petroleum products from underground storage tanks in the watershed that have not been fully investigated and/or remediated. Approximately 40 of these releases are known to have impacted ground water quality. Chemicals released during these events included benzene, toluene, xylenes, ethylbenzene, and methyl-t-butyl ether (MTBE). Recharge by infiltration could help mitigate these impacts in some areas.

Also as pointed out by staff in past analysis, consumptive use of recycled water by the HDPP would eliminate discharge of water that is significantly degraded. This would therefore serve to protect existing water quality. The Mojave River has been selected as a priority or "focus" watershed because of numerous water quality and quantity issues. In general, no adverse impacts are expected with percolation of untreated SWP water into the groundwater system, as the water reaching the aquifer is expected to be similar to or better in quality than the native groundwater

E. Reliability - In addressing the Petition (and amendment to be filed), an additional criterion to consider is the contribution HDPP makes to electrical reliability. As set forth in the Interim Relief Decision, HDPP has been identified as a potential source of electrical generation in the event that the issues surrounding the curtailment of natural gas deliveries from the Aliso Canyon natural-gas storage facility cause a reduction in power production in the Los Angeles basin.

Q1. What witnesses or other evidence on HDPP's role in supporting reliability are needed?

Staff Response:

A1. The California Independent System Operator (California ISO) is best positioned to determine whether the unavailability of capacity at HDPP would leave the CA ISO unable to meet reliability standards imposed by the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC), and how the potential curtailment of natural gas deliveries from the Aliso Canyon facility would affect that conclusion. Given that the California ISO has issued restricted maintenance orders for generators in Southern California on several occasions during the summer of 2016 due to the joint possibility of high loads and power plant unavailability, and its impact on capacity sufficiency/reserve margins, it is reasonable to assume that the 830-MW HDPP facility would be deemed critical to reliability by the CA ISO.

Staff agrees that a project might be required to run in response to an event (e.g., wildfires, local fuel curtailments). This is true for almost every power plant in the

state. Staff still differentiates between being available to run when called upon in such events, and Petitioner's implications that the HDPP now has to operate continuously for the entire year. Most events and contingencies are temporary, or the daily or seasonal demand and supply swings return the grid system to equilibrium, resolving the temporary requirement that a project operate. Aliso Canyon will have real effects on many power plants throughout Southern California, however, there is no possibility that HDPP will operate all 8760 hours in the coming year. Therefore, actual water use is more likely to be similar to past years, or even less since the project is likely to operate less as more renewable generation is added to the grid.

REFERENCES

CEC 2016 -- MOU between California Department of Fish and Game and the Victor Valley Wastewater Reclamation Authority, June 27, 2003 (TN 210503).

Murray, Nancee. California Department of Fish and Wildlife letter to High Desert Amendments Committee, Answers to Question 1(a) and 1(b). February 29, 2016.

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