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State Of California **Natural Resources Agency**

Memorandum

Date: March 1, 2016
Telephone: (916) 653-4677
File: 97-AFC-1C

To: **Commissioner Karen Douglas J.D.**, High Desert Power Project Amendment Presiding Member
Commissioner Janea A. Scott J.D., High Desert Power Project Amendment Associate Member
Susan Cochran, Hearing Officer

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Subject: **High Desert Power Project Amendment HDPP (97-AFC-1C)**
ANSWERS TO COMMITTEE QUESTIONS

Staff hereby files its answers to the Committee questions as ordered in the February 19, 2016 Notice of Postponed Prehearing Conference and Evidentiary Hearing.

STATE OF CALIFORNIA

ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

IN THE MATTER OF:) DOCKET NO. 97-AFC-1C

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HIGH DESERT POWER PROJECT, LLC)

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Staff Responses to Committee Questions for Parties in All Parties and Persons Interested in the High Desert Power Plant (97-AFC-01C) Amendments Proceeding, dated February 16, 2016, TN# 210315

1. *In the 2000 Final Decision, emphasis was placed on not allowing the project to use groundwater from the adjudicated basin because of impacts to sensitive habitat and threatened/endangered species reliant on that habitat. With the passage of time, and particularly the last four years of drought conditions:*

    a. *What is the status of the identified habitat?*

A 2003 Memorandum of Understanding (MOU) between California Department of Fish and Game (CDFG, now Fish and Wildlife or CDFW) and Victor Valley Wastewater Reclamation Authority (VVWRA) dedicates a portion of the local recycled water to the Mojave River and associated habitat. The Energy Commission is not a party to the MOU (TN 210503), and cannot directly answer the question.

    b. *Are the threatened/endangered species (i) still in the region and (ii) still listed as threatened or endangered?*

The Energy Commission is not a party to the MOU, and cannot directly answer the question. Further assessment of the status of the habitat affected by the MOU and whether there are still threatened species in the area or still listed may be best answered by parties to the MOU – VVWRA and CDFW.

2. *Please provide the following information regarding water usage. For each, also provide actual usage and the source of water used:*
    a. *Peak flow demand*
    b. *Monthly flow demand*
    c. *Update "Table 1. Historical Water Usage for the Facility," found at .pdf page 59 of the Petition for Modification (TN 206468), to include data for 2015.*

The project owner can provide these numbers and update their table. Staff has relied on their reporting of earlier water use, as the Quarterly Fuels and Energy Reports (QFER) water use data reporting did not start until 2007. Also, QFER reports do not include Peak Flow Demand.

3. *Regarding plant operations:*
   a. *Provide the number of starts and operation duration per month for each year of plant operation.*

The project owner can provide these numbers and update their table.

   b. *Describe any critical needs that the plant satisfies (e.g., grid support).*

Criticality of the plant is determined by the California Independent System Operator (CAISO) and the Owner. Staff cannot answer this question directly but does offer the following analysis also provided in response to the project owner's claim related to the critical need for the facility (TN 210303).

"The project owner claims HDPP could replace lost generation from San Onofre Nuclear Generating Station. There is a significant distinction between 'must take' (SONGS) and market dispatched (HDPP). SONGS operated at full output 24/7, generally achieving an annual capacity factor of over 90 percent, while HDPP dispatches at about 50 percent annual capacity factor based on its ability to bid into the market (see table below).

HDPP Annual Generation and Water Use for Generation

Year	MWh	GWh	MW	c.f.	Water AFY	AF/GWh
2015	3542240	3542	854.9	47.3%	2,824	0.7972
2014	3894245	3894	854.9	52.0%	2,992	0.7683
2013	4458044	4458	854.9	59.5%	3,283	0.7364
2012	4889960	4890	854.9	65.3%	3,412	0.6978
2011	1867836	1868	854.9	24.9%	1,280	0.6853
2010	3279549	3280	854.9	43.8%	2,359	0.7193
2009	4163511	4164	854.9	55.6%	2,748	0.6600
2008	4618727	4619	854.9	61.7%	3,378	0.7314
2007	4441277	4441	854.9	59.3%	2,831	0.6374
2006	3926681	3927	854.9	52.4%	2,508	0.6387
2005	3656112	3656	854.9	48.8%	2,935	0.8028
2004	3785083	3785	854.9	50.5%	2,935	0.7754
2003	2318686	2319	854.9	31.0%	---	---
Annual Avg	3,757,073	3,757	---	50.2%	2,790	0.7208

Source TN 206468 and Energy Commission Quarterly Fuels and Energy Reports (QFER) data

The SONGS outages to replace the steam generators occurred in 2009 to 2010 (Unit 2), and again in 2010 to 2011 (Unit 3). Both units were subsequently taken offline and retired in January 2012. As shown above, SONGS operation/non-operation and HDPP operations are not truly linked, with one of HDPP's lowest annual output years occurring

in 2011 when SONGS Unit 3 was offline for steam generator replacement. The data does show that in 2012 HDPP had it highest capacity factor, but capacity factors have since returned to its annual average of about 50 percent, which was the norm before SONGS retired.

Another comparison, equally inconclusive on how HDPP would operate, is that HDPP is about 0.30 percent of installed Western Electricity Coordinating Council (WECC) generation capacity of 284,300 MW, and provides about 0.43 percent of the WECC GWhs (WECC 2015). The true measure of how HDPP will operate going forward can only be based on past performance and the technology employed. Staff sees no reason to assume HDPP annual dispatch, and therefore annual water use, would increase from past averages. Staff expects HDPP's annual capacity factor to decline as California moves forward to 33% and then 50% Renewable Portfolio Standard (RPS). Additionally, power plants move down the dispatch curve as plant performance degrades with age. For example, many combined cycle projects are undertaking Advanced Hot Gas Path Upgrades to retain their competitiveness in the California high renewables generation market, as shown in the table below for a recent California combined cycle upgrade. Note the huge jump in ramp rates, as well as output and efficiency improvements. Unless HDPP undertakes these, and similar upgrades to improve their water supply reliability, it would seem that their competiveness will diminish, resulting in ever declining annual dispatch, and ever declining water needs.

Advanced Hot Gas Path Upgrade

	Performance at Certification	Post Upgrade Performance
CT-A Gross MW	166.7	177.1
CT-B Gross MW	166.7	177.1
ST Gross MW	209.2	212.4
Total Gross MW per Unit	542.6	566.6
Minimum Auxiliary Load per Unit	14.6	14.6
Net MW per Unit	528.0	552.0
Ramp Rate per Unit (Single CT plus ST)	16 MW/min	30 MW/min
Ramp Rate per Unit (Two CT plus ST)	22 MW/min	60 MW/min
Heat Rate Improvement		1.10%

Source: TN 207273"

The project owner's testimony also states that HDPP provides valuable local jobs and economic benefits, tax revenue, and support from elected officials. Staff does not disagree with petitioner's assertions, but cannot find any reason why these benefits cannot continue with the use of recycled water. Use of the cheaper recycled water will provide the City of Victorville (CVV) a revenue stream that can be used to develop and maintain their recycled water program and possibly even become leverage for the extension of recycled water use throughout the region. This could provide even greater benefits than using the out-of-basin State Water Project (SWP) water supply that is more expensive and generates little revenue for there to be a direct local benefit. The benefits of recycled water are even greater when it is taken into consideration that the current strain on the SWP and MRB would be relieved.

4. Regarding the use of reclaimed/recycled water from the City of Victorville (CVV):

a. Initial concerns regarding the amount of water available to the High Desert Power Plant (HDPP) were based on the Victorville 2 power plant having priority rights. What is the status of Victorville2? Does the CVV have sufficient reclaimed water to satisfy the needs of both HDPP and Victorville 2?

In July 2008, the Victorville 2 Hybrid Power project (VV2) was approved by the Energy Commission (TN 47152) to use up to 3,150 acre feet a year (AFY) of recycled water in accordance with the MOU. In August 2008, the High Desert Power Project (HDPP) determined that additional surplus recycled water was available above that required in the MOU and in the VV2 Decision, and filed a petition to amend to use local recycled water for its process water needs. The petition was approved (2009 HDPP Order, TN 54277), with a requirement that the project conduct a feasibility study to evaluate using 100% recycled water.

Table 1- Wastewater Volume and Use – 2008 Data

Total VVWRA Effluent (AF) Secondary and Tertiary Treated	Required Waste Water Discharge (AF) per	VV2 Projected Tertiary Treated	Westwinds Golf Course Tertiary Treated	Waste Water Available for Other
13,776	9,677	3,150	352	597

Source TN 53411 - Revised Staff Analysis of Proposed Modifications to Remove the Prohibition of the use of Recycled Water for Project Operations, September 24, 2009.

In 2013, the VV2 project was granted a 5-year extension by the Energy Commission, which expires in 2018 (TN 71362). Since the extension was granted, the VV2 project has not secured a PPA or financing, or initiated construction. In addition, the Westwinds Golf Course that once used recycled water from VVWRA closed on or about 2011. Recycled water surplus to the MOU and available to HDPP could exceed 4,000 AFY.

Staff believes that VV2 is unlikely to be built and compete for recycled water. This assessment is based on the following factors:

- Lack of investors: Since the license was issued, CVV, the VV2 license owner, has attempted to sell it but has been unsuccessful;
- VV2 is not in a California ISO-designated local reliability area; an area in which threshold amounts of dispatchable generation capacity are necessary to meet system reliability standards.
- The operating characteristics of the VV2, designed years ago, may or may not be suitable for the California high renewables electricity market;
- It could pursue an amendment, like Palmdale and Blythe II/Sonoran amendment proceedings at the Energy Commission, but this is not certain to arrive at a positive outcome or a project design that can secure a power purchase agreement; and
- It has not secured a power purchase agreement with a utility, or financing.

Staff concludes the recycled water supply is available and can be used for HDPP operation, based on CVV and VVWRA's commitment to provide a long term supply of recycled water in the maximum amounts necessary. Additionally, staff bases this on the existing contract between Victorville Water District (VWD, an agency of the CVV) and HDPP to deliver recycled water in the maximum amounts necessary, and VWD's willingness to make treatment plant modifications to maximize recycled water delivery.

The MOU provides not less than 9,000 AFY plus "not less than twenty percent (20%)" of increases that occur from regional growth of sanitary wastewater be discharged to the river to preserve and protect the riparian vegetation and dependent species. Staff understands through coordination with VVWRA that they have been complying with the MOU. All wastewater discharges to the Mojave River are also measured and reported in annual reports to the Mojave Water Agency. The recycled water available to HDPP or VV2 would be those amounts available after the MOU requirements are met.

b. What is the volume of reclaimed water available from the treatment plant on both a peak demand and average demand day for flows to operate HDPP? How do

the availability volume and demand volumes compare on a peak and on an average day?

Staff does not have information on the design peak output from the treatment plant. Currently, VVWRA treats about 13 million gallons a day of wastewater, or at an average rate of about 9,000 gallons per minute and over 14,500 AFY. Therefore, treatment plant recycled water in excess of the requirements of the MOU is available to customers such as HDPP. The MOU does not require that recycled water diversion rates be consistent down to the gpm level, only that the daily and annual diversions be met. Therefore, the treatment plant can direct all recycled water (e,g,. 9,000 gpm) to the HDPP during a HDPP peak demand, and then "true up" with river later in the day or year.

A limitation on the flow rate from the treatment plant to the project is the recycled water pumping capacity, as discussed in staff's response to the project owner's feasibility study report (TN 206321). A pump test that was conducted by the treatment plant and the CVV demonstrated that the pumping and pipeline capacity available at the treatment plant exceeds the 4,000 gpm peak demand of HDPP. However, if we assume, as estimated by the project owner, that the maximum combined pumping capacity of the two pumps from the treatment plant is 2,800 gpm, the 1.6 million gallon stand-by storage can supplement that rate by 1,200 gpm, by gravity feed, for up to 22 hours to meet peak project water demand.

Recycled Water Delivery Rates to HDPP (gpm)

	Staff's Analysis	Alternative - HDPP delivery assumptions
	(gpm)	(gpm)
Pump 1	2,400	2,800 [a]
Pump 2	2,400	-- [a]
From storage	NA [d]	1,200 [b]
Total deliverable	4,800	4,000
Redundant 3rd pump	2,400	NA [c]

Notes:

a) Assuming the combined delivery capacity of the two pumps and pipeline is 2,800 gpm as HDPP owner claims..
b) Existing storage available to HDPP (ROC dated 10/9/2015, TN 206321). At 1.6 million gallons, the storage could deliver 1,200 gpm, by gravity - no pump needed, for up to 22 hours. Storage can be filled during offline or reduced operation hours.
c) Project owner has not indicated that they are aware that the City is planning on adding a third pump for redundancy.
d) Staff believes the pumps are adequate to delivery recycled water needed without use of stored water.

c. What is the constituent load of the reclaimed water from the treatment plant?

Reclaimed water from VVWRA contains TDS and silica in concentrations that are generally within the limits (450 mg/l and 40 mg/l for TDS and silica, respectively) specified by the contractual agreement between HDPP and VWD.

d. What upgrades might be necessary (pre-treatment, storage, post-use disposal) at HDPP to accommodate usage of additional reclaimed water from CVV?

Upgrades necessary include pre-treatment of the recycled water to remove constituents that add a load to the zero liquid discharge (ZLD) microfilters. Additional stand-by storage at the HDPP site would also be a good addition so that the recycled water can be delivered directly to the HDPP and eliminate the need to send it to the elevated tank located about half a mile away from the power project. This would also save the costs of pumping the reclaimed water to the tank.

5. The recent records of conversation among Energy Commission Staff, Mojave Water Agency (MWA), and CVV indicate that MWA may not have water available for HDPP, particularly over the long term.

a. What mechanism could be used to ensure the availability of water from MWA?

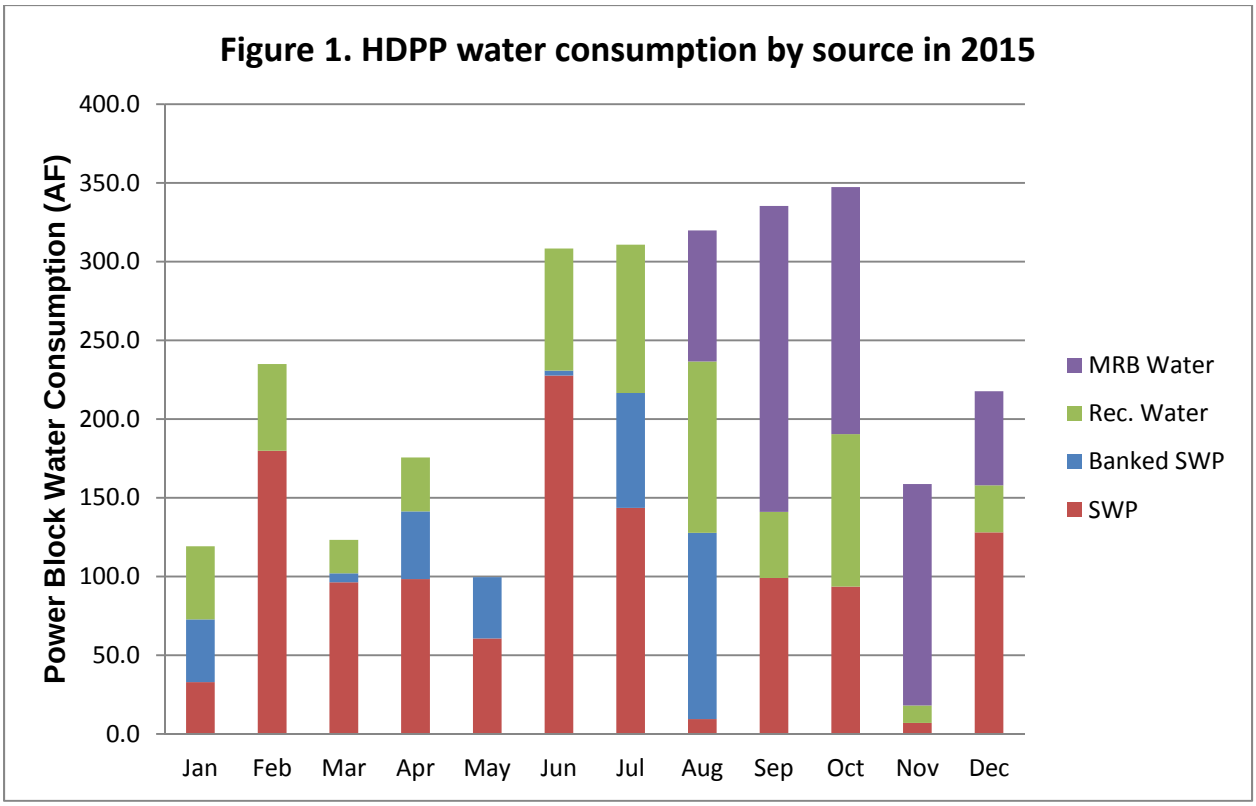
As discussed in staff's opening testimony, HDPP could develop a backup supply by requesting water from the SWP for banking by percolation through MWA.

b. For the last two years, HDPP has had the ability to use water from the adjudicated basin overseen by MWA. How much such water has been actually used? From what source was that water acquired?

It has been 18 months since the Energy Commission adopted an Order approving temporary use of up to 2,000 AF of adjudicated MRB water per water year 2014/15 and water year 2015/16[1]. The project did not start using the adjudicated MRB groundwater until August 2015. According to monthly reports on the water use from the project owner, the project used about 635 AF of MRB water from August 2015 through December 2015 (see Figure 1). Note that SWP in Figure 1 is that water consumed at the site in that month. In some months, total SWP quantities in other tables and figures in this PTA record include SWP water amounts that include both the SWP consumed at the project and that which HDPP treated and banked. Staff has not found any curtailments of recycled water in late 2015, so it is not clear why the project owner was not following the loading order being touted in the PTA as mechanism to use the most of the cheapest water.

Figure 1 also shows the monthly HDPP water sources and the total monthly water use (or a representation of total plant operations). As expected for a California generator, HDPP operates more in the air conditioning season months. The offseason high water use months are likely when HDPP fills behind other generation resources, both in state and out of state, that generally have major and minor scheduled outages in the winter and spring months to ensure their availability in the coming air conditioning season.

[1] California water year runs from October 1 to September 30.



c. Does HDPP's banking agreement with MWA allow HDPP to bank water from source other than the State Water Project?

HDPP does not currently have a banking agreement with MWA. The agreement for the permitted injection banking operation is between the project owner and VWD. The injection bank is used to inject SWP water purchased by HDPP when it is available, for storage and later, unrestricted use by HDPP. However, the water for injection into the storage bank wells has to meet certain water quality criteria that require treatment at the HDPP site prior to injection.

Staff is recommending that the project owner enter into an agreement with CVV and MWA to store or bank groundwater without using the currently permitted pre-treatment and injection bank. This could save the project owner operational costs they could use to transition to recycled water use (See staff's rebuttal testimony; TN 210303 at page 8). Staff does not recommend that the project be allowed to use groundwater from the adjudicated MRB as backup, but rather banked SWP water purchased by HDPP and banked by MWA. Use of MRB groundwater could result in significant impacts to the adjudicated MRB. Staff also recommends that even with SWP water use as a backup supply, the project owner should be required to offset potential impacts through a water conservation offset program in order to reduce demand on the SWP and the Sacramento-San Joaquin Delta. As shown in staff's opening testimony (TN 210083), continued use of SWP is not consistent with Energy Commission water policy where there is a feasible alternative supply of recycled water available.