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STATE OF CALIFORNIA

ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

In the Matter of:	)	**Docket No. 97-AFC-1C**
	)	
High Desert Power Project, LLC	)	
	)	
	)	

ENERGY COMMISSION STAFF'S REBUTTAL TESTIMONY

Staff received the petitioner's written testimony, filed on January 29, 2016 (HDPP 2016). Based on a review of the petitioner's testimony, staff's rebuttal is necessary to respond to issues first raised in applicant's opening testimony, and is evidence upon which the Committee can base its decision.

Several contested issues remain in the one technical area at issue in this petition, Soil and Water Resources. Staff's docketed testimony regarding Soil and Water Resources (CEC 2016) addresses the petition to drought proof the High Desert Power Project, LLC (HDPP) and is supported by declarations attached here. At the time of this filing, no testimony or rebuttal has been filed by Intervenors. Staff has new evidence to introduce in its rebuttal testimony to respond to petitioner's opening testimony which will supplement the record, and reserves the right to submit additional evidence at such time as it becomes necessary.

The following staff witnesses are identified and their declarations and statements of qualification are attached here to sponsor opening and rebuttal testimony to the issues raised in petitioner's opening testimony: Soil and Water Resources – Abdel-Karim Abulaban, Associate Civil Engineer; Matthew Layton, Supervising Mechanical Engineer; Paul Marshall, Senior Engineering Geologist.

The positions and arguments of both staff and applicant have been set forth and are ready to proceed to hearing. Staff does not agree with the petitioner's position in the technical area listed above for the reasons already set forth in staff's opening testimony and other filed documents, and will present arguments at the evidentiary hearing.

DATED: February 12, 2016 Staff's Testimony Respectfully Submitted,

Original signed by
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STAFF'S REBUTTAL TESTIMONY

Staff's rebuttal testimony comprises responses, figures, and changes to conditions of certification. Changes to the conditions of certification appear in single ~~strikethrough~~, with the new text **bold and underlined**. Staff's rebuttal is organized to follow the outline of the project owner's testimony, which is identified by quotations and italics.

SOIL & WATER RESOURCES

Rebuttal Testimony of Abdel-Karim Abulaban, Matthew Layton, and Paul Marshall

HDPP'S OPENING TESTIMONY: EXECUTIVE SUMMARY

Comment: In the Executive Summary of petitioner's opening testimony the project owner asserts:

> "*In furtherance of the Commission's directive, the petition sets forth a water supply strategy that both: (a) maximizes the Facility's use of recycled water ("Recycled Water"), and (b) provides HDPP with continued access to other water supply sources that must be blended with available Recycled Water to drought-proof the Facility as described below*." (P. 1-2).

Staff's Rebuttal: Staff disagrees that the petition sets forth a water supply strategy to maximize the use of available recycled water to drought proof the facility. The petition and opening testimony propose the use of recycled water when HDPP deems suitable, and would allow the use of freshwater up to the 4,000 AFY maximum needed for project operation. The project owner does not propose any expansion or plant modification of the facility to maximize the use of

recycled water. The only way to drought proof the project is to maximize and make permanent the use of recycled water with freshwater only as a backup.

With regards to other water supplies, the project owner's petition proposes continued access to freshwater supplied from the State Water Project (SWP) while adding and expanding access to groundwater from the adjudicated Mojave River Basin (MRB) on a permanent basis. HDPP's reliance on groundwater from a basin that must be managed through adjudication because of past overdraft and ongoing concern for new firm demands that would exacerbate impacts, such as what the project owner proposed in this petition, is neither prudent nor drought-proofing the facility.

Comment: In the Executive Summary of petitioner's opening testimony the project owner states that:

> "*In reviewing this Testimony and the relief requested, it will be vitally important for the Commissioners to distinguish between two divergent concepts:*
>
> *1. How the Facility will likely operate and use its various water supplies.*
> *--Versus--*
> *2. The "Reliability Envelope" or the permitting flexibility HDPP needs to operate this merchant Facility in California's competitive marketplace.*" (P. 2).

Staff's Rebuttal: Staff does not agree with the project owner's testimony that distinguishing how the facility will operate using various water supplies is

divergent, or somehow incompatible, with having reliable water supplies for this facility to operate. As discussed above, the project owner's proposal does not limit how much freshwater the project could use for maximum operation. Staff agrees that the question of how the project is likely to operate is a relevant one. Staff disagrees with petitioner's opening testimony concerning what they've named the "Reliability Envelope", which is explained to mean permitting flexibility. Staff understands the "reliability envelope" refers to the boundaries within which the project owner feels most comfortable. Having ongoing access to SWP water, including banked SWP water, means that HDPP could continue to use a maximum amount of freshwater as the preferred source (SWP, banked SWP, and MRB adjudicated water), leaving no way for staff to verify a minimum or maximum use of recycled water at the facility.

HDPP's testimony about the "Reliability Envelope" presents the Committee with a false proposition – that the Energy Commission must assure the project owner's marketplace competitiveness, or the project will be forsaken with no other options. Staff submits that it is feasible for the project to transition to 100 percent recycled water use, which is the surest way to make the facility drought resistant. The project owner provided confidential financial data for staff review, but after thorough consideration it is still not clear to staff if or how the cost of conversion would impact the project reliability or operation. As discussed in staff's opening testimony, use of recycled water is not only feasible, but also essential, given recent cases where the Commissioners have required that

alternative water supplies and technologies be used consistent with the State's water policy.

Comment: In its testimony about the "Reliability Envelope" the project owner reiterated the reasons the project could not be switched to 100 percent recycled water by siting to the HDPP Recycled Water Feasibility Study and stated that:

> "*As explained in detail in this Opening Testimony, the HDPP Recycled Water Feasibility Study concluded that it is not feasible for the Facility to operate using 100% Recycled Water for cooling and other industrial purposes because HDPP's Recycled Water supplier is projected to not have the Recycled Water supplies required to meet the Facility's 4,000 acre-feet per year ("AFY") and 4,000 gallons per minute ("gpm") instantaneous water needs.*" (P.2-3).

Staff's Rebuttal: Staff does not agree with HDPP's testimony concerning the facility's 4,000 acre-feet per year (AFY) and 4,000 gallons per minute (gpm) water needs. As stated in staff's response to the HDPP Recycled Water Feasibility Study (Feasibility Study) (CEC 2015b), the facility has never reached the 4,000 AFY consumption since it came online. The most water the project has used is less than 3,500 AFY, with an average of about 2,800 AFY. The project owner has not demonstrated that it will ever operate at a higher capacity factor than it has ever operated. In fact, the project owner stated that it expects to operate less in the future as more renewable generation comes online as the state makes steady progress to the 50% Renewable Portfolio Standard (RPS).

Staff's analysis of HDPP's Feasibility Study also considered that the City of Victorville and the Victor Valley Wastewater Reclamation Authority (VVWRA) Shay Road Treatment Plant conducted a pump test to assess if recycled water could be delivered from the treatment plant to the facility directly, without going to the elevated tank. The pump test showed that the two pumps at the treatment plant are capable of pumping more than the maximum rate the project needs at pressures below what the pipeline is rated for (160 psi). The test also showed that the pipeline could withstand the pressures needed to deliver at that rate if needed (CEC 2015a, TN# 206295).

In its response to staff's analysis of HDPP's Feasibility Study, submitted on October 9, 2015 (HDPP 2015a), the project owner stated that the maximum pumping rate possible from the VVWRA plant was 2,800 gpm.

Even using the project owner's claimed maximum possible rate of 2,800 gpm, the remaining flow can be supplemented with water in the 1 million gallon elevated tank. To supply the additional 1,200 gpm, the storage in the tank can last the project for 13 hours. Additionally, the project owner neglected the storage in the 600,000 gallon pool next to the elevated tank, which is used as a staging storage to pump the water to the elevated tank. Figuring in the storage of the pool, the total stand-by storage adds up to 1.6 million gallons, enough to supplement the directly delivered flow to the project for almost 21 hours. A project's peak demand flow rate normally does not last for 21 hours, almost a whole day. Normally, peak demands occur as sporadic spikes in a smoothly varying trend

line that hovers around an average value. If maximum demand lasts longer than just a few occasional spikes in the trend line, there would be a larger fraction of higher flow rates. average rate would be shifted towards the maximum. A larger fraction of higher flow rates would result in a higher average closer to the maximum.

Comment: HDPP's Executive Summary testimony reiterates that the petition seeks an allowance for percolating water into the basin as an additional method to build the facility's groundwater bank.

> *"HDPP also proposes in this Petition to allow for the possibility of percolating water into the Basin as an additional method to build the Facility's groundwater bank. Authorizing HDPP to increase its banked groundwater supply through the percolation of SWP Water by MWA using existing MWA facilities will provide an additional mechanism to help drought-proof the Facility. HDPP proposes to work with MWA to seek an agreement that allows HDPP to bank SWP water in the MRB via percolation using existing MWA facilities."* (P. 4)

Staff's Rebuttal: As discussed in staff's opening testimony (CEC 2016b), staff is in favor of the project owner banking the water by percolation into the basin through MWA. However, the project owner is requesting that it be allowed to do this in addition to the current injection bank that the project owner has been using. Consistent with staff's opening testimony, if the project owner banked by percolation instead of the injection bank the project would be benefitted in several ways.

First, currently the project can only treat and inject water into the bank when the project is operating to accept the waste stream from the treatment. The new banking option allows the project to bank any time SWP water is available, and regardless of HDPP operating status. Second, it would save the project owner the cost of treating the water for injection. Third, the project water supplies would not include the waste stream from banking pre-treatment, thus avoiding the resulting TDS added to the process water. So project water treatment, as currently configured, could treat and increase use of recycled water and its inherent constituents. This could result in little to no freshwater being used to blend with the recycled water to get a blend suitable for the project's cooling tower and Zero Liquid Discharge (ZLD). In other words, the elimination of the injection banking would eliminate the brine stream that goes from the treatment system to the cooling tower and eventually to the ZLD system, thereby reducing the load on the ZLD system. And lastly, the treatment capacity (equipment, etc.) that was dedicated to treating the SWP water for injection would become available to be re-purposed to treat power plant water (e.g., recycled water) so that even more recycled water can be used. And, banked ground water would be available as backup, giving the project the reliability and drought proofing that HDPP is seeking.

Comment: The petitioner's testimony compares the HDPP with the San Onofre Nuclear Generating Station (SONGS):

"By way of comparison, the Facility's capacity is approximately 37% of the capacity of the now retired San Onofre Nuclear Generating Station. With its high capacity factor, the Facility is a flexible, dynamic baseload generating that provides grid reliability and allows for the smooth integration of intermittent renewable resources". (P. 4)

Staff's Rebuttal: Staff agrees that HDPP is about 37 percent of the nameplate capacity of SONGS. However, project owner's testimony about SONGS does not demonstrate that HDPP could replace SONGS in form or function – with 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 use 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%	---	---
ANN AVG	**3,757,073**	**3757**	**---**	**50.2%**	**2790**	**0.7208**

Source: HDPP 2015 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 shows 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% 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: SCE 2016

Comment: The petitioner's Executive Summary makes the assertion that HDPP is a key resource in California's generation capacity. The project owner's testimony states that HDPP provides valuable local jobs and economic benefits, tax revenue, and support from elected officials (P. 4)

Staff's Rebuttal: Staff does not disagree with petitioner's assertions, but does not find any reason why these would not continue with the use of recycled water. Use of the less expensive 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 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.

Comment: The petitioner's testimony articulates the need for appropriate checks and balances to drought-proof HDPP and asserts the following in its Executive Summary:

> "*The proposed modifications are required to drought-proof the Facility. No new infrastructure is required for the requested modifications. No new water supplies are required. All that is required is a sufficiently flexible Reliability Envelope, with appropriate checks and balances, that will drought-proof the Facility consistent with Energy Commission policy and with no adverse consequences to the environment. The proposed modifications are required to drought-proof the Facility. No new infrastructure is required for the requested modifications. No new water supplies are required. All that is required is a sufficiently flexible Reliability Envelope, with appropriate checks and balances, that will drought-proof the Facility consistent with Energy Commission policy and with no adverse consequences to the environment."* (P. 4).

Staff's Rebuttal: Staff disagrees with HDPP's testimony that the proposed petition would have no adverse consequences to the environment. All water supplies other than recycled water originate as SWP water, though stored and drawn from different places. The continued use of SWP water causes continued

stress on the Delta and the State's biological resources. What the project owner has proposed in the petition is more straws into the same source, which the project owner argues and staff agrees, is currently unreliable and likely to become more unreliable in the future. This proposal does not drought-proof the project. Whereas, recycled water is a steady and reliable source that will always be available to HDPP.

HISTORY OF HDPP'S PURSUIT OF RECYCLED WATER

Comment: The petitioner's testimony addresses HDPP's 2008 Petition for Modification to Use Reclaimed Water (HDPP 2008) at the facility, and the Commission's 2009 Order (CEC 2009) to allow HDPP to use as much recycled water as feasible to operate the facility given "current equipment capabilities and permit conditions." The petitioner's opening testimony further explains that the 2009 Decision noted that the portion of reclaimed water used by the facility will depend on the quantity and quality of reclaimed water available to the facility and the capacity for its ZLD system to process reclaimed water.

Staff's Rebuttal: Staff agrees that this is an accurate restatement of the 2009 Order. However, staff disagrees with petitioner's assertions that HDPP did not have access to a recycled water supply that was adequate in quantity and quality such that significantly more recycled water could have been used. After the 2009 Decision, HDPP was to commence using recycled water for feasibility testing.

After two extensions for the time period (2010 – 2013) to complete testing, the project owner only used 248 acre-feet. This was only enough water to have operated the plant for one month at the typical rate the project has used water. However, in 2014 the project used 192 AF in one month (August), which demonstrates that HDPP is currently capable of using up to 60 percent recycled water. Due to the severe drought in 2014, the project had no choice but to use as much recycled water as possible, and reported using 1,140 AF out of the 2,980 AF (almost 40 percent) used that year (HDPP 2015, GSI Table 2). From analyzing this data, staff believes that HDPP has little intention of maximizing its use of recycled water. This includes with the equipment currently installed at the facility.

With regards to quality of recycled water, the most important water quality parameters specified in the contract between HDPP and CVV are the total dissolved solids (TDS) and silica concentrations. The contract specifies 450 mg/l (or ppm) and 40 mg/l for TDS and silica concentrations, respectively, both on a three-day rolling average basis. While silica concentration is not monitored frequently for the recycled water, TDS is monitored continuously. As stated by the project owner in a separate Petition To Amend (TN # 202996) for water treatment equipment, TDS concentrations for the recycled water produced by the VVWRA plant were within specified limits. The few silica tests that were performed also showed the concentrations were within contractual limits (CEC 2015c, TN# 206296). Only recycled water from Industrial Waste Water Treatment

Plant (IWWTP) has slightly elevated TDS levels (but mostly less than 600 ppm), which is due to the industrial nature of the wastewater treated by IWWTP. However, IWWTP produces a fraction of the amount produced by VVWRA, and is used only in case the VVWRA plant is producing less than the project currently uses.

Staff acknowledges the VVWRA plant, which was and is the primary supplier, was undergoing upgrades in 2011 and 2012 and had periods where there were interruptions in supply. However, the project could have used significantly more recycled water yet opted to use SWP water that was also available at the time.

Comment: HDPP's testimony affirms its commitment to use as much recycled water as feasible for the operation of the facility and in accord with the Commission's 2014 Order (CEC 2014a).

Staff's Rebuttal: Staff disagrees that this petition proposes amendments that satisfy the requirements of the Commission's 2014 Order. The drought facing California is real, persistent, and likely the new norm – threatening its citizens and its critical industries. The Energy Commission's direction in the 2014 Order was to address the water delivery problems, present today, and likely for the future, with HDPP's primary water supply. The order required that "[t]he project owner shall submit a Petition to Amend (PTA) no later than November 1, 2015 that will implement reliable primary and backup HDPP water supplies that are

consistent with state water policies or an alternate cooling system like dry cooling." HDPP is located in the California high desert at the terminus of the east branch of the SWP aqueduct, which delivers state water to the local water agency that deliver it to HDPP. Water quantities can be curtailed, and there is the potential that deliveries can be interrupted.

Staff is recommending that the project transition to 100 percent recycled water – which is both available and reliable. In contrast, the project owner is requesting an unreliable supply of SWP water to be augmented by local groundwater that is being replaced – by unreliable SWP water. Staff recommends that this is not practical, and that this proposal in the petition does not satisfy the requirements and intent of the Commission's Order.

In addition to staff's disagreement with the petitioner's proposed maximum use of freshwater, the project owner has now raised a new issue in its opening testimony which staff also disagrees with concerning the facility's annual water needs. In its proposed amendments to condition of certification **SOIL&WATER-1**, HDPP seeks to have an increase in its total annual water supply up to 5,000 AFY for all water sources (HDPP 2016). Though staff has sought testimony from the project owner to demonstrate a commitment to limit freshwater use and maximize recycled water for cooling, their proposal seeks to have up to 3,090 AFY of MRB water. Historic records show that the project never operated at more than 65 percent capacity factor and its water consumption has been less than

3,500 AFY. Staff does not have any evidence of an engineering design basis for the requested increase up to 5,000 AFY. HDPP has never even used the current maximum of 4,000 AFY. HDPP has not demonstrated that the facility will operate for lengths of time that would necessitate 5,000 AFY of water.

Comment: Petitioner's testimony asserts that HDPP has worked diligently since 2008 to drought-proof the facility by diversifying its water supply sources, and cites to the Commission's original certification for its express prohibition from using recycled water.

Staff's Rebuttal: Staff agrees with the project owner's portrayal of the water supply issues that were addressed during the original licensing proceeding and after operation began. However, staff disagrees with HDPP's portrayal of the conditions that led the Commission to permit recycled water use. The Commission's Final Decision in May of 2000 (CEC 2000) was very clear why the Commission prohibited recycled water. The groundwater basin was undergoing adjudication, and the recycled water had preexisting claims. The 2000 Decision explained that by allowing the use of SWP there was a real potential for interruptions, which led to the requirement for a bank as backup. However, the project owner never filled the bank to levels that would allow the bank to carry the project through a drought.

When the project was certified, all parties acknowledged the risk of losing the project's primary water supply, SWP water, and hence the owner was required to store a 3-year water supply (of maximum annual use) in the groundwater bank, which the project owner failed to achieve. The project owner's unwillingness to build up the back-up water bank exacerbated its current predicament and places an unnecessary burden on California water users. This is most unfortunate now that the State has experienced four years of drought, but there were several years when surplus water was available and approval to deliver it to the project was granted (HDPP 2015, GSI Table 1).

Comment: HDPP cites to events that have occurred since the original facility certification, listed one through five in opening testimony and repeated here in the same sequence with staff's rebuttal.

1. *"Several major events have occurred since the original certification that made it possible for HDPP to voluntarily transition towards using Recycled Water. First, in August of 2000, three months after the Commission's certification of the facility, the California Supreme Court substantially affirmed the judgement of the Riverside County Superior Court adjudicating the water rights in the Basin and appointing MWA to act as Watermaster to implement the adjudication."* (P. 6).

Staff's Rebuttal: Staff agrees that at the time of licensing the MRB was undergoing adjudication and it was well know that the adjudication would result in limitations on the use of MRB groundwater due to overdraft impacts in the basin. HDPP's use of groundwater would have exacerbated impacts. It is true that MWA

has managed regional groundwater, and the Alto Subbasin where the project is located is operating within parameters set by adjudication. However, other parts of the MRB connected to the Alto Subbasin continue to be impacted. Any increased demand on the MRB could have basin wide impacts.

2. *"Second, by Memorandum of Understanding ("MOU") dated June 27, 2003 (more than three years after the Commission's Certification of the Facility), CDFG and the Victor Valley Wastewater Reclamation Authority ("VVWRA") agreed that VVWRA would continue to discharge at least 9,000 acre feet per year of recycled water to the Mojave River to protect instream resources, thus freeing surplus Recycled Water for other uses in the region."* (P. 6).

Staff's Rebuttal: Staff commends the project owner for pursuing recycled water use. This pursuit was driven by recycled water being a cost effective and dependable supply to supplement the facility's primary supply of SWP water. Staff recognized this and also realized that given the new availability of this alternative supply HDPP would benefit by conducting a feasibility study to transition to facility to 100 percent recycled water consistent with State and Energy Commission water policy. The Commission adopted the 2009 Order (CEC 2009) - requiring the project owner to conduct a feasibility study for the use of 100 percent recycled water.

3. *"Third, starting in 2007, water deliveries from the SWP have been dramatically reduced as a result of court decisions regarding the biological opinion issued to protect the Delta smelt in the Sacramento-San Joaquin Delta ("Delta Smelt Biological Opinion"). The SWP Water reductions have fundamentally altered the Facility's water supply plans. The reduction in pumping undermined the Commission's and*

HDPP's mutual understanding and belief that SWP Water would be available in sufficient quantities to allow the Facility to "bank" water many years in advance of need, thus assuring a dependable supply." (P. 6-7).

Staff's Rebuttal: Staff agrees that SWP deliveries have not been reliable and were curtailed during the drought. However, these facts do not undermine the Commission 2000 Decision because the Commission anticipated that there would be reduced SWP deliveries by requiring HDPP to bank for back up water storage. The issue of the vulnerability of the project's SWP supply was extensively discussed during the licensing proceedings for the project in 1999 and 2000, and the vulnerability of the facility's water supplies has been acknowledged by the project owners.

The Commission's Decision was reasonable when it foresaw the potential interruption of the project's primary water supply. The Commission addressed the risk of the interruption of the primary water supply (SWP) by requiring the project to develop a groundwater injection plan to bank a backup supply adequate to fully supply the project for up to 3 full-load years of operation. Had the project owner complied with the requirement of the original 2000 Decision and filled the water bank as required, the water bank would have lasted the project beyond the current drought period given current rates of water use (i.e., a capacity factor close to 50 percent). This would be the case even if there was no delivery of any water from the SWP or recycled water.

4. *"Fourth, HDPP and the Commission both shared the reasonable expectation that the local water supplies would improve their treatment and delivery systems to provide water of sufficient quality and quantity as needed for reliable operations."* (P.7).

Staff's Rebuttal: Staff was told by the City of Victorville (CVV) and VVWRA plant officials, as evidenced in the record of recycled water delivery included in several submittals by the project owner, the local water supplies have improved. For example, CVV installed a short pipeline that was needed to connect the pipeline from the VVWRA plant to the elevated tank at the facility used to deliver the recycled water to the project. Also, in conversations with the VVWRA plant's manager, Mr. Logan Olds, staff was informed about a major capital improvement project that was done in 2011, which resulted in the treatment plant stopping all deliveries of recycled water to the HDPP for about six months. VVWRA's improvement resulted in a substantial reduction in the frequency of interruptions for delivery of recycled water to HDPP (CEC 2015b).

In 2012, the VVWRA plant also installed an ultraviolet system to disinfect its effluent so that it would be more suitable for use at the HDPP (personal communication with Gilbert Perez, VVWRA, February 12, 2016). In addition, there was an improvement in the diversion of 1.2 million gallons per day of domestic wastewater from the VVWRA plant to the IWWTP starting in February 2015 (CEC 2016), which resulted in a reduction of the TDS in the effluent from IWWTP to 450 ppm or less, which meets contractual limits accepted by HDPP. Lastly, as mentioned in staff's initial testimony, CVV has been working with the

primary discharger of industrial wastewater to IWWTP, which is a Dr. Pepper/Snapple juice plant, to implement pretreatment measures to reduce TDS levels in wastewater from that discharger to levels that can be suitable for HDPP's use after it is treated by the IWWTP.

In addition, CVV and VVWRA conducted a pump test at the Shay Road plant demonstrating that the two pumps at the treatment plant are capable of pumping more than the maximum rate the project needs at pressures below what the pipeline is rated for (160 psi). The test also showed that the pipeline could withstand the pressures needed to deliver at the maximum rate if needed.
As stated in staff's review of the feasibility report (CEC 2015b), there is recycled water of sufficient quantity and quality for project use.

5. *"Fifth, the current drought has simply been more prolonged and more severe than any reasonable person would have anticipated in 2000 when the Facility was originally certified."* (P.7).

Staff's Rebuttal: The current drought is exactly what was anticipated when the bank was required as part of the project certification. The amount of water the project was required to store in the bank, combined with the reduced deliveries from the SWP, would have been more than enough to last the project for the full duration of the current drought. This would have been true in spite of the drought being longer than the longest drought on the record when the project was certified, given the HDPP does not operate anywhere near 100 percent capacity on an annual basis.

Comment: Petitioner's opening testimony states that, "*On its Own Initiative, HDPP Petitioned the Commission to Allow the Facility to Use Recycled Water.*" (P. 7).

Staff's Rebuttal: Again, staff commends the project owner for pursuing this most cost effective and reliable water supply that would drought-proof the project. The Commission agreed with the project owner and required that the Feasibility Study consider how to move the project to 100 percent recycled water. In the November 3, 2014 Feasibility Study Report (HDPP 2014) the project owner concluded that it would not be possible to transition the project to 100 percent recycle water using existing equipment. Staff conferred with HDPP and believes that the project owner will not do any improvement or expansion of the facility's treatment equipment to increase the amount of recycled water. Staff disagrees with the project owner, and recommends that HDPP switch to 100 percent recycled water with facility improvements.

Comment: To explain how HDPP intends to drought-proof the water supply, petitioner offered in its testimony that:

> *"HDPP Currently Has Access to Four Different Water Supplies That Can Be Blended to Drought-Proof the Facility, None of Which Alone is Sufficient for the Reliable Operation of the Facility."* (P. 8).

Staff's Rebuttal: Only one of the four water supplies that the project owner proposes is sufficient for reliable operation of the facility, recycled water. The other three supplies: SWP; banked SWP; and MRB groundwater are from one

freshwater source - the SWP. HDPP has been using SWP water either directly delivered to the project or from the injection bank that has been used to store SWP water for project use. MRB groundwater is dependent on SWP water for replenishment of withdrawals beyond natural recharge sources. In the original licensing proceeding the project was specifically prohibited from using MRB groundwater. The Commission granted access to MRB groundwater on a temporary basis and in a limited amount for a short term relief because of the severe drought conditions. In granting this, the Commission required HDPP to come up with a plan to drought-proof the project. The Commission's 2014 Order expressly stated that the project owner should not expect to use the MRB groundwater beyond the term of that temporary relief, which is September 2016 (CEC 2014).

HDPP's dependence on groundwater from a basin that must be managed through adjudication is not a prudent means of 'drought proofing' a facility. The PTA not only proposes continued access to freshwater supply from the SWP, but it also seeks to expand access to that same unreliable SWP water in the form of groundwater from the adjudicated MRB on a permanent basis. The project owner testified that paying for the groundwater on a 2:1 basis as an industrial user would mitigate the project's impact on the basin. Staff disagrees; paying money is not the solution if there is insufficient SWP water to replenish the aquifer.

SUMMARY OF MODIFICATIONS PROPOSED IN THE PETITION

Comment: The petitioner's opening testimony restates and affirms its commitment to use as much recycled water as feasible by implementing a, ""*Loading Sequence" to Maximize Recycled Water Use by the Facility."* (P. 11).

Staff's Rebuttal: As staff discussed in its opening testimony, the proposed loading sequence is designed to blend better quality water with the cooling tower water whenever a certain blowdown water quality criterion is exceeded. However, staff disagrees with the loading sequence because HDPP's proposal does not include any provisions that limit use of the fresh water to the maximum that staff is proposing. Instead, the loading sequence assumes that the project would have access to up to 3,090 AFY of water from the MRB. Also, the loading sequence is not enforceable. Staff would have no control on how the loading sequence would be implemented in the field and could not monitor its implementation in real time. HDPP would share data about the loading order of water supplies with staff after-the-fact, leaving the project owner to conduct blending without verification. In short, the proposed loading sequence does not maximize recycled water use or limit freshwater use to less than 100 percent of annual use.

Comment: HDPP's testimony states at Page 12 that the "Loading Sequence" provides the project with the economic incentive to minimize use of adjudicated

groundwater because adjudicated groundwater is the most expensive water supply available to the facility.

Staff's Rebuttal: Staff agrees that groundwater is the most expensive indirect costs, and staff also agrees that recycled water is the least expensive in direct cost for the facility. However, since the project owner did not use recycled water in the years that it was available and instead used SWP water, staff believes that there are other factors beyond the direct costs that influence the project owner's decisions about water supplies. Staff is concerned that while the loading sequence proposed by the project owner may have the flexibility that this petition proposes, it would result in significant environmental impacts and lack enforceability.

Comment: In addition to testimony in the Executive Summary seeking authority to increase SWP banked groundwater, HDPP's summary of the modifications proposed in the petition offered additional testimony supporting a permit to allow percolation of SWP groundwater by using MWA's existing infrastructure.

Staff's Rebuttal: Staff is in favor of the project owner banking SWP water by percolation into the basin through MWA. However, the project owner is requesting that it be allowed to do this in addition to the current injection bank that the project owner has been using. As staff's analysis and testimony indicate, the project would be benefitted if HDPP does the banking by percolation instead of through the injection bank.

Currently, the project can only treat and inject water into the bank when the project is operating to accept the waste stream from the treatment. The new banking option allows the project to bank any time SWP water is available, and regardless of HDPP's operating status. Banking by percolation would save the project owner the expense of treating the water before injection. Additionally, the project water supplies would not include the waste stream from banking pre-treatment, avoiding the resulting TDS in the process water. This means that the project's water treatment as currently configured could treat and increase the use of recycled water. Staff believes that this would result in little to no freshwater being used to blend with the recycled water to get a blend suitable for the project's cooling tower and ZLD. The elimination of the injection bank would eliminate the brine stream that goes from the treatment system to the cooling tower and eventually to the ZLD system, thereby reducing the load on the ZLD system, which could help the system process more blowdown water. Finally, the treatment capacity (equipment, etc.) that was dedicated to treating the SWP water for injection could be repurposed to treat power plant water (e.g., recycled water) so that even more of it can be used. And banked MRB water would be available as an emergency backup supply to give the project the reliability and drought-proofing that HDPP seeks.

WATER RESOURCES TESTIMONY

Comment: The petitioner states in its summary of water resources testimony that the quantity and quality of recycled water available to the facility is insufficient to be the sole source water supply (P. 14).

Staff's Rebuttal: Staff disagrees. As discussed in staff's opening testimony and also in staff's response to the project owner's recycled water Feasibility Study Report, the net amounts of recycled water available to the project from the VVWRA plant alone are more than sufficient to meet HDPP's water supply needs based on the historic maximum amounts that the project has used. Additionally, as stated by the project owner's consultant, GSI Water Solutions, Inc. in the HDPP's 2015 amendment petition to drought proof the project (HDPP 2015, TN# 206468, page 12 of GSI's attachment), the VVWRA plant started to divert 1.2 MGD (approximately 1,340 AFY) of domestic wastewater to the IWWTP in or about February 2015. Combined with the 0.5 MGD (560 AFY) that the IWWTP was producing before the diversion, that brings the total effluent from the IWWTP to 1.7 MGD (2,040 AFY). Since domestic wastewater is typically lower in TDS than the primarily industrial wastewater discharged from the Snapple juice plant to the IWWTP, the diversion is expected to result in a dilution of the TDS levels in the IWWTP's effluent, which would bring the TDS level to within the contractual specifications for HDPP. The VVWRA wastewater would significantly increase the recycled water supply available to the project.

Comment: HDPP's testimony states that to date, the project's recycled water suppliers have not been able to assure the instantaneous flow requirement of 4,000 gpm.

Staff's Rebuttal: Staff disagrees. As discussed in staff's response to the project owner's Feasibility Study, the City of Victorville and the VVWRA treatment plant conducted a pump test to assess if recycled water could be delivered directly from the treatment plant to the facility. The pump test showed that the two pumps at the treatment plant are capable of pumping more than the maximum rate that HDPP needs at pressures below what the pipeline is rated for (160 psi). The test also showed that the pipeline could withstand the pressures needed to deliver the recycled water at that rate if needed.

As discussed above, even using the project owner's claimed maximum possible rate of 2,800 gpm (TN # 206909), the rate difference to be supplemented from storage would be 1,200 gpm. To get this additional rate, the storage in the elevated tank and the adjacent pool would be sufficient to supply the project for almost 21 hours.

The requirement that 4,000 gpm of supply water be available 24 hours per day is not realistic, and there is no pumping scenario for plant operation where this would ever be required. Staff disagrees with the project owner's arguments and conclusions about why a 4,000-gpm rate is needed on a 24-hour daily basis.

While the instantaneous demand is relevant to sizing the supply and delivery system, it is unrealistic to use instantaneous demand to size annual supply. In this case, 4,000 gpm would equate to 6,400 AFY. HDPP is permitted for no more than 4,000 AFY, has not exceeded 3,500 AFY, and has an average use of about 2,200 gpm, as reported by the project owner in several annual compliance reports.

It is commonplace that California power plants experience both seasonal as well as diurnal fluctuations in power generation. However, peak generation occurs a limited number of hours per year, and generally only once per day. In addition, as more renewable resources are integrated into the system, some natural-gas plants may operate only twice a day; once during the morning ramp and then again during the evening ramp. Therefore, it is not reasonable to require a project water supply to meet the peak demand every hour, 24 hours a day.

Comment: Petitioner's testimony states that because the facility's water treatment systems were certified and designed to use SWP water only, recycled water can only be used when blended with other water supplies (P. 15-16).

Staff's Rebuttal: Staff disagrees. The project owner demonstrated that it can and is able to use recycled water. In opening testimony staff proposed amending the project permit to allow for banking of SWP water by percolation through

MWA, and explained that this change would help the project to use more recycled water and greatly reduce or eliminate the project's need for freshwater.

Comment: HDPP's testimony asserts that the project's use of groundwater will have no significant impacts on the MRB basin (P. 17).

Staff's Rebuttal: Staff disagrees. The project owner's testimony claims that the impact on the MRB would be "*de minimus*", citing to percentages that represent HDPP's use of the basin's safe yield under different scenarios. Staff does not agree with the project owner's testimony that the small percentages cited for the project's use of groundwater from the basin, will not have a significant impact.

Staff's analysis concluded that pumping up to 3,090 AFY from MRB groundwater would result in a significant impact to the MRB that cannot be mitigated. And, since recharge of the groundwater basin relies on SWP that is only intermittently available, staff recommends that the project owner no longer be allowed to use SWP water as a primary supply. If the project transitions to 100 percent recycled water use, this potential significant impact would be mitigated. No groundwater use from MRB should be allowed once the project transitions to recycled water use, and if SWP is used as a backup supply, the project owner should be required to offset the use of SWP water through conservation or other offset program. This would ensure that there would be no significant impacts to the MRB or the Delta.

Comment: HDPP offered additional testimony about the proposed "Loading Sequence" by asserting that the proposal would provide the project with economic incentive to minimize use of higher cost MRB adjudicated water (P. 18).

Staff's Rebuttal: Staff disagrees and lacks sufficient information about the project owner's financial circumstances to fully consider this testimony. Though, staff discussed in its opening testimony and here in rebuttal that the proposed loading sequence is designed to seek water of better quality to blend with the cooling tower water whenever certain water quality of blowdown rate criterion is exceeded. HDPP's loading sequence proposal does not include any provisions that limit the use of freshwater to the maximum that staff is proposing. Also, the loading sequence is not enforceable, as staff would have no control on how it would be implemented in the field and would not be able to monitor its implementation in real time.

Comment: Petitioner offered in its testimony its belief that the 3,090 AFY allowance represents a worse case plausible scenario that must be considered to allow HDPP to participate in California's electricity markets (P. 19).

Staff's Rebuttal: Staff disagrees. If this scenario were plausible, it would create an unsustainable demand on the MRB that could not be mitigated. In addition, this proposal is inconsistent with California's water policy. Staff also notes that

the project owner has not demonstrated that HDPP needs this much water to be able to compete and participate in California's markets.

Staff reviewed and understands the project owner's calculation of the volume of groundwater HDPP anticipates will be needed to ensure that the facility can participate in California's electricity markets. This is the amount HDPP may need if they do not retrofit the existing facility to process recycled water. Staff points out that if the project is not required to transition to 100 percent recycled water use, the use of 3,090 AFY of groundwater from MRB is a scenario that should not be permitted because of the potential impacts and lack of consistency with State water policy. In addition, given the project owner's proposed changes to **SOIL&WATER-1**, staff would have no way of verifying why this amount was needed.

Comment: HDPP's testimony states that the petition provides objective "checks and balances" to verify that the facility will continue to maximize its use of recycled water (P. 21).

Staff's Rebuttal: Staff disagrees. The proposal does not include any enforceability measures to ensure that the project would maximize recycled water use. Since the proposed plan includes reliance on water from the MRB, which requires water from the unreliable SWP to replenish withdrawals, HDPP's petition if granted as proposed would not drought-proof the project. Given current

data on recycled water use during drought conditions, the project owner has prioritized SWP water above recycled water.

The project owner has offered testimony that the particulate matter limits from the cooling tower effectively limit the TDS in the cooling tower water, and therefore the limits dictate input into the plant process water. Staff believes that this issue could easily be addressed. HDPP was fully permitted in the 2000 Decision for PM10 based on nearly continuous operation year round (CEC 2000). However, HDPP has never operated near the 100 percent capacity factor, such that each year the project emits much less than it was permitted and offset for. This is shown in the table below. The cooling tower emissions are about 5 percent of hourly PM10 emissions, and slight emission increases from the cooling tower could easily be sustained under the current facility cap.

HDPP PM10 Emissions				
Year	Actual PM10 Emissions (tpy)	Permitted PM10 (tpy)	PM10 % of permitted	Annual capacity factor
2015	83.1	233.2	35.6%	---
2014	117.2	233.2	50.3%	52.0%
2013	131.3	233.2	56.3%	59.5%
2012	146.2	233.2	62.7%	65.3%
2011	54.3	233.2	23.3%	24.9%
2010	---	233.2	---	43.8%
2009	117.8	233.2	50.5%	55.6%
2008	127.2	233.2	54.5%	61.7%

Comment: HDPP states in its opening testimony that there is no groundwater overdraft in the Alto Subarea where the facility is located, and explains that:

"Conservation, importation of State Water Project water, MWA's 'R-cubed' program, and implementation of the Judgment have resulted in hydrologic balance in Alto." (P. 23).

Staff's Rebuttal: Staff agrees that the Alto Sub-basin is currently within operating balance, but staff offers as rebuttal the following caution - there is no guarantee how long the basin's operating balance will last. The project owner acknowledges in its testimony that the water balance in the MRB depends on importation of SWP water. The pressing question not addressed by the project owner's testimony or in the current petition before the Commission is: What would occur if there is no imported water to make up withdrawals, even though the withdrawals are done under the adjudication? The parties to this proceeding agree that curtailments and interruptions of SWP are likely to continue.

Comment: HDPP's testimony asserts that implementing the proposed "Loading Sequence" will result in no net change in basin supply (P. 24).

Staff's Rebuttal: Staff disagrees. HDPP's testimony opines that the recycled water not used by the project would be discharged to the river where some of it would percolate into the groundwater basin, and therefore contribute to the balance in the basin. However, the basin is not made whole with recycled water, but rather with SWP water. Only a fraction of the amounts discharged to the river would percolate because of evapotranspiration, so it may not be equivalent to the quantities of MRB water used by the project.

Discharge of the recycled water to the river has the potential of degrading the river water quality by increasing its TDS and nitrate concentrations. Also, application of the recycled water to land, be it for percolation or for irrigation purposes, has the potential to concentrate salts through evapotranspiration. This would impact soils by limiting use for riparian or agricultural purposes. Direct consumptive use of recycled water by HDPP would eliminate the addition of salts and nitrates to the MRB and serve to protect basin wide water quality.

Comment: HDPP offers testimony asserting that extending the existing authorization to use MRB adjudicated water requires no new infrastructure and can be implemented consistent with applicable laws, ordinances, regulations, and standards (LORS) (P.24).

Staff's Rebuttal: Staff disagrees. The continued use of freshwater from the SWP, and expanding the project's water supply to allow the use of MRB groundwater, is not consistent with State or Energy Commission Policy. Staff has provided detailed LORS analysis in its testimony showing why the use of the freshwater supplies is inconsistent with State and Energy Commission policy, and to demonstrate that recycled water is a feasible alternative supply that should be used for the project.

Comment: HDPP's opening testimony explains that VWD (CVV) has existing legal authorization to serve MRB adjudicated water to the facility (P. 25).

Staff's Rebuttal: Staff agrees, but recommends that consideration be given to this being an immitigable impact to the basin. The existence of an authorization for a purveyor to supply the water does not mitigate the impact to the basin. The Commission's 2000 Decision specifically prohibited this use to protect the MRB from significant impacts. Adding this new water use, which is directly linked to the SWP, would create a new demand on freshwater supplies and would be inconsistent with the State's water policy.

Comment: The project owner's testimony also states that the Judgement mitigates all use of MRB adjudicated water to below the level of significance (P.25-27).

Staff's Rebuttal: Staff disagrees and discourages allowing the Judgment to be a plan for mitigating impacts since it does not guarantee that impacts to the MRB will be mitigated. The methods available for mitigation, such as the water replenishment fee, do not guarantee freshwater from the SWP. The SWP is the primary recharge source to maintain the basin balance within operating levels and stem overdraft, and cannot be guaranteed to be available for recharge. The Energy Commission is not obligated to accept the Judgement's mitigations as its own when evaluating the potential impacts of a proposed project. Staff has provided evidence in its testimony of the availability of an alternative water supply that would virtually eliminate risk of impacts to the MRB. Recycled water is staff's recommendation for mitigation.

PROPOSED MODIFICATIONS TO CONDITION OF CERTIFICATION

SOIL&WATER-1

Staff proposed in its analysis and testimony a new condition of certification **SOIL&WATER-1**, which is fundamentally different from that proposed by the project owner in its opening testimony. This new condition would require the following:

1. Conversion of the project to use 100 percent recycled water within a 3-year period;
2. Allowing interim use of SWP, banked SWP, or MRB via CVV adjudicated water rights during the 3-year conversion period;
3. Use of a backup supply after the conversion, made up of SWP water or banked SWP water via the existing bank or a bank developed in conjunction with MWA;
4. Prohibiting use of adjudicated groundwater from MRB after transition to 100 percent recycled water; and
5. Implementation of a Water Conservation Offset Plan to reduce demand on the SWP equivalent to impacts created by the project use.

As for modifications to Conditions of Certification **SOIL&WATER -4**, **-5**, **-12**, and **-13** proposed by the petitioner, staff agrees with those changes that apply to the banking of groundwater by MWA. Staff does not agree with the changes that allow for continued injection of SWP water in the existing project bank. As indicated in staff's testimony, staff would support allowing the project owner use of the existing water in the injection bank provided it is in compliance with the current conditions of certification or transitioned to management under a groundwater bank with MWA and CVV.

References

CEC 2016a Record of Conversation, December 22, 2015, with Mojave Water Agency and City of Victorville Representatives, February 11, 2016 (TN# 210280).

CEC 2016b Opening Testimony of the Proposed Petition to drought proof the project and allow the use of alternative water supplies, January 29, 2016, TN # 210083.

CEC 2015a Record of Conversation between CEC Staff and City of Victorville, October 7, 2015, TN # 206295.

CEC 2015b Response to recycled water feasibility study summary report, October 9 2015, TN # 206321.

CEC 2015c Record of Conversation for Staff Visit to VVWRA Treatment Plant, October 7, 2015, TN # 206296.

CEC 2014 Staff Analysis of the Proposed Petition to Allow High Desert Power Project to use Alternative Water Supplies, August 28, 2014, TN # 203003.

CEC 2014a Order Approving Petition To Amend, September 26, 2014, TN # 203108.

CEC 2009 Order Approving a Petition to Modify Soil and Water Conditions Related to Use of Recycled Water for Project Cooling, November 30, 2009, TN # 54277.

CEC 2000 Final Commission Decision on the High Desert Power Project, May 3, 2000.

HDPP 2016 Opening Testimony of High Desert Power Project, January 29, 2016, TN # 210088.

HDPP 2015 High Desert Power Project (97-AFC-1C) Petition for Modification to Drought-Proof the High Desert Power Project, October 30, 2015, TN # 206468.

HDPP 2015a High Desert Power Project (97-AFC-1C) Response to recycled water feasibility report, October 9, 2015, TN # 206909.

HDPP 2014 High Desert Power Project (97-AFC-1C) Recycled Water Feasibility Study Report, November 3, 2014, TN # 203306.

HDPP 2008 High Desert Power Project (97-AFC-1C) Petition for Modification to Use Reclaimed Water, August 14, 2008, TN # 47547.

WECC 2015 2015 State of the Interconnection Reliability - WECC https://www.wecc.biz/ReliabilityAssessment/Pages/State-of-the-Interconnection.aspx.

SCE 2016 Mountainview Generating Station (00-AFC-2) Hot Gas Path Component Replacement with Advanced Components, January 11, 2016, TN # 207273.