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BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

Application for Certification for the HIGH DESERT POWER PROJECT	Docket No. 97-AFC-1C

LEGAL BRIEF OF HIGH DESERT POWER PROJECT, LLC IN RESPONSE TO ORDERS AFTER JULY 10, 2017, COMMITTEE CONFERENCE

QUESTION PRESENTED FOR LEGAL BRIEFING

On October 30, 2015, High Desert Power Project, LLC ("Project Owner" or "HDPP") filed a petition to drought-proof the High Desert Power Project ("Facility"), as directed by the Commission (this "Amendment"). The Committee appointed to oversee this Amendment issued the "Orders after July 10, 2017, Committee Conference" that directs the parties, the Project Owner, California Energy Commission Staff, and California Department of Fish and Wildlife ("DFW") (collectively, the "Parties"), to provide legal briefs on the following question:

> *Has Condition of Certification Soil & Water-6.d been satisfied so that it is no longer relevant to the proceedings? Please provide citation to records in the docket that support any facts supporting arguments presented.*

As described below, the requirements of Soil&Water-6.d have been satisfied by actions since 2009 and will be satisfied by the Committee's approval in this proceeding. Accordingly, the Committee should delete Condition of Certification Soil&Water-6.d.

INTRODUCTION

A. Prior Approvals Satisfied Soil&Water-6.D

As described below, Soil&Water-6.d has also been satisfied numerous times since the original 2000 Final Decision. In particular, the 2009 amendment eliminating the complete ban on the use of recycled water, per the requirements of Soil&Water-6.d, "specifically evaluates the water resources impacts of continued operation and imposes any mitigation necessary to ameliorate any identified impacts" (hereinafter, the "2009 Recycled Water Amendment"). These prior approvals are discussed in detail in Section IV below. Soil&Water-6.d should have been deleted in 2009. It is "vestigial."

B. The Pending Amendment Satisfies Soil&Water-6.D

The 2009 Recycled Water Amendment made Soil&Water-6.d superfluous. Even assuming, *arguendo*, that the 2009 amendment was somehow insufficient, there can be no doubt that the Committee's decision on this Amendment will also satisfy Soil&Water-6.d.

This Amendment has been pending before the Commission for more than three years. The Committee assigned to this Petition has diligently worked with the parties to resolve differences. The Committee has posed questions to the parties, engaged in thoughtful exploration of the issues, granted interim relief, and expended substantial resources. The Committee's process and compliance with applicable law is unassailable. With action on this Amendment, the Committee has specifically evaluated "the water resources impacts of continued operation and impose[d] any mitigation necessary to ameliorate any identified impacts."

The filing of this Amendment was mandated by the then-existing language of condition Soil&Water-1.c, which required evaluation of HDPP's water supply:

> The 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.[1]

The Committee is conducting this proceeding to meet the substantive requirements of law by (1) complying with the California Environmental Quality Act ("CEQA") and (2) determining that the Facility will remain in compliance with all applicable laws, ordinances, regulations and standards ("LORS"). (Cal. Code Regs., tit. 20 § 1769(a).) The Amendment was filed to "drought-proof" the Facility. In pursuing this Amendment with its regular authority and diligence, the Committee and the Parties thoroughly examined the water supply issues related to the facility. It is undisputed that the Committee and the Commission's activities in this pending Amendment will result in a decision that, per the requirements of Soil&Water-6.d, "specifically evaluates the water resources impacts of continued operation and imposes any mitigation necessary to ameliorate any identified impacts." Answering the water supply-related issues is the very purpose of this proceeding.

As discussed in detail in Section IV, Soil&Water-6.d has been satisfied by prior CEQA and LORS-compliant Commission approvals since 2009. The parties will debate these issues, looking backward.

Even if the Committee found that the 2009 Recycled Water Amendment removing the ban on recycled water and other approvals were insufficient, the present CEQA and LORS-compliant proceeding is not subject to such historic vagaries. This Committee will act in a CEQA and LORS-compliant manner on the question of water supply for the Facility in this proceeding. ***The Committee order approving this Amendment will satisfy Soil&Water-6.d.***

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[1] Added to Soil&Water-1, September 10, 2014, Order 14-0910-2, TN #: 203108 Submitted 9/26/2014; deleted on June 14, 2016, Order 16-0614-4a, TN #: 212052 Submitted 7/1/2016.

PROCEDURAL HISTORY

Condition of Certification Soil&Water-6, entitled "Banked Water Available for Project Use," pertains to the accounting of water injected into, withdrawn from, and lost or "dissipated" from the Facility's groundwater bank. Injection-related dissipation have been calculated using the FEMFLOW3D model in accordance with Soil&Water-5.a.[2] Condition Soil&Water-6.c governs the disposition of injected banked water in the three years prior to Facility closure and requires that 1,000 AF of injected water remain in the bank after Facility closure.[3]

Condition Soil&Water-6.d was first proposed by CEC staff in its February 14, 2000 Final Testimony (amended February 15, 2000).[4] CEC staff argued that the "applicant should be required to update the ground water study and possibly provide additional banking, if the applicant intends to operate beyond 30 years." Soil&Water-6.d was included in the Final Decision adopted May 3, 2000.[5] As discussed below, both the express terms and the intent of Condition Soil&Water-6.d have been satisfied.

Much has changed in the 17 years following certification of the Facility. When the Facility was certified in 2000, the sole water supply available for power plant operations was State Water Project surface water for direct use or injection into a groundwater bank for later recovery and use. The Facility's groundwater injection and recovery facilities had not been constructed, and the Mojave Basin adjudication was still pending in court. In August of 2000, three months after the Commission's certification of the Facility, the California Supreme Court substantially affirmed the Judgment of the Riverside County Superior Court adjudicating the water rights in the Mojave Basin and appointing the Mojave Water Agency ("MWA") to act as the Watermaster to implement the adjudication. MWA has constructed the numerous regional groundwater recharge facilities that now operate today. Through MWA's leadership, the Mojave Basin has been well-managed, serving as a model for the landmark Sustainable Groundwater Management Act of 2014.

By Memorandum of Understanding ("MOU") dated June 27, 2003 (more than three years after the Commission's certification of the Facility), the California Department of Fish and Wildlife (then California Department of Fish and Game) and Victor Valley Wastewater

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[2] The FEMFLOW3D model was developed for the CEC by a prior advisor to the CEC. See TN #: 213585 Submitted 9/9/2016.

[3] Condition Soil&Water-6.d states that "The project shall not operate for longer than thirty (30) years unless the Commission has approved an amendment to its license that specifically evaluates the water resources impacts of continued operation and imposes any mitigation necessary to ameliorate any identified impacts." The Soil&Water-5 and -6 Verifications are applicable to Soil&Water-6.d. In relevant part, the Soil&Water-5 Verification states that "CEC Staff shall use [groundwater injection and withdrawal] information in the HDPP model to evaluate the amount of banked groundwater available and to calculate the approximate rate of decay. CEC Staff shall notify the project owner within thirty (30) days of the amount of banked groundwater available to be pumped in the new calendar year or in the next quarter, if applicable." The Soil&Water-6 Verification states in relevant part "any facility closure plan submitted during that last three years of commercial operation shall address the disposition of any remaining water available to the project, as well as the disposition of the pipeline, wells, and water treatment facility."

[4] Available at: http://www.energy.ca.gov/sitingcases/highdesert/documents/2000-02-14_STAFF_TESTIMONY.PDF.

[5] TN #: 14407 Submitted 5/3/2000 and TN #: 32572 Submitted 5/3/2000, available at: http://www.energy.ca.gov/sitingcases/highdesert/documents/2000-05-03_HD_DECISION.PDF.

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. Starting in 2007, water deliveries from the State Water Project ("SWP Water") 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.

These are just some of the changed circumstances since 2000. As a result — and acting of its own volition — in 2008 HDPP petitioned the Commission to lift the prohibition and allow for the use of Recycled Water at the Facility. The 2009 Recycled Water Amendment removed the prohibition on the Facility's use of recycled water.

Other Commission approvals and agreements among the Parties have followed. In July 2011, the Facility first started using recycled water from the Victor Valley Water Reclamation Authority. The 2014-2016 drought caused further shortages of SWP Water that, coupled with water quality limitations of recycled water and operational conditions restricting the injection of water into the groundwater bank, forced the Project Owner to seek additional water supply amendments to its license. In 2014, the Commission granted temporary drought relief authorizing use of adjudicated groundwater pursuant to the Mojave Judgment. In 2016, the Commission granted temporary drought relief authorizing the recharge of the groundwater bank via percolation in existing facilities of MWA.

Each amendment complied with CEQA and LORS and included any necessary mitigation.

More recently, the Parties to the current Amendment proceeding have reached agreement that the former groundwater model, FEMFLOW3D, should no longer be used to track additions, losses, and withdrawals from the Facility's groundwater bank. The parties are in unanimous agreement that the groundwater bank accounting and reporting should be done by the court-appointed Watermaster for the Mojave Basin Area Judgment. The parties are also in unanimous agreement that the authority to recharge the groundwater bank via percolation should be permanent.

TIMELINE OF SIGNIFICANT WATER SUPPLY-RELATED EVENTS

In response to the Committee's request that the parties "provide citation to records in the docket that support any facts supporting arguments presented," in addition to the documents cited elsewhere herein, the following events, documents, and approvals are relevant to demonstrating that Condition Soil&Water-6.d has been satisfied. In particular, the Commission's decision on the 2009 Recycled Water Amendment removing the ban on the use of recycled water and the approvals thereafter "specifically evaluate[d] the water resources impacts of continued operation and impose[d] any mitigation necessary to ameliorate any identified impacts."

a. February 14, 2000 (Amended February 15, 2000) – CEC staff propose new condition Soil&Water-6.d in their Final Testimony. The intent of the condition is that "staff believes that the applicant should be required to update the ground water study and possibly provide additional banking, if the applicant intends to operate beyond 30 years." (Available at: http://www.energy.ca.gov/sitingcases/highdesert/documents/2000-02-14_STAFF_TESTIMONY.PDF.) (Attachment 1.)

b. May 3, 2000 – CEC adopts Final Decision approving the AFC that includes Soil&Water-6.d. (TN #: 14407 Submitted 5/3/2000 and TN #: 32572 Submitted 5/3/2000.)

c. August 21, 2000 – The California Supreme Court substantially affirms the Mojave Basin Judgment as to the Stipulating Parties in *City of Barstow v. Mojave Water Agency* (2000) 23 Cal. 4th 1224. (TN #: 213704 Submitted 9/16/2016, TN #: 213705 Submitted 9/16/2016.)

d. April 22, 2003 – The Facility begins commercial operation.

e. August 14, 2008 – Project Owner files petition for modification to remove the prohibition on use of recycled water. (TN #: 47547 Submitted 8/14/2008.) (Attachment 2.)

f. April 20, 2009 through September 30, 2009 – CEC staff files Staff Analysis and Revised Staff Analyses concluding that the use of recycled water at the Facility complies with CEQA and LORS. (TN #: 51196 Submitted 4/20/2009, TN #: 53411 Submitted 9/24/2009, TN #: 53500 Submitted 9/30/2009.) (Attachments 3, 4, 5.)

g. November 30, 2009 – Commission adopts Order approving petition for modification to remove prohibition on use of recycled water in CEQA-equivalent approval. (TN #: 54277 Submitted 11/30/2009.) (Attachment 6.)

h. April 23, 2014 – Project Owner files petition for modification to use adjudicated groundwater from the Mojave Basin. (TN #: 202211 Submitted 4/23/2014.) (Attachment 7.)

i. August 28, 2014 – Project Owner files Petition for Staff Approved Modification to install an ultraviolet treatment system and enhance the existing cold lime softening system to improve treatment of cooling tower blowdown and improve the overall performance, efficiency and reliability of the facility. (TN #: 202996 Submitted 8/28/2014.) (Attachment 8.)

j. September 26, 2014 – Commission approves use of adjudicated groundwater for two year period in CEQA-equivalent approval. (TN #: 203108 Submitted 9/26/2014.) (Attachment 9.)

k. October 20, 2014 – CEC staff approves Petition for Staff Approved Modification to install ultraviolet treatment system and cold lime softening system in CEQA-equivalent approval. (TN #: 203216 Submitted 10/20/2014.) (Attachment 10.)

l. November 30, 2014 – Project Owner files Recycled Water Feasibility Study Report. (TN #: 203306 Submitted 11/3/2014.) (Attachment 11.)

m. October 30, 2015 – Project Owner files Petition for Modification to Drought-Proof the High Desert Power Project. (TN #: 206468 Submitted 10/30/2015.) (Attachment 12.)

n. February 6, 2017 – Project Owner identifies the evidence in the record demonstrating that recharging the groundwater bank via percolation in Mojave Water Agency's existing facilities complies with CEQA and LORS. (TN #: 215784 Submitted 2/6/2017.)

o. Jun 2, 2016 – CEC staff, DFW and Project Owner reach agreement that HDPP should be allowed to recharge groundwater bank via percolation using Mojave Water Agency's existing facilities. (TN #: 211710 Submitted 6/2/2016 [June 2, 2016 Stipulation]; see also CEC Staff Opening Testimony/Preliminary Staff Analysis, pp. 9-10 [TN #: 210083 Submitted 1/29/2016]; Letter from MWA to CEC Staff, February 19, 2016 [TN #: 210498 Submitted 2/22/2016]; Transcript of May 23, 2016 Committee Status Conference, pp. 33-59.)

p. July 1, 2016 – Commission grants temporary relief allowing percolation of SWP Water using Mojave Water Agency's existing facilities for a two year period. (TN #: 212052 Submitted 7/1/2016.)

q. May-July 2017 – CEC staff, DFW and Project Owner reach agreement that the approval to recharge groundwater bank via percolation in Mojave Water Agency's existing facilities should be made permanent and that the Mojave Basin Watermaster should be responsible for accounting of the balance of percolated water in the bank instead of the CEC using the FEMFLOW3D groundwater model. (See Draft Stipulation and Agreement between HDPP, CEC Staff and DFW, May 26, 2017 [TN #: 217756 Submitted 5/26/2017]; see also Transcript of July 10, 2017 Committee Status Conference, pp. 4, 8-9, 11-12, 23-24 [TN #: 220246 Submitted 7/18/2017]; Transcript of June 5, 2017 Committee Status Conference, pp. 9-10, 16-28 [TN #: 218802 Submitted 6/15/2017]; CEC Staff and DFW joint proposed conditions of certification, July 10, 2017 [TN #: 220108 Submitted 7/10/2017].)

r. July 2016 to July 2017 – Percolation of water by Mojave Water Agency into the Facility's groundwater bank is expected to recharge the maximum allowed quantity of 13,000 AF by the end of 2017.

DISCUSSION

I. COMMISSION APPROVALS IN 2009 AND LATER SATISFIED SOIL&WATER-6.D

In 2009, and subsequently, the Commission has evaluated the water resources impacts of continued operation of HDPP and imposed the mitigation necessary to ameliorate any identified impacts, as required by Soil&Water-6.d.

A. The 2009 Recycled Water Amendment Approval Expressly Satisfied Soil&Water-6.d.

The 2009 Recycled Water Amendment removed "the prohibition of the use of recycled waste water to supplement or replace the power plant's current potable water supply for project operations."[6] In addition to removing the prohibition on the use of recycled water, the 2009 Recycled Water Amendment also eliminated banking milestones, required docketing of copies of the agreement for purchase of recycled water, and required metering devices to be installed.[7]

In approving the 2009 Recycled Water Amendment, the Commission noted the Staff's recommended approval of the Amendment as compliant with the requirements of CEQA and the Commission's regulations governing amendments.[8] The Commission expressly issued conclusions of law that the water supply for HDPP would not result in "any significant impact to public health and safety, or the environment."[9] In addition, the Commission made the following further findings of fact and conclusions of law:

> The Energy Commission public review process has been certified as a CEQA equivalent, ***and therefore satisfies CEQA requirements***. The Energy Commission finds that:
>
> - The petition meets all the filing criteria of Section l 769(a) concerning post-certification project modifications.
> - The modification will ***not change*** the findings in the Energy Commission's Final Decision pursuant to Section 1755.
> - The project will ***remain in compliance*** with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code section 25525;
> - The Change will be ***beneficial to the public*** because there will be a decrease in the use of potable SWP water for project operation.
> - The change is based on information that was not available to the parties prior to Commission certification. ***The availability of fresh water from the State Water Project has diminished dramatically in comparison with estimates available at the time of certification for reasons that were not anticipated during project certification***, which threatens the reliability of project operations.[10]

There is no ambiguity. The 2009 Recycled Water Amendment approval satisfied Soil&Water-6.d's requirements, making the language surplusage that should be removed from the Facility's Certification.

The Order approving the 2009 Recycled Water Amendments "specifically evaluates the water resources impacts of continued operation and imposes any mitigation necessary to

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[6] Order 09-1118-5, "ORDER APPROVING a Petition to Modify Soil and Water Conditions Relating to Use of Recycled Water for Project Cooling," November 18, 2009, TN #: 54277 Submitted 11/30/2009.

[7] *Id*., pp. 1-2.

[8] *Id*., p. 2.

[9] *Id.*

[10] *Id*. (emphasis added).

ameliorate any identified impacts," as required by Soil&Water-6.d. The Order confirms that the 2009 approval satisfies CEQA and the Commission's regulations. As modified, the Facility remains in compliance with applicable law, is deemed "beneficial to the public," and recognizes that the "availability of fresh water from the State Water Project has diminished dramatically in comparison with estimates available at the time of certification for reasons that were not anticipated during project certification, which threatens the reliability of project operations."

The 2009 Recycled Water Amendment adoption Order confirms that all of the requirements of Soil&Water-6.d have been satisfied. The language should be removed because it is a vestige that, if left in the Certification, places a cloud over the Facility.

B. Since 2009, Subsequent Approvals and Agreements Confirm that Soil&Water-6.d Has Been Satisfied.

Since the 2009 Recycled Water Amendment, there have been multiple amendments to the license that "specifically evaluate[d] the water resources impacts of continued operation and impose[d] any mitigation necessary to ameliorate any identified impacts." In the late-2000s, shortages of SWP Water due to regulatory restrictions in the Delta forced the Project Owner to diversify its supply.

On November 30, 2009, the Commission adopted an Order approving the Project Owner's petition for modification to remove the prohibition on use of recycled water in a CEQA-equivalent approval, the 2009 Recycled Water Amendment. (TN #: 54277 Submitted 11/30/2009.) The 2014-2016 drought caused further shortages of SWP Water that, coupled with water quality limitations of recycled water and operational conditions restricting the injection of water into the groundwater bank, forced the Project Owner to seek additional water supply amendments to its license. On September 26, 2014, the Commission granted temporary drought relief authorizing use of adjudicated groundwater pursuant to the Mojave Judgment fora two year period in a CEQA-equivalent approval. (TN #: 203108 Submitted 9/26/2014.) On October 20, 2014, the CEC staff approved the Project Owner's Petition for Staff Approved Modification to install an ultraviolet treatment system and cold lime softening system in a CEQA-equivalent approval. (TN #: 203216 Submitted 10/20/2014.) On July 1, 2016, the Commission granted temporary relief allowing the Facility's groundwater bank to be recharge via percolation using Mojave Water Agency's existing facilities for a two year period. (TN #: 212052 Submitted 7/1/2016.)

It is undisputed that the Commission made findings of fact and approved conclusions of law required for approval; that each amendment to the Facility's license complied with CEQA through scrupulously following the Commission's certified regulatory program; that each amendment complied with applicable LORS; and that each amendment included any necessary mitigation. Soil&Water-6.d was fully satisfied.

C. Concerns Regarding the Project's Groundwater Injection and Recovery Expressed in 2000 Are No Longer Relevant, Especially Given the Watermaster's Authority and Success.

Soil&Water-6.d was first proposed by CEC Staff in their Final Testimony, amended February 15, 2000.[11] CEC Staff expressed concern that the groundwater bank may be inadequate and could be depleted during the operational life of the project: "By requiring the ground water study to be reevaluated in thirty years, should the owner wish to continue operation, the amount of ground water in the bank would be assessed and any measures needed to mitigate impacts on ground water due to further operation could be identified." (CEC Staff Final Testimony, February 15, 2000, p. 5.)

These fears pre-date the Judgment and Mojave Water Agency's management of the basin, a model for California's landmark Sustainable Groundwater Management Act. Soil&Water-6.d was therefore proposed to address impacts related to *groundwater injection and recovery*. These concerns from 2000 are mooted by the authorities vested in the Watermaster and its ongoing comprehensive management of the groundwater basin, and specifically its successful regional percolation program.

D. To the Extent Soil&Water-6.d Was Concerned with Growth-Inducing Impacts in the Year 2000, Those Concerns Have Proven to be Unfounded.

The Commission in the Final Decision added Condition Soil&Water-6.d as part of a package of other condition amendments that responded to concerns expressed regarding potential growth inducing impacts. Specifically, the Commission sought to address a concern that the new aquifer storage and recovery facilities could be used by the Victor Valley Water District (now Victorville Water District or "VWD") to serve or expand its customer base, removing an impediment to growth. (See Final Decision, p. 217.) These concerns have proven to be unfounded.

The Facility groundwater injection and recovery facilities have not been used by any other party or for any other purpose. In fact, the injection facilities have not been effective in building the bank for the Facility, let alone a benefit to third parties. VWD has not used the injection capability of the wells for any other party or for any purpose other than the benefit of the Facility. Moreover, VWD does not have a storage account to store water for its own benefit of the benefit of others using these injection facilities. Accordingly, the Facility injection and extraction wells have not been a tool for inducing growth within the Victorville area. The growth-inducing concerns that lead to the inclusion of Soil&Water-6.d have not come to fruition, providing another reason for removing this surplus language.

II. THE APPROVAL OF THIS AMENDMENT WILL SATISFY THE REQUIREMENT OF SOIL&WATER-6.D

As discussed in Section II above, this Amendment was mandated to "drought-proof" the Facility. It took considerable analysis and discussion to arrive at this stage of the proceeding,

[11] Available at: http://www.energy.ca.gov/sitingcases/highdesert/documents/2000-02-14_STAFF_TESTIMONY.PDF.

but the Facility will be drought-proof when the authority to percolate SWP Water using Mojave Water Agency's existing facilities is made permanent.

The Commission granted temporary relief allowing percolation of SWP Water for a two year period. (TN #: 212052 Submitted 7/1/2016.) Recently, the Parties reached agreement that the approval to percolate should be made permanent and that the Mojave Basin Watermaster should be responsible for accounting of the percolated water bank balance instead of the CEC using the FEMFLOW3D groundwater model.[12] There is substantial evidence in the record demonstrating that percolation and Watermaster accounting of groundwater storage and recovery complies with CEQA and LORS. (TN #: 215784 Submitted 2/6/2017.) The removal of the interim period to percolate is now the only affirmative change in the Conditions of Certification that the Project Owner requests to drought-proof the Facility.

In acting on the pending Amendment to make percolation permanent, the Committee will necessarily determine compliance with the requirements of CEQA and the Commission's regulations and determine whether the proposed changes would not result in "any significant impact to public health and safety, or the environment. In doing so, the Commission will in this proceeding specifically "evaluate[] the water resources impacts of continued operation and impose[] any mitigation necessary to ameliorate any identified impacts," as required by Soil&Water-6.d.

All parties to this proceeding are on record as supporting percolation, without equivocation.[13] This Committee will act in a CEQA and LORS-compliant manner on the question of water supply for the HDPP facility in this proceeding. ***<u>The Committee order approving this Amendment will also satisfy Soil&Water-6.d</u>***.

<u>CONCLUSIONS</u>

The express terms of Condition Soil&Water-6.d have been met in 2009 with the lifting of the prohibition on the use of recycled water. In addition, since 2009, there have been multiple CEQA and LORS-compliant Commission approvals of water supply amendments. These CEQA and LORS-compliant processes "specifically evaluate[d] the water resources impacts of continued operation and impose[d] any mitigation necessary to ameliorate any identified impacts."

Even assuming, *arguendo*, that the prior approvals did not satisfy Soil&Water-6.d, this Amendment approval will satisfy this condition. Here, as in the 2009 Recycled Amendment approval, the Committee has specifically evaluated "the water resources impacts of continued operation and imposes any mitigation necessary to ameliorate any identified impacts." The Committee's proceeding met the substantive requirements of law by (1) complying with the California Environmental Quality Act and (2) determining that the Facility will remain in

[12] See Draft Stipulation and Agreement between HDPP, CEC Staff and DFW, May 26, 2017 (TN #: 217756 Submitted 5/26/2017); see also Transcript of July 10, 2017 Committee Status Conference, pp. 4, 8-9, 11-12, 23-24 (TN #: 220246 Submitted 7/18/2017); Transcript of June 5, 2017 Committee Status Conference, pp. 9-10, 16-28 (TN #: 218802 Submitted 6/15/2017); CEC Staff and DFW joint proposed conditions of certification, July 10, 2017 (TN #: 220108 Submitted 7/10/2017).

[13] TN #: 220246 Submitted 7/18/2017: Transcript of the 07/10/2017 Continued Committee Status Conference, p. 4, lines 4-25.

compliance with all Applicable LORS. It is undisputed that the Committee and the Commission's activities in this pending Amendment will result in a decision that satisfied the requirements of Soil&Water-6.d.

In approving this Amendment, the Committee should find and conclude that the requirements of Soil&Water-6.d have been satisfied by approvals since 2009, by this Amendment, or by both, and delete the language from the Certification as surplusage.

Respectfully Submitted,

ELLISON SCHNEIDER HARRIS & DONLAN LLP
Jeffery D. Harris
Peter J. Kiel
Attorneys for High Desert Power Project, LLC

ATTACHMENT 1

February 14, 2000 (Amended February 15, 2000) – CEC Staff Propose New Condition Soil&Water-6.d in Their Final Testimony

State Of California | The Resources Agency of California

Memorandum

Date : <u>February 14, 2000</u>~~February 10, 2000~~

Telephone: (916) 653-1614

To : Robert A. Laurie, Commissioner and Presiding Member

File: Feb 10, Filings.Doc

From : California Energy Commission - Richard K. Buell
1516 Ninth Street
Sacramento, CA 95814-5512
Siting Project Manager

Subject : **STAFF TESTIMONY FOR FEBRUARY 18, 2000 HEARINGS ON THE HIGH DESERT POWER PROJECT (97-AFC-1)**

Please find attached staff's testimonies in response to the High Desert AFC Committee's February 1, 2000 order. If you have any questions or comments, please call me at (916) 653-1614, or email at rbuell@energy.state.ca.us.

Attachments

RKB:rkb

cc: High Desert Power Project POS List

FINAL STAFF TESTIMONY ON HIGH DESERT

Testimony of Richard K. Buell

INTRODUCTION

In its February 1, 2000 order, the High Desert AFC Committee's stated it would reopened the record to receive evidence on:

- Air Quality – the sufficiency of Emission Reduction Credits obtained by the Applicant;
- Biological Resources – the correct monetary amounts for the mitigation specified in Condition of Certification BIO-7;
- Dry Cooling – supplemental economic information;
- Site Control – evidence of legal entitlement to use proposed site, including any potential growth inducing impacts associated with the entitlement period; and
- Water Agreement – provision of final aquifer storage and recovery agreement, including consistency of terms with proposed "Soil & Water" Conditions of Certification. Applicant and Staff shall also address any potential growth inducing impacts associated with the term of the water agreement, and shall also respond to the specific changes to the proposed Conditions suggested by Mr. Ledford.

Finally, the order stated that the applicant and Staff shall, and other parties may, address concerns raised by the City of Barstow and other commentors on the Presiding Member's Proposed Decision."

This testimony provides staff's findings regarding these points (staff proposed revised BIO-7 condition of certification is contained in separate testimony filed by Marc Sazaki).

AIR QUALITY

On January 14, 2000, the High Desert Power Project, LLC (the applicant), filed the "Applicant[‘s] Motion to Reopen Proceedings for Limited Purpose". This filing contained copies of option agreements the applicant has entered into to obtain emission offset credits (ERCs) for the proposed project. Those option agreements are complete, except for the Crown, Cork and Seal agreement, which appeared to have lapsed. On January 26, 2000, the applicant filed a letter dated December 20, 1999, and signed by representatives of Crown, Cork and Seal and the applicant, extending the option agreement. Although the option agreements have certain potentially sensitive information excised, staff does not believe this information is necessary to establish that the applicant has obtained ERCs. With receipt of the above information, staff believes that the applicant has demonstrated that it has obtained sufficient ERCs to offset the proposed project. Staff further notes that on December 22, 1999, the Mojave Desert Air Quality Management District sent a letter to the Energy Commission staff stating "[t]hese actions … secure sufficient

ERCs to completely offset the HDPP, as required by the Final Determination of Compliance dated June 29, 1999."

DRY COOLING

On January 14, 2000, the applicant provided supplemental testimony of Andy Welch, which addresses the subject of dry cooling. Staff has reviewed this testimony and does not believe it sufficient to conclude that dry cooling is economically infeasible at the High Desert Power Project (HDPP) site.[1] Staff agrees that the project, as mitigated pursuant to staff's Revised Soil & Water Conditions of Certification attached to this testimony, will not result in any significant environmental impacts. Staff also agrees that the ambient conditions (temperature) at the HDPP site are potentially more severe (i.e., have a more significant impact on efficiency) than those at other sites where applicants have proposed dry cooling. However, staff notes that the most severe temperatures will coincide with peak demand for electricity, and consequently, peak prices for electricity. Although dry cooling would make the HDPP less economic, staff does not believe the applicant has demonstrated that the project will not be economically competitive.

As California has moved to a competitive electricity market, some electricity producers have chosen dry cooling for a variety of reasons; the cost of water, estimated long term availability of cooling water, and water quality impacts to name a few. Staff has conducted its water resources analysis of this project, and other projects, to determine whether the use of fresh inland waters would result in any significant environmental impacts. Barring identification of significant environmental impacts, staff has concluded that the decision of which cooling technology to use should be determined by the project developers. Staff acknowledges that future availability of water in California for power plant cooling is highly uncertain. However, staff believes it important to note that the risk in this case is borne by the applicant.

SITE CONTROL

On January 14, 2000, the applicant provided supplemental testimony of Andy Welch, which addresses the subject of site control. Staff has reviewed the information and believes the documents provided establish the applicant's control of the site.

AQUIFER STORAGE AND RECOVERY AGREEMENT

On January 14, 2000, the applicant provided supplemental testimony of Andy Welch, which addresses the "Aquifer Storage and Recovery Agreement for the High Desert Power Project" (the Agreement). The Agreement is attached to the

[1] Staff testimony, presented at the October 1999 Hearings, found that dry cooling was technically feasible, but did not reach a conclusion on the economic feasibility of dry cooling at the HDPP site. If dry cooling were found necessary to mitigate HDPP impacts, additional analysis would be required for staff to reach a conclusion on economic feasibility.

applicant's January 14, 2000 filing, and includes staff's January 4, 2000 Revised Soil & Water Resources conditions of certification. Based on Mr. Gary A. Ledford's comments on the Presiding Member's Proposed Decision (PMPD) and motion opposing the applicant's motion to reopen the record, staff has identified several additional concerns about the terms of the Agreement, clarity of staff's conditions of certification, and potential growth inducing impacts resulting from implementation of the Agreement. These are discussed below.

TERM OF THE AGREEMENT

The term of the agreement is 80 years (section 27.1 of the Agreement). Staff's assessment of ground water impacts was based on 30 years, which was the expected project life identified in the AFC. Staff also notes that if no additional storage is provided, other than that required in the conditions of certification, it is possible that the ground water bank will be depleted at 30 years. Consequently, staff believes that the applicant should be required to update the ground water study and possibly provide additional banking, if the applicant intends to operate beyond 30 years. Staff has proposed a new condition of certification to address this point (see revised Soil & Water condition 6.d. below).

GROWTH INDUCING IMPACTS

Staff agrees with Mr. Ledford that certain aspects of the Agreement could create growth inducing impacts. Staff notes that all of the project's water related facilities are oversized. The Agreement (section 15) allows for VVWD's use of HDPP facilities. VVWD's use of HDPP facilities are potentially growth inducing since this would provide an increased water supply for VVWD, thereby removing an obstacle to growth. Table 1 describes various scenarios staff considered in reaching this conclusion. The magnitude of the growth inducing impacts has not been estimated by staff. However, the most significant effect is created by VVWD's use of the HDPP water treatment facilities, since this provides VVWD access to State Water Project (SWP) water, which is currently not available to VVWD. Increased water supply for VVWD potentially leads to new residential, commercial, agriculture or industrial development in the Victor Valley area. This new growth potentially results in increased air emissions, wastewater and waste production, impacts on ground water (see Table 1), traffic, and impacts on community services. The environmental consequences of these impacts have not been addressed in the HDPP proceeding. Staff has not had the time necessary to provide estimates of the magnitude of these impacts in this testimony, given the fact that this issue arose after the conclusion of the October 1999 hearings.

At this time, staff believes there are two ways that these potential growth inducing impacts could be addressed in the HDPP proceedings: 1) the schedule for the project could once again be extended to provide time the parties to present a detailed analysis of growth inducing impacts; or 2) staff can propose measures which would limit the potential for growth inducing impacts to occur. To expedite this process, staff has included in this testimony proposed measures to limit the potential for growth inducing impacts. These three measures and one to address the point raised by Mr. Ledford about the term of the agreement are identified on Table 1 and discussed below:

TABLE 1 IMPACTS NOT YET EVALUATED

Action Leading To Impact	Impacts To Ground Water	Growth Inducing	Probability Of Occurring	Possible Mitigation
HDPP continues operation beyond 30 years.	Impact uncertain, since staff analysis only examined 30-year life of project. Solution is to add condition to require the ground water study be updated, if the owner wises to extend project life.	None.	Speculative.	Add new condition to revisit water study after thirty years. (Soil&Water 6.d.)
VVWD uses HDPP wells to supply domestic needs during 30 years of project life.	No impact because Soil & Water Conditions 5 and 17 would require production from HDPP wells to be offset by reductions from wells closer to Mojave River.	VVWD use of HDPP wells could lead to lower water rates, which could encourage increased water demand. However, increased demand could only be met from wells farther away than the HDPP wells, which could tend to raise rates. It is unclear whether these pricing impacts would be offsetting.	There is a low probability of growth inducing impacts occurring since the economic benefit is uncertain and likely small.	Soil & Water Resources conditions address these impacts. (Soil&Water 5 and 17)
VVWD uses HDPP wells to supply domestic needs after 30 years of project life	Impact to ground water is uncertain, since it is unclear what steps will have been taken to address the overdraft or mitigate impacts. Presumably, VVWD's use of HDPP wells would be governed by the Adjudication or any subsequent agreement or requirements to mitigate ground water impacts.	Speculative, since it is not clear what economic or environmental conditions will exist in 30-years.	High probability of occurring.	Add new condition requiring future operation of the water facilities to be addressed in the closure plan for the project (Soil&Water Verification to condition 6).
VVWD uses HDPP wells to supply domestic needs after project premature closure in 1 to 30 years.	Impacts to ground water are possible, since there is no reasonable expectation that the ground water overdraft problem will be solved.	Potentially growth inducing because VVWD will have additional wells to supply growth in the area.	Significant probability of the project failing due to unavail-ability of SWP water. However, if SWP water is unavailable because it is being used to mit-igate overdraft problem, there is a lower probability of water impacts. If SWP water is not available, probability of growth inducing impacts is lower since water rates in area could rise.	Add new conditions requiring the project owner to maintain ownership of water facilities, and requiring future operation of the wells to be addressed in the closure plan for the project. (Soil&Water Verification to condition 6 and condition 7).
VVWD uses HDPP water treatment facility to treat SWP water for domestic use.	No impacts to ground water, unless VVWD's use of SWP water displaces water need for ground water recharge.	Potentially growth inducing because VVWD will have additional water supplies.	High probability of occurring.	Add new condition requiring the project owner to maintain ownership of water facilities and limiting VVWD's use of water treatment facilities to emergency conditions. (Soil&Water 17 4)).

1. Add new condition to revisit water study after thirty years. (Soil&Water 6.d)

   By requiring the ground water study to be reevaluated in thirty years, should the owner wish to continue operation, the amount of ground water in the bank would be assessed and any measures needed to mitigate impacts on ground water due to further operation could be identified.

2. Add new condition requiring the applicant to maintain ownership of water facilities. (Soil&Water7)

   The Energy Commission as lead agency must review construction and operational impacts of all aspects of the proposal. Our analysis to date has not evaluated the use of the project's water facilities by others, which could have growth inducing impacts. The Energy Commission cannot allow the use of these facilities by others, until such an analysis is conducted.

3. Add new condition requiring future operation of the water facilities to be addressed in the closure plan for the project. (Verification to Soil&Water 6)

   By requiring the operation of the water facilities to be addressed in the closure plan for the project, the Energy Commission will be able to assess any potential environmental impacts resulting from future operation of the wells.

4. Add new condition limiting VVWD's use of water treatment facilities to emergency conditions. (Soil&Water 17 4))

   By limiting VVWD's use of the water treatment facilities to emergency conditions, VVWD's water supply will not increase, and thus, an environmental impact will not result from allowing VVWD access to a new supply of water.

These measures are incorporated in the Revised Conditions of Certification below. If these conditions are not acceptable to the applicant or VVWD, either of these parties could conduct a detailed assessment of the growth inducing potential of VVWD's use of HDPP facilities.

CLARIFICATION OF SOIL & WATER RESOURCES CONDITIONS OF CERTIFICATION

At the hearing on the PMPD, Mr. Ledford raised a number of issues regarding the clarity of staff's proposed conditions of certification. Staff's revised conditions of certification provide clarification based on Mr. Ledford's comments. Conditions that have substantial changes from those presented in the PMPD or are additions are shown underlined.

RESPONSE TO CITY OF BARSTOW COMMENTS

On January 14, 2000, the City of Barstow (the City) filed comments on the PMPD on four points. On February 7, 2000, the City file a letter with the applicant indicating that Mr. Buck Johns had allayed their concerns. The City identified that the location of Pearblossom Highway was incorrectly shown on page 14. Staff recommends that the revised PMPD correct this error.

The City raised concerns regarding whether the City would be "penalized" by the purchase of interpollutant/interbasin emission reduction credits. The City correctly notes that the PMPD states that “[p]roject NOx and VOC emissions could, however, contribute to O3 violation in areas downwind, such as Barstow.” Staff believes this is an accurate statement. However, staff believes that the proposed interpollutant/interbasin emission reductions in combination with implementation of the Mojave Desert Air Quality Management District’s attainment plan will ensure than no significant impacts occur downwind in Barstow.

The City raised concerns regarding the annual water use of the project and regarding the project’s potential impacts to the ground water overdraft problem. The proposed project will bank 13,000 acre-feet of water to supply water during a hypothetical three year drought. The maximum annual consumption of the project is 4,000 acre-feet per year.

The City’s last comment relates to the cost effectiveness of dry cooling. This issue is discussed above.

REVISED CONDITIONS OF CERTIFICATION

SOIL&WATER-1 The only water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9.

a. Whenever SWP water is available to be purchased from MWA, the project owner shall use direct delivery of such water for project operation.

b. Whenever water is not available to be purchased from the MWA, the project owner may use SWP water banked in the seven HDPP wells identified in Figure Number 1 of the Addendum Number 1 to the “Evaluation of Alternative Water Supplies for the High Desert Power Project” (Bookman-Edmonston 1998) as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to **SOIL&WATER-5.**

c. If there is no water available to be purchased from the MWA and there is no banked water available to the project , as determined pursuant to **SOIL&WATER-5**, no groundwater can be pumped, and the project can not operate. At the project owner’s discretion, dry cooling may be used instead, if an amendment to the Commission’s decision allowing dry cooling is approved.

Verification: See verification for conditions 2, 3 and 6.

SOIL&WATER-2 The project owner shall provide a copy of the storage agreement between the Mojave Basin Area Watermaster (Mojave Water Agency) and VVWD prior to the initiation of any groundwater banking, and on an annual basis thereafter.

Verification: The project owner shall submit to the CEC CPM a copy of the application for a storage agreement with the Mojave Basin Area Watermaster at the time the application is filed. The project owner shall submit to the CEC CPM a copy of the approved storage agreement from the Mojave Basin Area Watermaster within fifteen (15) days of receipt of the agreement.

SOIL&WATER-3 The project owner shall provide a copy of a "Will Serve Letter" from VVWD to the CEC CPM prior to the start of commercial operation.

Verification: The project owner shall provide a copy of a "Will Serve Letter" from VVWD to the CEC CPM within thirty (30) days of its receipt by the project owner.

SOIL&WATER-4 Injection Schedule:

a. The project owner shall inject one thousand (1000) acre-feet of SWP water within twelve (12) months of the commencement of the commercial operation. During this period, the project owner may pump banked groundwater that is available to the project as determined by **SOIL&WATER-5**.

b. By the end of the fifth year of commercial operation, the amount of water injected minus the amount of banked groundwater used for project operation shall meet or exceed thirteen thousand (13,000) acre-feet.

c. After the fifth year of commercial operation and until three (3) years prior to project closure, the project owner shall replace banked groundwater used for project operation as soon as SWP water is available for sale by MWA. The project owner may choose to delay replacement of a limited quantity of banked groundwater used for project operations during aqueduct outages until the cumulative amount of groundwater withdrawn from the bank reaches one thousand (1,000) acre-feet. Once the limit of one thousand (1,000) acre-feet has been reached, the project owner shall replace banked groundwater used for project operation during aqueduct outages as soon as SWP water is available for sale by MWA.

Verification: See the verification to condition 5.

SOIL&WATER-5 Calculation of Balance:

a. The amount of banked groundwater available to the project shall be calculated by the CEC staff using the HDPP model, FEMFLOW3D. The amount of banked groundwater available shall be updated on a calendar basis by the CEC staff, taking into account the amount of groundwater pumped by the project during the preceding year and the amount of water banked by the project during the preceding year.

b. When calculating the amount of banked groundwater available to the project, CEC staff shall subtract any amount of water that is produced by Victor Vally Water District (VVWD) from the project wells for purposes other than use by the project that exceeds the baseline, as defined in **Soil&Water-17(1)**.

c. Each annual model run shall simulate the actual sequence of historic pumping and injection since the injection program began. From the model runs, the CEC Staff shall determine the amount of groundwater available for each new calendar year. If the amount of banked groundwater available to the project is less than one (1) year's supply plus 1,000 acre-feet, the CEC Staff shall determine the amount of groundwater available to the project on a quarterly basis.

Verification: During the period beginning eighteen (18) months after the start of rough grading and ending the end of the first month after one full year (12 months) of commercial operation, the project owner shall provide a monthly report to the CEC CPM and to the CDFG on the progress of construction of the project wells, and shall identify the amount of SWP water injected and the amount of groundwater pumped during the previous month.

After the end of the first month after one full year (12 months) of commercial operation, the project owner shall submit to the CEC CPM and to the CDFG in writing, on a quarterly basis, a monthly accounting of all groundwater pumped and all SWP water treated and injected for the preceding quarter. Within thirty (30) days of receipt of the approved annual storage agreement, pursuant to **SOIL&WATER-2**, the project owner shall submit to the CEC CPM and to the CDFG an annual written estimate of the anticipated amount of SWP water that will be banked and the anticipated amount of groundwater that will be pumped in the coming year. If the amount of banked groundwater available to the project is less than one (1) year's supply plus one thousand (1,000) acre-feet, quarterly estimates of anticipated injection and withdrawal will be required;

CEC Staff shall use this information in the HDPP model to evaluate the amount of banked groundwater available and to calculate the approximate rate of decay. CEC Staff shall notify the project owner within thirty (30) days of the amount of banked groundwater available to be pumped in the new calendar year or in the next quarter, if applicable.

SOIL&WATER-6 Banked Water Available for Project Use:

a. The amount of banked groundwater available to the project during the first twelve (12) months of commercial operation is the amount of SWP water injected by the project owner into the High Desert Power Project (project) wells, minus the amount of groundwater pumped by the project owner, minus the amount of dissipated groundwater.

b. The amount of banked groundwater available to the project after the first twelve (12) months of commercial operation is the amount of SWP water injected by the project owner into the project wells, minus the amount of groundwater pumped by the project owner, minus the amount of dissipated groundwater, minus one thousand (1,000) acre feet.

c. During the three (3) years prior to project closure, the project owner may withdraw the balance of banked groundwater determined to be available to the project, except for one thousand (1,000) acre-feet, pursuant to **SOIL&WATER-5.** The project owner is not required to replace this final withdrawal of groundwater. However, during the three years prior to project closure, at no time may the balance of banked groundwater decline below one thousand (1,000) acre-feet. Furthermore, there must be a remaining balance of one thousand (1,000) acre-feet banked in the groundwater system at closure, as determined to be available to the project pursuant to **SOIL&WATER-5**.

d. The project shall not operate for longer than 30 years unless the Commission has approved an amendment to its license that specifically evaluates the water resources impacts of continued operation and imposes any mitigation necessary to ameliorate any identified impacts.

e. No water is available for project use if the requirements of **SOIL&WATER-4** are not met by the project owner.

Verification: The project owner shall use the same verification as for **SOIL&WATER-5**; however, in addition, any facility closure plan submitted during that last three years of commercial operation shall address the disposition of any remaining water available to the project, as well as the disposition of the pipeline, wells, and water treatment facility.

SOIL&WATER-7 The project owner shall retain ownership of all project facilities, including the water pipeline, the project wells, and the water treatment facility. The project owner may enter into a contract allowing operational control by the Victor Valley Water District, providing that the contract contains the provisions identified in SOIL&WATER 18.

Verification: Should the project owner choose to sell facilities, it must apply for an amendment to the Energy Commission Decision, and include an evaluation of any environmental effects associated with the transfer of ownership to another entity.

SOIL&WATER-8 The project owner shall conduct pumping tests in all project wells to establish *in situ* hydraulic parameters including transmissivity and storativity in the Regional Aquifer. From these parameters and the project well-log data, the project owner shall calculate the following site-specific values:

- effective horizontal hydraulic conductivity
- effective vertical hydraulic conductivity
- specific yield, if pumping tests indicate the aquifer is unconfined, or
- specific storage, if aquifer is confined.

Prior to conducting the pumping test, the project owner shall submit a work plan detailing the methodology to be used to conduct the proposed pumping tests and to calculate the specified parameters and values to the CEC CPM and to the CDFG for review and approval.

Based upon the information generated by the pumping tests, CEC Staff shall revise the HDPP model to reflect the results of the pumping tests. All modeling runs referred to in **SOIL&WATER-5** shall incorporate the results of these pumping tests, following approval by the CEC CPM determined pursuant to this condition.

Protocol: The pumping tests shall provide data to calculate the *in situ* hydraulic parameters of the Regional Aquifer.

- At a minimum the pumping tests for all HDPP wells shall include the measurement of drawdown in at least one (1) non-pumping (observation) well that is screened at the same depth as the pumping well.
- Observation well(s) for each pumping test must be sufficiently close to the pumping well that pumping produces measurable drawdown of sufficient duration in the observation well(s) to analyze the site-specific hydraulic parameters including transmissivity and storativity in the Regional Aquifer.
- In addition, if the observation well data indicates a slow release of groundwater from storage, the pumping test shall be extended until the release from storage can be observed to stabilize in a plot of the data from the observation well(s). (For a description of the evaluation of storativity under slow release conditions, see Driscoll, F.G., 1986, Groundwater and Wells, H.M. Smyth, Inc., p. 229-230).
- Single well pumping tests and pumping tests that do not produce enough measurable drawdown in observation wells to conclusively calculate hydraulic parameters will not meet the Conditions of Certification.

Verification: The project owner shall submit to the CEC CPM and to the CDFG, six (6) months prior to the start of pumping tests, the work plan that details the methodology for conducting the proposed pumping tests on the seven (7) HDPP wells and for calculating the specified parameters and values. With the approval of the work plan by the CEC CPM, in consultation with the CDFG, the project owner shall perform the pumping tests following the CEC protocol.

Within two (2) months after the completion of pumping tests, the project owner shall submit to the CEC CPM and to the CDFG a report detailing how the pumping tests were conducted and the results of the tests, including the calculation of: (1) the *in situ* hydraulic parameters of transmissivity and storativity for the Regional Aquifer; and (2) the site-specific values of effective horizontal hydraulic conductivity, effective vertical hydraulic conductivity, and specific yield and/or specific storage.

SOIL&WATER-9 The project owner shall modify the HDPP model grid to accommodate the representation of gradational changes in the hydraulic conductivity of the Regional Aquifer, in conformance with the USGS Mojave River Groundwater Basin model.

The CEC Staff shall revise the HDPP model, using the modified grid, to incorporate the gradational changes in the hydraulic conductivity of the Regional Aquifer represented in the USGS Mojave River Groundwater Basin model.

All modeling runs referred to in **SOIL&WATER-5** shall incorporate the modifications of the model along with the model information obtained from the USGS following approval by the CEC CPM determined pursuant to this condition.

Verification: The project owner shall submit the modified model grid input files (including updated versions of any other input files that are effected by the modification of the grid) within two (2) months after the construction of the HDPP wells to the CEC Staff for review and approval, in consultation with the CDFG.

SOIL&WATER-10 The project owner shall prepare an annual report of describing groundwater level monitoring performed as follows. The project owner shall monitor groundwater levels in all project wells, in VVWD wells 21, 27, 32, and 37, in Adelanto wells 4 and 8a, and in all other wells within a one (1) mile radius of the project wells. Groundwater monitoring shall also be conducted within the Mojave River Aquifer Alluvium. Additional monitoring wells specified by VVWD for the evaluation of well interference within Pressure Zone 2 should also be included. Monitoring shall be performed on a quarterly basis starting within six (6) months after the start of rough grading.

Verification: The project owner shall annually submit a copy of the groundwater level monitoring report to the CEC CPM, the CDFG, the MWA and the VVWD.

SOIL&WATER-11 The project owner shall submit an approved Waste Discharge Requirement prior to the start of any groundwater banking unless the Regional Water Quality Control Board (RWQCB) decides to waive the need to issue a waste discharge requirement or waive the need for the project owner to file a Report of Waste Discharge.

Verification: The project owner shall submit a copy of the approved Waste Discharge Requirement from the Lahontan RWQCB to the CEC CPM within sixty (60) days of the start of rough grading. The project owner shall also submit to the CEC CPM a copy of any additional information requested by the RWQCB as part of their evaluation of the application. If the RWQCB decides to waive the need to file a Report of Waste Discharge or the need for a waste discharge requirement, the project owner shall submit a copy of the letter from the RWQCB to the CEC CPM. If a waste discharge requirement is required by the RWQCB, the project owner shall provide a copy of the approved permit to the CEC CPM.

SOIL&WATER-12 The project owner shall prepare and submit to the CEC CPM and, if applicable, to the Lahontan RWQCB for review and approval, a water treatment and monitoring plan that specifies the type and characteristics of the treatment processes and identify any waste streams and their disposal methods. The plan shall provide water quality values for all constituents monitored under requirements specified under California Code of Regulations, Title 22 Drinking Water Requirements from all production wells within two (2) miles of the injection wellfield for the last five (5) years.

The plan shall also provide SWP water quality sampling results from Rock Springs, Silverwood Lake or other portions of the East Branch of the California Aqueduct in this area for the last five (5) years. Also identified in the plan will be the proposed treatment level for each constituent based upon a statistical analysis of the collected water information. The statistical approach used for water quality analysis shall be approved prior to report submittal by the CEC CPM and, if applicable, the RWQCB. Treatment of SWP water prior to injection shall be to levels approaching background water quality levels of the receiving aquifer or shall meet drinking water standards, whichever is more protective. The plan will also identify contingency measures to be implemented in case of treatment plant upset.

The plan submitted for approval shall include the proposed monitoring and reporting requirements identified in the Report of Waste Discharge (Bookman-Edmonston 1998d) with any modifications required by the RWQCB.

Verification: Ninety (90) days prior to banking of SWP water within the Regional Aquifer, the project owner shall submit to the Lahontan RWQCB and the CEC CPM a proposed statistical approach to analyzing water quality monitoring data and determining water treatment levels. The project owner shall submit the SWP water treatment and monitoring plan to the CEC CPM and, if appropriate, to the Lahontan RWQCB for review and approval. The CEC CPM's review will be conducted in consultation with the MWA, the VVWD, and the City of Victorville. The plan submitted for review and approval shall reflect any requirements imposed by the RWQCB through a Waste Discharge Requirement.

SOIL&WATER-13 The project owner shall implement the approved water treatment and monitoring plan. All banked SWP water shall be treated to meet local groundwater conditions as identified in Condition **SOIL&WATER-2**. Treatment levels may be revised by the CEC and, if applicable, by the RWQCB, based upon changes in local groundwater quality identified in the monitoring program not attributable to the groundwater-banking program. Monitoring results shall be submitted annually to the CEC CPM and, if applicable, to the RWQCB.

Verification: The project owner shall annually submit monitoring results as specified in the approved plan to the CEC CPM. The project owner shall identify any proposed changes to SWP water treatment levels for review and approval by the CEC and, if appropriate, the Lahontan RWQCB. The project owner shall notify the RWQCB, the VVWD and the CEC CPM of the injection of any inadequately treated SWP water into the aquifer due to an upset in the treatment process or for other reasons. Monitoring results shall be submitted to the CEC CPM

SOIL&WATER-14 The project owner shall provide access to the United States Air Force for all efforts to characterize and remediate all soil and groundwater contamination at the power plant site.

Verification: The project owner shall submit in writing a copy within two (2) weeks of receipt of any request from the Air Force for site access to characterize or remediate contaminated soil and/or groundwater to the CEC CPM.

SOIL&WATER-15 Prior to beginning any clearing, grading or excavation activities associated with closure activities, the project owner must submit a notice of intent to the State Water Resources Control Board to indicate that the project will operate under provisions of the General Construction Activity Storm Water Permit. As required by the general permit, the project owner will develop and implement a Storm Water Pollution Prevention Plan.

Verification: Two (2) weeks prior to the start of construction, the project owner will submit to the CEC CPM a copy of the Storm Water Pollution Prevention Plan.

SOIL&WATER-16 Prior to the initiation of any earth moving activities, the project owner shall submit an erosion control and revegetation plan for CEC Staff approval. The final plan shall contain all the elements of the draft plan with changes made to address the final design of the project.

Verification: Thirty (30) days prior to the initiation of any earth moving activities, the final erosion control and revegetation plan shall be submitted to the CPM for approval, in consultation with the CDFG.

Soil & Water 17 The project owner shall enter into an Aquifer Storage and Recovery Agreement with the Victor Valley Water District (VVWD). This agreement shall contain the following conditions:

1) It shall prohibit VVWD from producing or allowing others to produce water from project wells, except that VVWD may produce water from project wells: (i) for use by the HDPP project pursuant to Soil & Water 1; and (ii) for purposes other than use by the HDPP project pursuant to Soil & Water 1 provided that such production, in combination with production from the VVWD wells identified in "c" below does not exceed the amount identified as "the baseline", as defined in “a” below.

a. The contract shall define the baseline as the average aggregated annual production of the wells identified in "c" during the immediately preceding five years. The contract shall state that any water produced by VVWD pursuant to (ii) above shall be included in subsequent calculations of the baseline only if that production does not exceed the baseline for the calendar year in which the production occurs, as required by this condition.

b. The contract shall require VVWD to establish the first baseline using the five calendar years preceding the operation of the project wells, and shall re-calculate the baseline on a calendar year basis by January 15 of each year.

c. The contract shall state that "wells identified in "c" means VVWD wells that are located in a corridor two to two and one half miles wide adjacent to and west of the river's western bank including all wells within the following land sections:

- Within Township 6 North, Range 4 West, sections 31, 32, 33, and 34.
- Within Township 5 North, Range 4 West, sections 4, 5, the east ½ of 8, 9, 10, 15, 16, the east ½ of 21, 22, 23, 25, 26, 27, the east ½ of 28, the east ½ of 33, 34, 35, and 36.

2) It shall state that the project owner shall provide to the CEC CPM and CDFG on a quarterly basis a monthly accounting of 1) all water pumped from project wells that is supplied to the project owner, and 2) water pumped from project wells that is supplied to VVWD

3) It shall state that VVWD shall provide to the CEC CPM and CDFG a baseline calculation no later than January 15 of each year.

4) The contract shall prohibit VVWD from using the water treatment facility except in emergency circumstances. In no event, shall VVWD use of the treatment facility exceed fourteen days in any calendar year, unless the Energy Commission has approved an amendment to the project decision allowing such use.

5) The contract may include terms that require VVWD to compensate HDPP for any costs associated with subtractions from the amount of banked groundwater available to HDPP under the terms of Soil&Water-5(c).

Verification: The project owner shall provide to the CEC CPM and CDFG a copy of a signed Aquifer Storage and Recovery Agreement with the terms described above prior to certification of the project. Any amendments to this agreement shall be approved by the CEC CPM 30 days prior to the effective date of the amendment.

Soil & Water 18 The project owner shall ensure that flow meters are installed on project wells such that the total amount of water injected and produced on a monthly basis can be determined. In addition, the project owner shall ensure that separate flow meters are installed on 1) that portion of the water delivery system that is dedicated to providing water to the project owner; and 2) on that portion of the water delivery system that will be used to provide water to VVWD pursuant to Soil & Water 17 (2).

Verification: The project owner shall provide to the CEC CPM and CDFG on a quarterly basis a monthly accounting of 1) all groundwater injected into project wells; 2) water pumped from project wells that is supplied to the project owner, and 3) water pumped from project wells that is supplied to VVWD.

BIOLOGICAL RESOURCES

Testimony of Marc Sazaki

INTRODUCTION

Prior to and up until the Committee's 10/07/99 hearing, CEC staff worked with representatives from the California Department of Fish and Game (Department), the U.S. Bureau of Land Management (Bureau), the U.S. Fish and Wildlife Service, and the High Desert Power Project to develop adequate mitigation for project related short- and long-term habitat loss affecting the desert tortoise (*Gopherus agassizii*) and the Mohave ground squirrel (*Spermophilis mohavense*). The desert tortoise is state and federally listed as a "threatened species. The Mohave ground squirrel is state listed as a "threatened species", but is not federally listed.

All parties agreed that the loss of desert tortoise habitat should be compensated by acquiring 1,242.8 acres of suitable habitat off site. Similarly, suitable habitat should be acquired and protected for Mohave ground squirrel. Through a Memorandum of Understanding between the Department and the Bureau, projects resulting in desert tortoise habitat loss would be compensated by acquiring replacement habitat and transferring it in fee title to either the state or federal government. If most of the impact occurs on state land, the state would be entitled to all the compensation lands. On the other hand, if most of the impact occurs on federal land, the federal government would be entitled to all the compensation lands.

Shortly before the aforementioned hearing, the Bureau informed CEC staff and the Department that compensation for desert tortoise habitat loss associated with High Desert Power Project actions on federal land would have to go to the federal government. Therefore, of the 1,242.8 acres of habitat compensation, the Bureau would require, as part of the right-of-way grant for the-32 mile natural gas pipeline that goes from the project to Kramer Junction, that 318.1 acres be provided to the Bureau (BLM 1999). This leaves 924.7 acres of desert tortoise habitat compensation that should go to the state if the project and 32-mile gas pipeline are constructed. If the project is constructed without the 32-mile gas pipeline, only 167.8 acres would go to the state and none to the Bureau.

CEC staff made an effort to adjust the estimated costs of the habitat compensation arising from the Bureau's change in position, but since the hearing, it has become apparent that the outcome was not only unclear, but incorrect because the adjustments made were simply based on a direct ratio between the acreage that would go to the state and the acreage that would go to the Bureau. In addition, for the project with the 32-mile gas pipeline, the wrong amount ($313,078.00) for initial protection of the land was mistakenly entered for that cost estimate.

For the new habitat compensation allocation between the state and federal government, 924.7 acres and 318.1 acres respectively, CEC staff re-ran the Property Analysis Record program that was originally used before the Bureau changed its position on habitat compensation. The outcomes are presented in Attachment 1 and Attachment 2. Attachment 1 considers the project and the 32-

mile gas pipeline (924.7 acres), while Attachment 2 considers the project without the 32-mile gas pipeline (167.8 acres). The dollar amounts presented are estimates for the purpose of establishing security deposits and endowment costs.

For 924.7 acres, the estimated costs are: $873,393.73 for acquiring and transferring the habitat , $52,200.08 for initial protection of the land, and $482,640.00 to provide an endowment for long-term management. If the 32-mile gas pipeline is not constructed, the estimated costs for 167.8 acres are: $162,361.87 for acquiring and transferring the habitat , $36,014.45 for initial protection of the land, and $353,100.00 to provide an endowment for long-term management.

Based on this analysis, CEC staff recommends the Presiding Member's Proposed Decision incorporate a new **BIO-7** Condition of Certification as specified below.

CONDITIONS OF CERTIFICATION

BIO-7 Prior to the start of rough grading of the project or any related facilities, the project owner shall acquire, protect, and transfer 924.7 acres (167.8 acres if the pipeline to Kramer Junction is not built) of land that the CPM, in consultation with the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS), approves as suitable habitat of the desert tortoise and Mohave ground squirrel. Fee title to the land shall be transferred to CDFG or, with the approval of the CPM and CDFG in consultation with the USFWS, to another public agency or a private non-profit conservation organization. If fee title is not transferred to CDFG, then the project owner shall ensure that a conservation easement approved by CDFG is recorded in favor of CDFG prior to transfer of fee title. Prior to transfer of fee title, the project owner shall provide $482,640.00 ($353,100.00 if the pipeline to Kramer Junction is not built) for establishment of a non-wasting endowment for the benefit of the fee title grantee to provide for the long-term management of the habitat lands. The project owner shall obtain approval of the CPM and CDFG of terms governing use and maintenance of the endowment fund.

The project owner may proceed with site disturbance for the project and related facilities prior to completing the requirements in this condition if the project owner establishes a trust account or irrevocable letter of credit approved by the CPM and CDFG, in the amount of $1,403,234.00 ($551,476.00 if the pipeline to Kramer Junction is not built). The security shall be provided to CDFG prior to commencement of any site disturbance and shall be maintained until all requirements of this condition are approved by the CPM and CDFG as complete.

Any remaining security after satisfaction of this condition, as determined by the CPM in consultation with CDFG, shall be returned to the provider of the security. The amount of the security is calculated as follows:

1. Estimated cost of acquiring and transferring 924.7 acres of habitat: $873,393.73 (167.8 acres and $162,361.87 if the pipeline to Kramer Junction is not built).
2. Estimated cost of initial protection of the land: $52,200.08 ($36,014.45 if the pipeline to Kramer Junction is not built).
3. Estimated cost of endowment for long-term management: $482,640.00 ($353,100.00 if the pipeline to Kramer Junction is not built).

If security is provided to allow the commencement of site disturbance prior transfer of habitat lands, the project owner must complete the required acquisition, protection, and transfer of land no more than twelve (12) months after the start of site disturbance and the endowment must be established for the benefit of the fee title grantee prior to transfer of the land. CDFG shall be entitled to draw upon the security to carry out requirements not completed by the project or within twelve (12) months from the start of site disturbance.

Verification: At least thirty (30) days prior to the start of surface disturbance on the project site or any related facilities, the project owner shall provide the CPM with a copy of the draft or form of letter of credit established pursuant to this Condition of Certification. The project owner shall provide the CPM and the CDFG a copy of the final letter of credit not fewer than five (5) business days prior to the start of surface disturbance, or at a later mutually agreed upon time. Upon completion of the acquisition and transfer of the habitat lands to the approved recipient(s), the project owner shall provide the CPM with copies of all title transfer records or records verifying other approved transactions.

REFERENCES

BLM (Bureau of Land Management) 1999. Letter from District Manager, BLM California Desert District to Field Office Supervisor, FWS Ventura Field Office, 2493 Portola Road, Suite B, Ventura, CA 93003. Subject: Initiation of Endangered Species Act (ESA) Section 7 Consultation on Southwest Gas Corporation's Proposed Natural Gas Pipeline for Service to the High Desert Power Project in San Bernardino County, California. Dated: December 22, 1999.

ATTACHMENT 2

August 14, 2008 – Project Owner Files Petition For Modification to Remove the Prohibition on Use Of Recycled Water

HIGH DESERT POWER PROJECT LLC
www.HIGHDESERTPOWER.com

DOCKET
97-AFC-1C
DATE AUG 1 4 2008
RECD. AUG 1 4 2008

PETITION FOR MODIFICATION TO USE RECLAIMED WATER

Submitted by the High Desert Power Project
To Modify
CEC Docket No. 97-AFC-1

For Submittal to:

California Energy Commission
Energy Facilities Siting and Environmental Protection Division
1516 9th Street
Sacramento, California 95814-5512

August 12, 2008

TABLE OF CONTENTS

1.0 INTRODUCTION

High Desert Power Project, LLC ("HDPP") hereby requests California Energy Commission ("CEC") to remove the CEC prohibition on the use of reclaimed water at the HDPP facility located in the City of Victorville which is the subject of the CEC Certification number 97-AFC-1 (the "Facility"). The reclaimed water will allow HDPP to reduce the amount of State Water Project ("SWP") water used and consumed at the Facility, allowing other beneficial use of this valuable surface water source. Historically, the CEC staff has strongly recommended the use of reclaimed water at power plants when it is available, including use at the Facility (see Attachment A).

The CEC adopted a Water Policy in the 2003 Integrated Energy Policy Report that requires developers of new power plants to use alternative water supply sources and alternative technologies unless they prove to be environmentally undesirable or economically unsound.[1] HDPP's proposal to use reclaimed water at the Facility is in concert with this policy. The use of reclaimed water is in line with the goals and strategic objectives of the State of California.

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 Zero Liquid Discharge ("ZLD") system to process reclaimed water. HDPP is seeking to obtain a supply of reclaimed water from the City of Victorville. In the future, reclaimed water could replace SWP water entirely for cooling and other industrial purposes. Every acre-foot of reclaimed water used would reduce the amount of SWP water required annually, potentially up to a 100% reduction.

This petition (this "Petition") requests amendments to two Conditions of Certification ("COC") as follows:

> **SOIL&WATER-1** (S&W-1) currently prohibits the use of reclaimed water at HDPP and requires modification to allow the use of reclaimed water.
>
> **SOIL&WATER-4d** (S&W-4d), revised by the CEC on July 19, 2006, specifies the amount of water to be injected into the aquifer banking system ("ABS"). The use of reclaimed water will reduce HDPP's need for SWP water allowing for proportionate reduction in the ABS banking requirement.

[1] Letter to Ramiro Garcia of Constellation Energy from Stephen Munro of CEC dated January 9, 2006. (see Attachment A)

If this Petition is approved, the Facility plans to use reclaimed water produced from local municipal and industrial sources treated to applicable CCR Title 22 standards. HDPP expects that the reclaimed water supply would be reliable and that any interruption would be infrequent and brief in duration, and would be backed up with SWP water (primary backup) and banked aquifer water (secondary backup) in the event of interruption.

HDPP plans to build facilities within the Facility fence line to receive and utilize reclaimed water. These facilities may initially be temporary facilities until HDPP has tested the capacity for its ZLD system to process reclaimed water. Permanent facilities within the Facility fenceline will be constructed based on the results of the evaluation. The facilities to be constructed that are described in this paragraph above are referred to herein as the "Water Facilities." Reclaimed water will be delivered to the Facility fence line via pipeline.

This Petition meets all the requirements for approval under applicable California regulations. 20 CCR § 1769(a)(1)(A-I). The Petition contains the requisite description of the water supply supplement and its historical context. The proposed modifications and the Water Facilities have been evaluated for compliance with all CEC COCs and applicable laws, ordinances, regulations and standards (LORS), and for potential impacts to the environment and the public. With the exception of S&W-1 and revised S&W-4(d), all COCs and applicable LORS would be met and, as the information submitted with this request indicates, there would be no significant impacts as a result of implementing the proposal.

2.0 DESCRIPTION OF PROPOSED RECLAIMED WATER SYSTEM

Delivery of Reclaimed Water and Use by HDPP

Currently, SWP water is the primary source of industrial water supply for HDPP. HDPP's annual usage was designed for up to 4,000 acre-feet/yr; however, actual historical use has been on the order of 3,000 acre-feet/yr based on dispatch. HDPP expects the dispatch of the Facility to increase with the growing demand for electricity in Southern California with a corresponding increase in water demand above 3,000 acre-feet/yr.

Initially, reclaimed water will be piped directly into the Facility's cooling tower and will be used for cooling purposes only. In the future, reclaimed water may be used for other industrial purposes besides cooling subject to the appropriate treatment standards in CCR Title 22.

The quantity of reclaimed water for initial usage in the cooling tower cannot be precisely determined at this time because it will be based on the specific conductivity (which is an indicator of Total Dissolved Solids) of the SWP water as well as the specific conductivity and silica content of the reclaimed water needed to achieve an acceptable blend. Without further treatment of the reclaimed water, HDPP anticipates that the specific conductivity of the reclaimed water will be approximately 25% to 40% higher than average SWP water; consequently, an increase in cooling tower blowdown will be required to meet the PM_{10} air emissions permit conditions. Cooling tower blowdown is ultimately limited by the capacity of the ZLD treatment system. Thus, the maximum amount of reclaimed water that may be used as make-up water to the cooling tower will initially be limited due to water chemistry limitations, but could reach 100% in the future if additional treatment of the reclaimed water is implemented prior to delivery to the Facility. Furthermore, reclaimed water could entirely replace SWP water for all other industrial uses in the future depending on other process water quality considerations.

HDPP will install an additional reclaimed water treatment system at the Facility to provide another barrier against any bacteria and viruses that may be present. A medium-pressure UV reactor will be installed in the piping. The system will consist of several UV light sources that travel across the cross section of the pipe with fully automatic operation. A quartz cleaning system will maintain the effectiveness of the light source. The treatment will kill microorganisms that are present in the water without producing harmful by-products.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS

The Water Facilities have been evaluated for potential impacts to soil & water, biological resources, and air quality. Since Water Facilities would be located within the already-disturbed plant site footprint, no known cultural/paleontological resources would be affected. Similarly, the addition of the Water Facilities will not affect the other technical areas analyzed in the Commission Decision including air quality, hazardous materials handling, public health, noise, socioeconomics, land use, visual resources, and traffic and transportation.

3.1 SOIL & WATER

Use of reclaimed water at the Facility will not have a negative impact on soil or water. Agreements are in-place between the California Department of Fish and Game ("CDFG") and the local wastewater treatment plant regarding the amount of water that must be discharged into the Mojave River. Only excess reclaimed water above this amount available within the Victorville community will be provided to the Facility.

Additionally, use of reclaimed water by the Facility would reduce the amount of SWP water consumed by the Facility and allows this water to be placed in service for other beneficial uses.

3.2 BIOLOGICAL RESOURCES

The Water Facilities would be located within the already-disturbed plant site footprint and therefore no sensitive species habitat would be affected.

In addition, construction of the Water Facilities would not impact any U.S. Fish and Wildlife Service, CDFG, or U.S. Army Corps of Engineers jurisdictional waters (e.g., desert washes). Therefore, implementation of the proposal would not cause any additional disturbance to biological resources. The HDPP Biological Resources Mitigation Implementation and Monitoring Plan ("BRMIMP") would be fully implemented, including the presence of monitors as appropriate, to ensure that any biological resources located on adjacent lands are protected and to prevent animals from entering construction areas.

3.3 AIR QUALITY

The Facility will continue to comply with the Mojave Desert Air Quality Management District ("MDAQMD") permit conditions for the cooling tower (MDAQMD Permit No. B005278). The permit limits the maximum hourly PM_{10} emission rate to 1.2 pounds per hour. The permit also requires the measurement of the blow-down water quality and a calculation of the resulting mass emission rate. The Facility will continue to comply with the existing permit conditions.

4.0 COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS ("LORS")

The Water Facilities would be constructed following appropriate design criteria. Implementation of the proposal would not trigger the applicability of any new LORS and would in no way impact HDPP's ability to comply with all applicable LORS listed in Appendix A of the Final Commission Decision.

Only reclaimed water that meets or exceeds the requirements for use of recycled water as set forth in CCR Title 22, Division 4, Chapter 3, Article 1, Section 60301.230, and CCR Title 22, Division 4, Chapter 3, Article 3, Sections 60306 and 60307 (pertaining to use for cooling water and other industrial purposes) will be delivered to and used at the Facility. The Facility will use reclaimed water only for cooling water and other industrial purposes and the reclaimed water used will meet the specified treatment standards.

The implementation of this project requires changes to COC S&W-1. Specifically, the proposed changes are as follows, with new text shown underlined and deleted text shown as ~~strikethrough~~:

SOIL&WATER-1 The only water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or reclaimed water.

a. Whenever SWP water is available to be purchased from MWA and/or reclaimed water is available, the project owner shall use direct delivery of such water for project operation.

c. If there is no water available to be purchased from the MWA or there is no reclaimed water available, and there is no banked water available to the project, as determined pursuant to SOIL&WATER-5, no groundwater shall be pumped, and the project shall not operate.

~~d. The project shall not use treated water from the Victor Valley Wastewater Authority.~~

In addition, this Petition requests a change to the revised COC S&W-4(d) which dictates the amount of water to be injected. The current ABS requirement was based on three years of SWP water usage at 4,000 acre-feet/yr plus 1,000 acre-feet. With the use of reclaimed water, the amount of SWP water that will be used by the Facility will be reduced. Therefore, HDPP requests the Commission to modify COC S&W-4(d) to reduce the amount of water required to be injected by the percentage of reclaimed water used at HDPP, up to a 100% reduction if reclaimed water completely replaces SWP water in the future.

Specifically, the proposed changes to revised S&W-4d are as follows, with the new text shown underlined and deleted text shown as ~~strikethrough~~:

SOIL&WATER-4 Injection Schedule:

d. The project shall install and implement a pre-injection reverse osmosis treatment system within one (1) year if any water banking milestone is not met as defined in the following table. If reclaimed water is used at the project, each Calculated Water Bank Reserve amount in the following table shall be reduced by a percentage, equal to the projected percentage of reclaimed water usage by the project to total water usage by the project, up to 100% reduction if 100% reclaimed water usage is projected to be used by the project; provided that such projected percentage will be determined by the Commission based upon the availability and capability of the project to utilize reclaimed water as demonstrated by HDPP after HDPP has tested and evaluated the usage of reclaimed water at the project; and provided, further, no such reduction shall apply until such determination has been made.

The above conditions are also included by reference in the Incidental Take Permit issued CDFG. Therefore, as a parallel effort, HDPP is requesting a change to that permit to incorporate the use of reclaimed water.

5.0 LIST OF PROPERTY OWNERS

The Water Facilities would be constructed at the Facility site which is under the ownership of the United States Air Force, leased to Southern California Logistics Airport Authority and subleased to HDPP. Implementation of the proposal would have no other impacts to property owners, the public or other parties in the CEC application proceedings.

See Table 1 below for property owners that surround the Facility.

Table 1
List of Property Owners

NAME	ADDRESS	TYPE OF BUSINESS
A-1 Recycling	18675 Perimeter Road Victorville, CA 92394	Aircraft Deconstruction
Apple Aero	18308 Readiness Street Victorville, CA 92394	General Aviation Aircraft Repair
Dynadrill, Inc.	13050 Aerospace Drive Victorville, CA 92394	Drilling
Flannery Company	13123 Aerospace Drive Victorville, CA 92394	Book Distributor
G.B. & L.	13117 Aerospace Drive Victorville, CA 92394	Trucking
General Electric	18000 Phantom Victorville, CA 92394	Aircraft Repair
K & S Metal Products & Repair	13600 Phantom Street Victorville, CA 92394	FAA Certified Repair/ Manufacturing Station
KLM Industries	13063 Mustang Road Victorville, CA 92394	Trucking Company
Kleinfelder, Inc.	18374 Phantom Road Victorville, CA 92394	Environmental Engineers
May Manufacturing	13198 Mustang Street Victorville, CA 92394	Spa Manufacturer
Mercy Air Services	18500 Readiness Street Victorville, CA 92394	Emergency Helicopter Service

Table 1
List of Property Owners

NAME	ADDRESS	TYPE OF BUSINESS
Nestle Waters North American Inc.	13456 Fighting Falcon St. Victorville, CA 92394	Bottled Water Distributor
Pasha Group	13236 Mustang Victorville, CA 92394	Freight Forwarding
Southern California Aviation	18384 Readiness Street Victorville, CA 92394	Aircraft Maintenance, Storage & Sales
Stoody	18475 Finance Street Victorville, CA 92394	Welding Supply Wholesale House
Grumpy Golfer (Westwinds Golf Course)	18003 Westwinds Road Victorville, CA 92394	Restaurant
Victorville Aerospace, LLC	13010 Aerospace Drive Victorville, CA 92394	Aircraft Maintenance
West Coast Aerospace	13059 Aerospace Drive Victorville, CA 92394	Thread Roll Die, Thread Manufacturer
Westwinds Golf Course	18003 Westwinds Road Victorville, CA 92394	Recreation / Golf
World of Leisure	13504 Phantom Street Victorville, CA 92394	Luxury Pool Table Manufacturer
World Service West	18590 Readiness Street Victorville, CA 92394	FBO & Security Services
Federal Prison Employment Federal Bureau of Prisons	13289 Air Expressway Victorville, CA 92394	Prison

6.0 Potential Effects on Property Owners, Public and Parties in the Application Proceedings

Implementation of the proposal would have no other impacts to the property owners, the public or other parties in the CEC application proceedings.

7.0 Summary of Request

In summary, this Petition requests the approval of the proposed changes to COCs S&W-1 and revised S&W-4(d) to permit the Facility to use reclaimed water for cooling and other industrial purposes pursuant to the appropriate treatment standards in CCR Title 22. The approval of the use of reclaimed water at the Facility is consistent with the CEC staff recommended use of reclaimed water when it is available.

Attachment A

Reference Letter

STATE OF CALIFORNIA —THE RESOURCES AGENCY ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

January 9, 2006

Mr. Ramiro Garcia, Environmental. Director - Western. Region
Constellation Energy
95 Enterprise, Suite 300
Aliso Viejo, CA 92656

Dear Mr. Garcia:

RESPONSE TO YOUR REQUEST FOR SUPPORT FOR USE OF RECLAIMED WATER - HIGH DESERT POWER PROJECT, SOILS & WATER-1 (97-AFC-2C)

This is in response to your letter of December 15, 2005, requesting support for a change to condition of certification S&W-1 to allow the use of reclaimed water for cooling at the High Desert Power Plant (HDPP).

Energy Commission staff strongly recommends the use of reclaimed water for power plant cooling when it is available and environmentally desirable. In the *2005 Environmental Performance Report Of California's Electrical Generation System*, Energy Commission staff reported that power plants developed since 1996 are using fresh water more efficiently due to increasing uses of recycled water for cooling, more efficient cooling technologies, and zero-liquid discharge systems. Between 1996 and 2004, 22 percent of the new electric capacity brought on-line used reclaimed water for cooling, while 52 percent of the electric capacity currently under construction, permitted, or in licensing review will use reclaimed water. Additionally, in response to concerns about the use of fresh water for power plant cooling, the Energy Commission adopted a Water Policy in the *2003 Integrated Energy Policy Report* that requires developers of new power plants to use alternative water supply sources and alternative cooling technologies unless they prove to be environmentally undesirable or economically unsound.

While it is not possible to anticipate the Energy Commission's decision on a future amendment petition with certainty, the record clearly demonstrates the Energy Commission's past support for the use of reclaimed water for power plant cooling purposes as an alternative to potable water and groundwater. In making a decision on any future request, the Commissioners would consider the use of reclaimed water at the HDPP facility, taking into account factors specific to HDPP and the locality. We note that there have been expressions of support from the City Manager of Victorville, a representative of the City of Barstow, the Director of the Mojave Water Agency, and a Victor Valley Waste Water Reclamation Authority representative. We are certain that the Commissioners will take their views into account, as well as the recommendation of the California Department of Fish and Game (CDFG), since the current prohibition against the use of reclaimed water in the HDPP Decision is primarily a result of CDFG's recommendation during the original proceedings.

We hope this information will be helpful to you and look forward to the receipt of your amendment petition requesting authorization to use reclaimed water. When you are ready to submit a petition, we will be happy to advise you of the information you will need to include. If you have any questions, please call me at 916-654-3936.

Sincerely,

STEPHEN D. MUNRO
Compliance Project Manager
Systems Assessment and
Facilities Siting Division

cc: Tom Bilhorn, CDFG
Becky Jones, CDFG

ATTACHMENT 3

April 20, 2009 – Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use of Recycled Water

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

DOCKET
97-AFC-1C
DATE April 20 2009
RECD. April 20 2009

DATE: April 20, 2009

TO: Interested Parties

FROM: Steve Munro, Compliance Project Manager

SUBJECT: High Desert Power Project (97-AFC-01C) Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use Of Recycled Water for Project Operations

California Energy Commission staff has issued the enclosed Staff Analysis (SA) for a 30-day public review period. The SA is an assessment of the Petition to Amend, which was submitted on August 12, 2008, by High Desert Power Project, (HDPP) LLC. The petition requests removal of the prohibition in Condition of Certification (COC) SOIL and WATER (S&W)-1 prohibiting the use of recycled water for project operations. HDPP's petition also proposes a transition from freshwater to recycled water for power plant cooling, with a corresponding revision of water banking requirements in S&W-4 to reflect recycled water use.

The High Desert Power Project is an 830 MW combined cycle power plant located in the City of Victorville in San Bernardino County. The project was certified by the Energy Commission on May 3, 2000, and began commercial operation on April 22, 2003.

The proposed modifications would allow HDPP to make the following changes:

- The project owner has requested that the Energy Commission modify COC S&W-1 to remove the prohibition of the use of recycled waste water to supplement or replace the power plant's current potable water supply for project operations.
- HDPP also proposes that the Calculated Water Bank Reserve amount (as shown in the Table of Milestones for Calculated Water Bank Reserve in COC S&W-4d) be reduced by a percentage equal to the proportion of recycled waste water that could be used for power plant operation.

Energy Commission staff reviewed the petition and assessed the impacts of this proposal on environmental quality, public health and safety. Staff concurs with the proposal to modify COC S&W-1 to remove the prohibition against the use of recycled water and proposes to revise the condition as requested. With regard to COC Soil and Water-4, staff believes it is premature to modify that condition at this time because a full analysis of recycled waste water use and related delivery infrastructure (i.e., a pipeline) is not currently available. It is staff's opinion that, with the implementation of revised COC S&W-1, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

The SA and the amendment petition have been posted on the Energy Commission web site at the following web address:

http://www.energy.ca.gov/sitingcases/highdesert/compliance/index.html. A Staff Workshop may be scheduled, if necessary, to address concerns from the public review process.

The Energy Commission's Order (if approved) will also be posted on the website. Energy Commission staff intends to recommend approval of the petition at a regularly scheduled Business Meeting of the Energy Commission. If you have comments on this proposed modification, please submit them to me at the address below prior to 5:00 p.m. on May 19, 2009.

Steve Munro, Compliance Project Manager
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

The Energy Commission encourages comments by e-mail. Please include your name or your organization's name in the e-mail. Those submitting attachments via e-mail should provide them in either Microsoft Word format, or in Portable Document Format (PDF), to: smunro@energy.state.ca.us.

If you have any questions, please contact me at (916) 654-3936.

Enclosure
Mail List: 707

HIGH DESERT POWER PROJECT (97-AFC-1C)

STAFF ANALYSIS OF PETITION TO AMEND CONDITIONS OF CERTIFICATION SOIL & WATER-1: PROHIBITION OF USE OF RECYCLED WASTE WATER, AND SOIL & WATER-4: WATER-BANKING

Prepared by Casey Weaver

April 16, 2009

SUMMARY OF CONCLUSIONS

The proposed amendment to the existing High Desert Power Project (HDPP) would not result in any significant adverse environmental impacts, and would comply with applicable laws, ordinances, regulations, and standards (LORS), if the project complies with existing conditions of certification and staff's proposed changes and additions to the existing conditions of certification are implemented.

EXISTING PROJECT DESCRIPTION AND BACKGROUND

HDPP is an 830 megawatt natural gas-fired combined-cycle facility located in the City of Victorville, in San Bernardino County. The power plant, owned by Constellation Energy Group, has been operational since April 2003.

The water supply for HDPP is surface water purchased from the City of Victorville, obtained from the State Water Project (SWP) through an agreement with Mojave Water Agency (MWA). Since this water supply is interruptible, the project owner also maintains a groundwater bank consisting of surplus water that is injected into the underlying aquifer for retrieval when SWP water is unavailable.

Several petitions to amend the Soil and Water conditions of certification have been submitted since project approval in 2000. The initial petition, submitted on September 30, 2005, has been supplemented and revised with additional information that was submitted by HDPP on November 28, 2005 (HDPP 2005c), December 5, 2005 (HDPP 2005d), March 10, 2006 (HDPP 2006a), March 16, 2006 (HDPP 2006b), May 26, 2006 (HDPP 2006c) and August 12, 2008 (HDPP 2008a). This staff assessment addresses the August 12, 2008 petition.

The Lahontan Regional Water Quality Control Board (RWQCB) specifies the maximum TDS concentration allowed to be injected into the regional aquifer. When SWP water has been available for purchase and banking, the project owner has had difficulty banking the water due to the high TDS in the available water. In addition, over the past two to three years the SWP water deliveries have been significantly reduced due to drought conditions and environmental restrictions on pumping from the Sacramento-San Joaquin Delta.

Current deliveries of SWP water have been cut back substantially (85 percent reduction). This cutback currently allocates 1,278 AFY for use by HDPP. With a maximum water use of 4,000 AFY for power plant operation, HDPP will require extraction of 2,722 AFY from the water bank. As of October 2008, there was 3,084 AF of banked water available for HDPP use.

The SWP water is provided to HDPP via a contract with the City of Victorville. The contract allocates a maximum of 8,000 AFY to HDPP. As HDPP will continue to consider the banked water as their backup water supply, they will need to resupply the bank (inject water) at times when SWP water is available in excess of their operational needs.

Given the current allocation of SWP water available to HDPP, there is no ability for HDPP to inject more water into the bank and the backup water supply is likely to run out within 18 months. With the reduction of water available through the SWP, HDPP is at risk of being required to significantly limit or even shut down plant operation within the next two years and beyond.

Proposed Amendments

The purpose of HDPP's current Petition to Amend is to remove the prohibition contained in the Commission's HDPP Decision regarding the use of recycled wastewater from Victor Valley Wastewater Reclamation Authority (VVWRA) for cooling (**SOIL & WATER – 1**). HDPP is also requesting a transition to recycled water provided by VVWRA and a related revision to its water banking schedule that reflects a decrease in the annual injection volume based on the use of recycled waste water (**SOIL & WATER - 4**). HDPP seeks to supplement SWP delivered water with recycled waste water from VVWRA to increase the reliability of water available for plant needs and to comply with Energy Commission policy to use the lowest quality water available.

The project owner has requested that The Energy Commission modify Condition of Certification **SOIL & WATER- 1** to allow the use of recycled waste water to at least supplement the power plant's water supply. In the Final Commission Decision (CEC 2000), Condition of Certification **SOIL & WATER- 1d** prohibited the use of treated water from the VVWRA for reasons that are explained in the following analysis.

HDPP proposes that, if the Energy Commission approves the requested use of recycled waste water, the Calculated Water Bank Reserve amount (as shown in the Table of Milestones for Calculated Water Bank Reserve in **SOIL & WATER-4d**) be reduced by a percentage equal to the amount of recycled waste water used for power plant operation.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS) COMPLIANCE

The LORS cited in the original project's Final Commission Decision (CEC 2000), apply to the activities to be undertaken under the proposed amendment and are therefore incorporated here by reference. Staff also adds the following regulation to the applicable LORS.

Soil and Water Amendment Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Regulation	Description
State	
California Water Code Article 7, Section 13552.6	States in part that the use of potable water for cooling towers is a waste or an unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution, if recycled water is available to the user.

ANALYSIS

In assessing the impacts of the proposed amendment elements, staff reviewed the project's Final Commission Decision (CEC 2000), subsequent amendments, and information provided by the project owner in support of the proposed amendments.

The scope of staff's analysis was to evaluate the two project changes requested in the petition for amendment. The first change to be evaluated (revision to Soil & Water – 1d.) is whether the removal of the prohibition to use recycled water from VVWRA would cause any potentially significant impacts. The second change to be evaluated is whether the requested transition to recycled water use and related reduction in the water-banking schedule would cause any potentially significant impacts that are substantially different than those impacts caused by the project as initially certified in 2000 and amended in 2006. Staff also evaluated whether both changes would be consistent with applicable LORS. Where there were potential impacts or LORS compliance was required, staff proposed appropriate mitigation and changes to the conditions of certification.

SOIL&WATER-1 currently prohibits the use of "treated water from the Victor Valley Wastewater (Reclamation) Authority" (VVWRA). This prohibition was required because, at the time of certification, California Department of Fish and Game (CDFG) was concerned that use of VVWRA waste water as a project water supply would reduce surface flows in the Mojave River. CDFG believed these reduced flows would affect riparian resources and result in significant environmental impacts. Therefore, to ensure there would be no impacts, staff agreed to add this specific prohibition as a condition of certification. Recognizing that the need for this prohibition was CDFG's concern that an adequate volume of waste water be maintained to protect riparian resources, staff focused its analysis on whether there would be additional waste water available for HDPP's use given the MOU requirements and other current and proposed future obligations for recycled waste water.

Since HDPP project certification in 2000, the Victorville area has continued to grow, creating additional waste water. It appears that with this additional growth, VVWRA has been able to satisfy CDFG concerns. In 2003, CDFG and VVWRA executed a Memorandum of Understanding (MOU) which specifies waste water discharge requirements VVWRA must maintain to ensure there will be no impacts to riparian resources in the Mojave River. The MOU also includes a provision that requires VVWRA to discharge a portion of future increases in waste water volume to the river.

In 2008, the Energy Commission certified the City of Victorville's Victorville 2 Hybrid Power Project (Victorville 2). This project was licensed to use 3,150 AFY of recycled waste water from VVWRA. Data used by staff in the Victorville 2 case (CDFG 2003, VV2, 2007, VVWRA 2004) and additional data provided by HDPP and VVWRA (March, 2009), was used to construct **Table 1- Wastewater Volume and Use – 2008 Data** shown below. **Table 1** shows the current and projected volumes of waste water and the balance available given current obligations for use of the waste water supply.

Table 1- Wastewater Volume and Use – 2008 Data

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

The waste water treatment plant operated by VVWRA produces and discharges two waste water streams. One stream is treated to tertiary standards, disinfected and is either conveyed to Westwinds Golf course for landscape irrigation or dechlorinated and discharged directly to the Mojave River. The other stream is treated to secondary standards and conveyed to percolation ponds for disposal without disinfection. Staff understands both of these supplies ultimately contribute flows to the Mojave Narrows. CDFG has indicated (ROC, 2009) waste water percolated from the ponds is credited towards the required discharge and is consistent with the terms of the MOU.

As shown in **Table 1**, the combined volumes of effluent treated and discharged appear to be sufficient to satisfy current obligations for treated waste water use. It also appears that there would be sufficient volume of effluent (provided appropriate treatment is accomplished) to meet future obligations for Victorville 2 and still provide 597 AFY for HDPP needs.

Since certification of Victorville 2, the city of Victorville has decided to sell the certified project and, subsequently, progress on project development has slowed significantly. The time necessary for acquisition and construction of the project could be on the order of 2 to 3 years. This situation suggests that the waste water supply dedicated to Victorville 2 may be available for interim use by HDPP while the Victorville 2 project is developed. In addition, by the time Victorville 2 is developed, it is likely that additional waste water will become available as the Victorville area continues to grow and VVWRA 's treatment capacity similarly increases. This would make additional waste water available for use that could meet all or a portion of HDPP's needs.

Staff does not believe that use of recycled waste water for HDPP operations would cause or contribute to adverse environmental impacts if the proposed revision to the condition of certification is implemented.

The project owner does not currently have an agreement with the City of Victorville for delivery of this water or a RWQCB permit for its use. In order for the project owner to obtain recycled waste water for power plant use, the prohibition included in condition of certification **SOIL & WATER- 1** must be removed. Staff believes that, due to proposed VVWRA expansion, an additional supply of recycled waste water is reasonably foreseeable and that it is likely the project owner can negotiate an agreement for delivery and obtain a permit for its use once the additional supply becomes available.

Staff believes that allowing the project owner to pursue a recycled waste water supply for power plant cooling is appropriate because it is a more environmentally desirable alternative to using SWP water and is consistent with Energy Commission policy. Reducing or replacing project use of freshwater would also be consistent with section 13552.6 of the California Water Code (Water Reuse) which states in part, "the use of potable domestic water for nonpotable uses...is a waste or an unreasonable use of the water within the meaning of Article X, section 2 of the California Constitution if recycled water is available..." . Staff has proposed revisions to condition of certification **SOIL & WATER- 1** to ensure compliance with Energy Commission water policy and section 13552.6 of the California Water Code.

Staff concurs with the project owners request to amend Condition of Certification **SOIL & WATER- 1** and has proposed additional revisions to ensure all recycled water reasonably available will be used for project operation.

As discussed above, the SWP deliveries can be significantly reduced during drought conditions or by environmental restrictions on Delta pumping. Therefore, HDPP's primary water supply is an interruptible supply. Accordingly, certification of the project required that HDPP obtain a backup water supply to provide water to the project during interruptions of the primary supply. Because the Mojave groundwater basin is over drafted and no existing groundwater reserves are available, HDPP was permitted to establish a groundwater bank to provide a backup water supply. SWP water quality (especially TDS) varies throughout the year. In addition to other water quality parameters, the RWQCB limits the level of TDS in water that is injected into aquifers. At times, the TDS concentration in SWP water exceeds the limits allowed for injection and, without treatment, cannot be used for water banking purposes. With the current reduction in deliveries of SWP water due to existing drought conditions and the variable water quality of the water available for banking purposes, the viability of the groundwater bank is in question.

As designed, the groundwater bank is to be developed and then used on an as-needed basis when deliveries of SWP water are restricted. In accordance with **SOIL&WATER- 4**, HDPP must eventually establish a water bank with a volume equivalent to the volume of water expected to be used by HDPP over a three year period of operation plus 1,000 AF. The volume of this banked water supply is based on the estimated maximum use of back up water required during a contiguous three year period when SWP water would be unavailable (3 years x 4,000 AFY) plus 1,000 AF.

The amount of banked groundwater available to the project is defined as the amount of water injected by HDPP minus groundwater extracted by the project, minus groundwater dissipation, minus 1,000 acre-feet. Groundwater dissipation is defined as the groundwater discharged to the Mojave River that was supplied to the aquifer by the project's injection operations. Dissipation varies according to the rate of injection and the total period over which water is stored in the aquifer following decommissioning of the project. 1,000 acre-feet of water would be left in the aquifer to buffer any potential environmental impacts that might occur if the water bank dissipation was underestimated.

The project owner currently has no commitment for supply and delivery of recycled waste water, a use permit or the water quality characterization necessary to design the project changes. Therefore, there is insufficient information for staff to analyze project impacts and identify which LORS would be required for project compliance. The project owner's proposed changes to **SOIL & WATER - 4** presume recycled waste water is available and the plant has been modified for use. Staff believes it is premature to modify **SOIL & WATER-4** as proposed because a full analysis of recycled waste water use cannot be performed at this time. The project owner has indicated they plan to submit another petition to amend the project when they know more about the recycled waste water supply and water quality characteristics and have designed the necessary plant modifications.

When this information becomes available, staff believes this would be the appropriate time to modify or eliminate **SOIL & WATER- 4** depending on the supply and design. Staff also believes that future analysis and design should include use of recycled waste water for all project operational needs. This would be consistent with Energy Commission water policy and Water Code Section 13550.

Staff realizes that if the project owner does not inject sufficient water to comply with the water banking goals identified in **SOIL & WATER- 4d**, the project owner may be required to construct a pre-injection reverse osmosis treatment system. Staff believes the intent of this requirement was based on the need to meet water quality requirements for the injected water. However, staff believes that where no water is available for treatment, the project owner should not be mandated to comply with the requirement for constructing and operating a treatment system.

While it is unrealistic to hold HDPP to the annual schedule as detailed in **SOIL & WATER- 4** due to current SWP water availability, the cumulative volume needs to be established as soon as possible. Until a recycled waste water supply is identified and obtained for use by HDPP, HDPP must attempt to comply with the existing schedule as stated in **SOIL & WATER- 4d**. Following connection to the recycled waste water supply line, the injection schedule may be modified by recalculating the volume of injection required, based on the volume of recycled waste water used in power plant operations in accordance with proposed condition of certification **SOIL & WATER- 4e**.

CONCLUSIONS

HDPP has proposed that the prohibition from using treated waste water from VVWRA be removed. This request is aligned with the goals and strategic objectives of the State of California and is consistent with Energy Commission policy that requires the use of alternative water supply sources and alternative technologies unless they prove to be environmentally undesirable or economically unsound. While the prohibition names VVWRA specifically, Energy Commission staff encourages HDPP to obtain and use recycled waste water obtained from VVWRA or other sources. Staff believes the applicant should also seek the maximum amount of recycled water available so all or most of the freshwater use can be replaced. Staff anticipates that HDPP will file another petition to amend when an alternate water supply is identified and more information on necessary project changes can be provided. Staff will then determine whether changes to **SOIL & WATER- 4** are appropriate and whether other conditions should be added or deleted.

Staff proposes condition of certification **SOIL & WATER- 1** be changed to address compliance with the Energy Commission Water Policy.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff recommends the following changes to the Conditions of Certification **SOIL & WATER- 1** (additions shown by underline, deletions by ~~strikeout~~):

SOIL&WATER-1 ~~The only~~ ~~w~~Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or appropriately treated recycled waste water.

a. Whenever SWP water is available to be purchased from ~~MWA~~ the city of Victorville, or recycled waste water is available, the project owner shall use direct delivery of such water for project operation.

b. Whenever water is not available to be purchased from the MWA the project owner may use SWP water banked in the seven HDPP wells identified in Figure Number 1 of the Addendum Number 1 to the "Evaluation of Alternative Water Supplies for the High Desert Power Project" (Bookman-Edmonston 1998) as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to **SOIL&WATER-5.**

c. If there is no water available to be purchased from the MWA and there is no banked water available to the project, as determined pursuant to **SOIL&WATER-5**, no groundwater shall be pumped, and the project shall not operate. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

~~d. The project shall not use treated water from the Victor Valley Wastewater Authority.~~

e. The project's water supply facilities shall be appropriately sized to meet project needs~~.~~ and to make maximum use of recycled waste water for power plant cooling needs. Prior to use of recycled waste water the project owner shall provide the CPM with a specific amendment petition providing details of the recycled water pipeline and connections, a copy of an agreement with VVWRA or other suppliers that will deliver recycled waste water, and any other information necessary to amend the project for the proposed recycled waste water use.

Verification: The project owner shall provide final design drawings of the project's water supply facilities to the CPM, for review and approval, thirty (30) days before commencing project construction.

Verifying compliance with other elements of Condition **SOIL&WATER-1** shall be accomplished in accordance with the provisions of the Verifications for Conditions 2, 3, and 6, as appropriate.

REFERENCES

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HDPP (High Desert Power Project). 2009. Letter from M. Fred Strauss, representing High Desert Power Project LLC, to Steve Munro of the California Energy Commission. Subject: Petition for Modification to Use Reclaimed Water, Response to March 4, 2009 Email and Data Requests, Commission Decision (97-AFC-1C), High Desert Power Project, LLC. March 13, 2009.

MBAW-VVWD (Mojave Basin Area Watermaster and Victor Valley Water District). 2002. Storage Agreement Between Mojave Basin Area Watermaster and

Victor Valley Water District. June 1, 2002.

ROC (Record of Conversation). 2009. Summary of conversation between Steve Munro of the California Energy Commission and Tom Bilhorn, hydrology consultant to California Department of Fish and Game (DFG), regarding interpretation of Memorandum of Understanding between DFG and Victor Valley Wastewater Reclamation Authority. March 4, 2009.

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VV2 (Victorville 2 Hybrid Power Project). 2007. Application for Certification to the California Energy Commission. February 27, 2007.

VVWRA (Victor Valley Wastewater Reclamation Authority). 2004. Victor Valley Wastewater Reclamation Authority, Victor Valley,Wastewater Subregional Facilities Draft Program EIR/EIS. August 12, 2004.

ATTACHMENT 4

September 24, 2009 – Revised Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use of Recycled Water

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

DOCKET
97-AFC-1C
DATE 9/24/2009
RECD. 9/24/2009

DATE: September 24, 2009

TO: Interested Parties

FROM: Steve Munro, Compliance Project Manager Steve Munro

SUBJECT: **High Desert Power Project (97-AFC-01C)**
Revised Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use Of Recycled Water for Project Operations

California Energy Commission staff has issued the enclosed Revised Staff Analysis (RSA) for a 30-day public review period. The RSA is an assessment of the Petition to Amend submitted on August 12, 2008, and the Supplement to Petition for Modification to use Reclaimed Water (Supplement), submitted on June 4, 2009, by High Desert Power Project, (HDPP) LLC. The Supplement was provided in response to the initial Staff Analysis, which was issued on April 20, 2009. The Supplement requests approval to construct and use a recycled water pipeline on its property connecting with a City of Victorville recycled water supply line across the street from the project entry gate at 19000 Perimeter Road. The approximately 1700-foot pipeline would run outside the fence along the northern and western plant fence line.

The High Desert Power Project is an 830 MW combined cycle power plant located in the City of Victorville in San Bernardino County. The project was certified by the Energy Commission on May 3, 2000, and began commercial operation on April 22, 2003.

The proposed modifications would make the following changes to the project's Soil and Water Conditions of Certification :

- Modify Soil and Water-1 as follows:
  - Remove the prohibition of the use of recycled waste water to supplement or replace the power plant's current potable water supply for project operations.
  - Authorize construction of a recycled water pipeline to enable the project to use recycled tertiary-treated water for approximately 1/3 of its project cooling water needs.
  - Require a feasibility study to be completed by December 31, 2011, to determine the feasibility of converting to 100 percent recycled water use.
- Modify Condition Soil and Water-4 as follows:
  - Eliminate water banking milestones because of infeasibility of achieving the milestones and the goal of converting project cooling to 100 percent recycled water, with potable State Water Project water and banked groundwater as a backup.

- Add new Condition of Certification Soil and Water-20 to require that copies of the Executed Recycled Water Purchase Agreement be submitted prior to interconnection.

- Add new Condition of Certification Soil and Water--21 requiring that water metering systems be installed.

Energy Commission Soil and Water Resources staff, and Biological Resources staff, among others, reviewed the petition, the Supplement, and data responses and assessed the impacts of this proposal on environmental quality, public health and safety. Given the previous ground disturbance resulting from construction of the HDPP project, Soil and Water, Biological, and Cultural Resources were the only technical areas with identified potential for impacts. Staff concurs with the proposal to modify Soil and Water-1 and 4 and add Soil and Water-20 and 21 as described above. It is staff's opinion that, with the implementation of these revised and added Conditions of Certification and existing Conditions of Certification pertaining to project construction, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

The RSA and the amendment petition have been posted on the Energy Commission web site at the following web address:
http://www.energy.ca.gov/sitingcases/highdesert/compliance/index.html. A Staff Workshop may be scheduled, if necessary, to address concerns from the public review process.

The Energy Commission's Order (if approved) will also be posted on the website. Energy Commission staff intends to recommend approval of the petition at the November 4, 2009 Business Meeting of the Energy Commission. If you have comments on this proposed modification, please submit them to me at the address below by 5:00 p.m. on October 8, 2009.

Steve Munro, Compliance Project Manager
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

The Energy Commission encourages comments by e-mail. Please include your name or your organization's name in the e-mail. Those submitting attachments via e-mail should provide them in either Microsoft Word format, or in Portable Document Format (PDF), to: smunro@energy.state.ca.us.

If you have any questions, please contact me at (916) 654-3936.

Enclosure
Mail List: 707

HIGH DESERT POWER PROJECT (97-AFC-1C)

Petition for Modification to use Reclaimed Water
Staff Analysis
Prepared by: Paul Marshall and Rick York
September 2009

INTRODUCTION

On August 12, 2008, High Desert Power Project, LLC (project owner) filed a Petition for Modification to use Reclaimed Water (HDPP 2008a) for its High Desert Power Project (HDPP). A preliminary Staff Analysis of the petition was issued for public review on April 20, 2009. The only comments received were from the project owner in the form of a supplement to the original petition. The Supplement to Petition for Modification to use Reclaimed Water (supplement) was submitted to the California Energy Commission (Energy Commission) on June 4, 2009 (HDDP 2009b).

Within the supplement, the project owner clarifies the three changes they are requesting to the HDPP license, which are enumerated below:

1. Removal of the prohibition on the use of reclaimed (recycled) water as set forth in Condition of Certification **SOIL&WATER-1**.
2. Authorization to interconnect to the City of Victorville's (City) existing recycled water pipeline, via a new underground water pipeline approximately 1,700 feet long that will run along the perimeter of the HDPP site, and use recycled water provided to the HDPP by the City.
3. Modification to the aquifer banking requirements in Condition of Certification **SOIL&WATER-4** to reflect recycled water use.

The proposed use of recycled water and the modification to the aquifer banking requirements have the potential to cause environmental impacts to soil and water resources due to pipeline construction and the delivery, use, and discharge of recycled water. These aspects of the proposed petition to amend have been evaluated in accordance with the California Environmental Quality Act (CEQA) and current laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

Staff has reviewed the LORS identified in the Energy Commission's Staff Assessment for the High Desert Power Project (CEC 1999) and the Energy Commission's Staff Analysis of Petition to Amend Condition of Certification Soil & Water-4 (CEC 2006) and has listed those LORS in **SOIL & WATER Table 1** that are new to this analysis.

SOIL & WATER Table 1
Laws, Ordinances, Regulations, and Standards

State LORS	
California Water Code, section 13523	Requires the Lahontan Regional Water Quality Control Board (LRWQCB) to prescribe water reuse requirements for water that is to be used as recycled water after consulting with the Department of Public Health (DPH).
California Code of Regulations, Title 17	Title 17, Division 1, Chapter 5, addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15, requires the California Department of Public Health (DPH) to review and approve new or modified recycled water projects to ensure they meet all recycled water criteria for the protection of public health.

PROJECT DESCRIPTION AND BACKGROUND

The HDPP is an 830 megawatt natural gas-fired combined-cycle power plant located in the City of Victorville (City), in San Bernardino County. The HDPP has been operational since April 2003, and its primary water supply is surface water purchased from the City through a contract with the Mojave Water Agency (MWA). The MWA is a Long-Term State Water Project (SWP) Contractor with a full entitlement of 75,800 acre-feet (AF) of SWP water (CEC 2006 and DWR 2007, Table B-4).

Because of drought and the pumping constraints that federal biological opinions have placed on the SWP, deliveries to MWA have been variable. From 2001 to 2005, deliveries of SWP water to MWA have averaged less than 10,000 AFY (DWR 2007, Table B-5B). MWA expects SWP deliveries to continue to be variable for the next ten to fifteen years due to requests for additional water by other SWP contractors and insufficient yield from SWP conservation reservoirs (MWA 2005, Chapter 4). Because the primary water supply is variable, the project owner is required to maintain a groundwater bank where contract water from the City above HDPP operational needs is injected into the underlying aquifer (groundwater bank) for retrieval when SWP water is unavailable.

Given the current allocation of SWP water available to HDPP, there is no ability for HDPP to inject more water into the bank. If the HDPP had to rely solely on its current groundwater supply, it would be able to operate for approximately 18 months. With the reduction of water available from the SWP, HDPP is at risk of being required to significantly limit or even shut down plant operation within the next two years and beyond.

Proposed Amendments

As contained in the August 4, 2008 amendment petition and the June 4, 2009 supplement, the project owner proposes to augment SWP water with recycled water and to amend the water banking schedule to reflect the availability and use of recycled water. The decrease in the annual groundwater injection volume would be reduced by a percentage equal to the amount of recycled water used for HDPP operation (CEC 2009).

The project owner proposed to amend Condition of Certification **SOIL & WATER-1** in the August 4, 2008 petition to allow the use of recycled water to augment the HDPP's SWP water supply and to eventually transition to 100 percent recycled water as it becomes available for use. Staff concurred with this request and proposed changes to this condition in the staff analysis dated April 20, 2009. With the use of recycled water for cooling purposes, a revised water banking schedule and modification to Condition of Certification **SOIL & WATER-4** was also proposed in the August 4, 2008 petition. Staff believed it was premature to amend Condition of Certification **SOIL & WATER-4** because additional information was needed to evaluate the source, volume, reliability, and method of delivery (CEC 2009). The Supplement to Petition for Modification to use Reclaimed Water (supplement) that was submitted to the California Energy Commission (Energy Commission) on June 4, 2009 (HDDP 2009b) provided additional information needed for further analysis of use of recycled water at HDPP.

ANALYSIS

Staff reviewed the project owner's June 4, 2009 supplemental petition to identify potential environmental impacts to soil and water resources and for consistency with applicable LORS. This analysis is based on information provided in the original Staff Assessment for the HDPP (CEC 1999), the Energy Commission's Staff Analysis of Petition to Amend Condition of Certification Soil & Water-4 (CEC 2006), the Energy Commission's Staff Analysis of Petition to Amend Condition of Certification Soil & Water-1: Prohibition of use of Recycled Wastewater, and Soil & Water-4: Water Banking (CEC 2009), and the project owner's July 20, 2009 data responses (HDPP 2009c).

Based on this review, staff presents the following assessment of the project owner's proposed changes to Conditions of Certification **SOIL&WATER-1 and -4**. The scope of this analysis is to evaluate:

1. The CEQA and LORS compliance of the project owner's proposal to remove from Condition of Certification **SOIL&WATER-1** the prohibition on the use of recycled water.

2. The use of tertiary treated recycled water for cooling purposes and its potential to adversely affect soil and water resources from its production, delivery (via a proposed new 1700-foot pipeline within the HDPP property), use, and discharge.

3. The CEQA and LORS compliance of the project owner's proposed modification to the aquifer banking requirements (Condition of Certification **SOIL&WATER-4**) to reflect recycled water use.

Recycled Water Analysis

Condition of Certification **SOIL&WATER-1** currently prohibits the use of recycled water from the Victor Valley Wastewater Reclamation Authority (VVWRA) for HDPP industrial purposes. This prohibition was required because the California Department of Fish and Game (CDFG) was concerned that use of VVWRA recycled water for HDPP cooling purposes would reduce surface flows in the Mojave River. CDFG believed that these reduced flows would affect riparian resources and result in significant environmental impacts. Staff agreed with CDFG and prohibited the use of recycled water for HDPP cooling in Condition of Certification **SOIL&WATER-1**, which was adopted by the Energy Commission in its Final Commission Decision (CEC 2000 and CEC 2009a).

Currently, SWP water is the primary source of industrial water supply for the HDPP. Based on its design, the HDPP has the capability to consume up to 4,000 AFY of raw surface water from the SWP. Based on operating data, the historic consumption of SWP water has been approximately 3,000 AFY based on the demand for electricity in Southern California. The project owner expects future electricity demand to increase with population growth in the Imperial Valley and the desert regions of Southern California (HDPP 2008).

Because of population growth in the Victorville area, the volume of wastewater delivered to the VVWRA Waste Water Treatment plant has increased. In 2003, CDFG and VVWRA executed a Memorandum of Understanding (MOU) that specifies discharge requirements that VVWRA must maintain to ensure there will be no impacts to riparian resources in the Mojave River. The MOU also includes a provision that requires VVWRA to discharge a portion of future increases in recycled water volume to the river (CEC 2009 and CDFG 2003).

In 2008, the Energy Commission certified the City of Victorville's Victorville 2 Hybrid Power Project (Victorville 2). This project has a recycled water supply agreement with VVWRA for the delivery of 3,150 AFY of recycled water. Since certification, the city of Victorville has decided to sell the project and progress on Victorville 2 has slowed significantly. The time necessary for acquisition and construction of the project could be on the order of 2 to 3 years. Therefore, the recycled water supply dedicated to Victorville 2 may be available for interim use by HDPP.

Based on the City's long-term projection of recycled water availability through the year 2040, the City expects to deliver up to 1,000 AF to the HDPP in 2010 and 2011. The City expects to start delivering recycled water to Victorville 2 during the second quarter of 2011 with full deliveries of up to 2,600 AFY starting in 2012. The City's long-term projection provided in its *Summary Table of Recycled Water Availability* includes all of the City's contractual obligations for recycled water (HDPP 2009c, Data Response 3).

The City has provided the project owner with a "Will Serve Letter" dated July 2, 2009 for the delivery of tertiary treated recycled water to the HDDP. The City commits to an initial delivery of 1,000 AFY (2010) and up to 4,000 AFY (2012) when the additional HDPP treatment facilities are installed and operating (HDPP 2009c, Data Responses 1 & 3). The City would meet the HDPP's increased recycled water demand (4,000 AFY) from its new Industrial Waste Water Treatment Plant that is currently under construction and is expected to be operational in the Spring of 2010.

The new Industrial Waste Water Treatment Plant in combination with the existing VVWRA facility would provide a reliable long-term supply of recycled water for the HDPP. In addition, supplying recycled water from two separate plants provides operational flexibility for treatment plant maintenance and/or forced outages (HDPP 2009c, Data Responses 1 & 3).

In the short term, *Summary Table of Recycled Water Availability* (HDPP 2009c, Data Response 3) shows that if Victorville 2 becomes operational in 2012, recycled water deliveries could be constrained and there would be limited availability for the period from 2012 to 2014. The availability of recycled water is dependent on the growth projections for the area serviced by the City and the expansion of treatment capacity necessary to meet all recycled water delivery obligations in 2015. If the growth projections are too high and the volume of wastewater available for treatment and delivery is not available, it is possible the volume of recycled water that can be delivered to HDPP and/or Victorville can be reduced and use of surface and groundwater supplies would be needed to make up supply needs on either or both projects for continued operation.

Staff believes the likelihood these fresh water supplies would be needed is low given the current schedule for development of Victorville 2 and delivery of recycled water. However, staff believes the owner should continue to bank any available SWP water supply and ensure carryover until the full reliable recycled water supply would be available in 2015 and HDPP can be modified for 100 percent recycled water use. Staff notes that if freshwater supplies are needed, Victorville 2 has been analyzed and certified to use fresh water on an interim basis so there would be flexibility in maintaining reliability while ensuring there would be no environmental impacts during this short term use. Modification of the aquifer banking requirement and proposed amendments to Condition of Certification **SOIL&WATER-1 and SOIL&WATER-4** to address this short term limitation are provided below.

To ensure the HDPP has a reliable long term supply of recycled water available and can commit to future maximum use of recycled water, staff proposes Condition of Certification **SOIL&WATER-20**. This condition would require the project owner to enter into a long term agreement with the City to supply the maximum recycled water use of 4,000 AFY at a rate of up to 6,000 gallons per minute. Staff also proposes addition of Condition of Certification **SOIL&WATER-21,** which would require the applicant to install and maintain metering devices as part of the recycled water supply and distribution system to monitor and record in gallons per day the volume of recycled water used by the HDPP. This condition will ensure the project complies with the terms of the recycled water agreement required in proposed Condition of Certification **SOIL&WATER–20**.

Recycled Water Use Laws

The production and use of recycled water is regulated under federal and state law. The State Water Resources Control Board (SWRCB) shares jurisdiction with the Regional Water Quality Control Boards (RWQCB) and with the Department of Public Health (DPH) over the use of recycled water. The SWRCB exercises general oversight over recycled water projects, while DPH is charged with the protection of public health and drinking water supplies through the development of uniform water recycling criteria. Under California Water Code, sections 13522.5, 13523, and 13523.1, any person who proposes to produce or use recycled water must file a report and obtain water reclamation requirements or a master reclamation permit from the appropriate RWQCB.

One of the primary conditions for the use of recycled water is protection of public health. The current Water Recycling Criteria (Title 22, California Code of Regulations, sections

60301 through 60355) require the submission of an engineering report to the RWQCB and DPH before recycled water projects are implemented. For existing recycled water projects, the report must be amended prior to any modifications or expansion.

In addition, Title 17, California Code of Regulations addresses the health and safety requirements of backflow prevention and cross connection of potable and non-potable water lines. Through the approval of the engineering report by DPH, that includes the backflow prevention and cross connection provisions of Title 17, the health and safety requirements of Title 17 and Title 22 would be met. To ensure compliance with federal and state laws, staff has added Condition of Certification **SOIL&WATER-20** that requires the project owner to submit a copy of an approved engineering report and any other DPH or LRWQCB requirements to the Compliance Project Manager (CPM) prior to the delivery of recycled water to the HDPP. HDPP has already made substantial progress in satisfying this condition as shown in the draft engineering report (HDPP 2009d) provided in support of the petition to amend for review and discussed in this analysis.

Compliance with Condition of Certification **SOIL&WATER-20** would ensure that a long-term recycled water supply is available for HDPP operation and that recycled water production and use complies with the Clean Water Act, the California Water Code, and the California Code of Regulations. Through compliance with federal and state law, impacts to soil or water resources from the production, delivery, use, and discharge of recycled water would be less than significant.

RECYCLED WASTEWATER

The draft Engineering Report for Recycled Water Use by High Desert Power Project (HDPP 2009d) indicates that after recycled water is blended with SWP water in the cooling tower for make-up purposes, it will be cycled through the existing zero liquid discharge system (ZLD). This system will provide for reuse of recycled water and eliminate the need for a wastewater discharge. The ZLD would however concentrate solids and chemical constituents into a semi-solid waste that would have to be disposed of. Staff believes the volume of waste that would be generated by the ZLD through the use of the recycled water supply would not change significantly but it is possible the chemistry of the waste could change. Staff believes the project owner should comply with existing Condition of Certification **Waste-1** and amend the operation waste management plan to describe the new waste stream and identify the methods of management that would be required given the waste characterization. The flow diagram in Appendix D also indicates the recycled water supply will not be interconnected with the aquifer banking system. This will eliminate any potential impacts to groundwater.

MODIFICATION TO AQUIFER BANKING REQUIREMENTS

As discussed above, the SWP deliveries can be significantly reduced during drought conditions or by environmental restrictions on Delta pumping. Therefore, HDPP's primary water supply is interruptible. Accordingly, certification of the project required HDPP to obtain a backup water supply to provide water to the project during interruptions of the primary supply. Because the Mojave groundwater basin is over drafted and no existing groundwater reserves are available, HDPP was permitted to establish a groundwater bank to provide a backup water supply. With the current reduction in deliveries of SWP water due to existing drought conditions and the variable water quality of SWP water, the current groundwater banking system does not provide a reliable long-term backup supply.

As designed, the groundwater bank is to be developed and then used on an as-needed basis when deliveries of SWP water are restricted. In accordance with **SOIL&WATER-4**, HDPP must eventually establish a water bank with a volume equivalent to the volume of water expected to be used by HDPP over a three year period of operation plus 1,000 AF. The volume of this banked water supply is based on the estimated maximum use of back up water required during a contiguous three year period when SWP water would be unavailable (3 years x 4,000 AFY) plus 1,000 AF.

Staff realizes that if the project owner does not inject sufficient water to comply with the water banking goals identified in **SOIL & WATER-4d**, the project owner may be required to construct a pre-injection reverse osmosis treatment system. Staff believes the intent of this requirement was based on the need to meet water quality requirements for the injected water. However, staff believes that where no water is available for treatment, the project owner should not be mandated to comply with the requirement for constructing and operating a treatment system.

While it is unrealistic to hold HDPP to the annual schedule as detailed in **SOIL & WATER-4** due to current SWP water availability, the cumulative volume needs to be established as soon as possible. In order to maintain a suitable volume for use as back up, HDPP should use its entire annual allotment (8,000 AFY) from the City, minus operational needs, to resupply the groundwater bank. Once full, the bank will be required to be maintained as necessary to sustain that volume. When the planned future amendment for conversion to full recycled water use is received staff can further consider whether it would be appropriate to change or eliminate the water banking requirement. Staff proposes to modify this condition and remove the schedule of milestones as shown below.

CONSTRUCTION IMPACTS

Construction of the recycled water pipeline will include excavating approximately 1,700 linear feet of trench along the north and west boundaries of the facility, placement of 18-inch diameter Polyvinyl Chloride pipe, interconnecting with VVWD's exsiting 16-inch line, and backfilling with engineered fill.

SOIL AND WATER IMPACTS - These construction activities would expose disturbed soils to wind and water erosion that could result in offsite impacts if proper control measures are not implemented. Staff recommends the applicant be required to update the erosion control and revegetation plan required in Condition of Certification **SOIL&WATER -16**. This would ensure that appropriate Best Management Practices and control measures would be implemented and pipeline construction activities would not result in any off-site impacts.

BIOLOGICAL CULTURAL AND OTHER ENVIRONMENTAL IMPACTS - Biological Resources staff has some concerns about the proposed pipeline construction since the proposed reclaimed water supply pipeline would be located immediately adjacent to (outside of) the existing fence that surrounds the power plant site. The area adjacent to the existing power plant site is desert tortoise habitat, and desert tortoise were observed in the area during the original construction. Therefore, staff agrees with the project owner's suggested approach that the current High Desert Power Project Biological Resources Mitigation Implementation and Monitoring Plan be implemented during project construction and that the Designated Biologist or a Biological Monitor be present during pipeline construction to make certain that wildlife species are not affected by pipeline construction. Staff and the Compliance Project Manager must also be provided regular project updates during construction; however staff and CDFG must be contacted immediately if a desert tortoise is encountered during pipeline construction. If a desert tortoise is encountered, staff, CDFG, and the project owner will discuss and agree upon impact avoidance measures to be implemented to avoid impacts to desert tortoise. With regard to Cultural Resources, these are of a lower order of concern, since the area of excavation has been previously disturbed, and there were no cultural resources found during the original plant construction. Implementation of the existing construction-related conditions of certification, including the approved Worker Environmental Awareness Training program for all construction workers, will prevent significant impacts on all environmental resources during the pipeline excavation and construction process.

LORS ANALYSIS

As presented in **SOIL AND WATER Table1**, new LORS were evaluated in the assessment. The proposed changes would comply with the following LORS if the new and amended conditions of certification are implemented.

- The Resource Conservation Recovery Act of 1976 by the proper handling and disposal of waste through compliance with Condition of Certification **Waste-1**.
- Title 17 of the California Code of Regulations, through the approval by San Bernardino County for backflow prevention and cross connections of potable and recycled water lines in accordance with Condition of Certification **SOIL&WATER-20**.
- Title 22 of the California Code of Regulations, through the proper use and discharge of recycled water in accordance with Condition of Certification **SOIL&WATER-20**.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff proposes additional changes to Condition of Certification SOIL & WATER-1 that were made in staff's Analysis dated April 20, 2009. These changes are proposed to accommodate the change in water supply and additional information supplied by the project owner as discussed in the analysis above. Staff generally concurs with the changes to Condition of Certification **SOIL&WATER–1** proposed by the project owner, however staff proposes language that would commit the owner to obtaining and using the maximum amount of recycled water use consistent with Energy Commission water policy.

Staff also previously recommended a copy of an agreement between the City and HDPP for the long term supply and delivery of recycled water be provided to support the proposed amendment. Staff understands the owner is working with the City to develop this agreement. Staff concurs with the owner that an agreement can be supplied as a condition of project certification as long as the agreement is in place before delivery of recycled water. Staff has included Condition of Certification **SOIL&WATER-20** to address this requirement and commitment on the part of the owner. Therefore, staff proposes to modify Condition of Certification **SOIL&WATER–1e** to reflect this change.

Staff generally concurs with the owner proposed changes to Condition of Certification **SOIL & WATER-4.** Staff believes the water banking schedule and requirement for reverse osmosis treatment in the event the schedule cannot be maintained can be stricken. However, staff believes that the owner should be required to bank SWP water when it is available and meets water quality requirements for injection. This will ensure that if water is available it would be banked and could be used for any short term reductions or limitations in recycled water supply discussed above.

SOIL&WATER-1 ~~The only w~~Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or appropriately treated recycled waste water.

a. Whenever SWP water is available to be purchased from ~~MWA~~ the city of Victorville, or recycled waste water is available, the project owner shall use direct delivery of such water for project operation.

b. Whenever water is not available to be purchased from the ~~MWA~~ city of Victorville the project owner may use SWP water banked in the ~~seven~~ four HDPP wells ~~identified in Figure Number 1 of the Addendum Number 1 to the "Evaluation of Alternative Water Supplies for the High Desert Power Project" (Bookman-Edmonston 1998)~~ as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to **SOIL&WATER-5.**

c. If there is no SWP water available to be purchased from the ~~MWA~~ city of Victorville, and there is no reclaimed water available, and there is no banked water available to the project, as determined pursuant to **SOIL&WATER-5**, no groundwater shall be pumped, and the project shall not operate. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

~~d. The project shall not use treated water from the Victor Valley Wastewater Authority.~~

e. The project's water supply facilities shall be appropriately sized and utilized to meet project needs~~.~~ and to make maximum use of recycled waste water for power plant cooling ~~needs~~ given current equipment capabilities. ~~Prior to use of recycled waste water the project owner will provide the CPM with details of the recycled water pipeline and connections, a copy of an agreement with VVWRA or other suppliers that will deliver recycled waste water, and any other information necessary to amend the project for the proposed recycled waste water use.~~

f. The project owner shall continue with the feasibility study and developing the design for eventual conversion to 100 percent recycled water use for evaporative cooling purposes by the 4th quarter of 2012. The intent of this conversion is to eliminate fresh water use for power plant cooling consistent with Energy Commission water policy and California Water Code, section 13550. The project owner shall submit a petition to amend the project because of the changes that would be needed to convert to 100 percent recycled water. The feasibility study shall be completed by the project owner and submitted to the CPM no later than December 31, 2011.

Verification: The project owner shall provide final design drawings of the project's water supply facilities to the CPM, for review and approval, thirty (30) days before commencing project construction.

The project owner shall provide a biannual report on the progress being made on the project design for use of 100 percent recycled water for power plant cooling. The report shall include information related to design and specifications for project modification and any adjustments or changes in the schedule for converting to 100 percent recycled water use. The first report shall be due six months after adoption of this condition of certification. If the schedule for implementation of 100 percent recycled water use goes beyond the 2nd quarter of 2013, the CPM may require the owner to provide an analysis demonstrating why the necessary plant modifications can or cannot be made in a more timely manner. This analysis may be brought to the Energy Commission for consideration and further determination of what action the owner should take to make the facility modifications to 100 percent recycled water use.

Verifying compliance with other elements of Condition **SOIL&WATER-1** shall be accomplished in accordance with the provisions of the Verifications for Conditions 2, 3, ~~and~~ 6, 20, and 21 as appropriate.

SOIL&WATER-4 Injection Schedule:

a. The project owner shall inject one thousand (1000) acre-feet of SWP water within twelve (12) months of the commencement of the project's commercial operation.

b. By the end of four years and two months from the start of commercial operation, the project owner shall install and begin operation of a pre-injection ultraviolet (UV) disinfection system.

c. By the end of the fifth year of commercial operation, the project shall submit a report to the CPM demonstrating that HDPP has maintained an average THM concentration level consistent with the WDR permit requirements.

d. After the end of the fifth year of commercial operation, the project owner shall: (i) inject SWP water when it is available in excess of volumes needed to operate the project. The amount of water available to HDPP for extraction is equal to Injection minus Extraction minus Dissipation minus 1000 acre-feet, as defined in SOIL&WATER-6.

~~d. The project shall install and implement a pre-injection reverse osmosis treatment system within one (1) year if any water banking milestone is not met, as defined in the following table.~~

~~**Table of Milestones for Calculated Water Bank Reserve** (1)~~

~~Water Banking Year~~	~~Anniversary Date (2)~~	~~End of Year Milestones (3)~~	~~Contingency Plan: Criteria for Installation of Reverse Osmosis~~
~~8~~	~~April 21, 2011~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 2,500 ac-ft~~
~~9~~	~~April 21, 2012~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 5,400 ac-ft~~
~~10~~	~~April 21, 2013~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 8,300 ac-ft~~
~~11~~	~~April 21, 2014~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 9,200 ac-ft~~
~~12~~	~~April 21, 2015~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 10,100 ac-ft~~
~~13~~	~~April 21, 2016~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 11,000 ac-ft~~
~~14~~	~~April 21, 2017~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 12,000 ac-ft~~
~~15~~	~~April 21, 2018~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve < 13,000 ac-ft~~

~~(1) Calculated Water Bank Reserve = Injection minus Extraction minus Dissipation. (Amount of water available to HDPP is equal to Injection minus Extraction minus Dissipation **minus** 1000 acre-feet, as defined in **SOIL&WATER-6.**)~~

~~(2) Start of Commercial Operation: April 22, 2003.~~

~~(3) Milestones are designed to determine if injection falls significantly behind schedule.~~

~~e. No later than the end of the fifteenth (15) year of commercial operation, the amount of water injected minus the amount of banked groundwater used for project operation, minus the amount of dissipated groundwater shall meet or exceed thirteen thousand (13,000) acre-feet.~~

~~f. After the requirement of section e. has been satisfied and until three (3) years prior to project closure, the project owner shall replace banked groundwater used for project operation as soon as SWP water is available for sale by MWA. The project owner may choose to delay replacement of a limited quantity of banked groundwater used for project operations during aqueduct outages until the cumulative amount of groundwater withdrawn from the bank reaches one thousand (1,000) acre-feet. Once the limit of one thousand (1,000) acre-feet has been reached, the project owner shall replace banked groundwater used for project operation during aqueduct outages as soon as SWP water is available for sale by MWA.~~

Verification: The project owner shall submit an installation and operation report describing the pre-injection ultraviolet disinfection system (UV) by the end of the fourth year of commercial operation. <u>Forecasted estimates of SWP water to be injected shall be included in the quarterly Aquifer and Storage Recovery Well Report.</u> The project owner shall submit a UV performance report by the fifth year of commercial operation. For other related items see the verification to Condition 5. See also the verification to Condition 12.

<u>**SOIL&WATER-20:** The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the City of Victorville (City) for the long-term supply (20 – 25 years) and delivery of tertiary treated recycled water to the HDPP. The HDPP shall not connect to the City's recycled water pipeline without the final agreement in place. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.</u>

<u>**Verification:** No later than 60 days prior to the connection to the VVWRA recycled water pipeline, the project owner shall submit two copies of the executed agreement for the long-term supply and delivery of tertiary treated recycled water to the HDPP. The agreement shall specify a maximum delivery rate of ? gpm and shall specify all terms and costs for the delivery and use of recycled water by the HDPP.</u>

<u>No later than 60 days prior to connection to the City's recycled water pipeline, the project owner shall submit to the CPM a copy of the Engineering Report and Cross Connection inspection and approval report from the California Department of Public Health and all water reuse requirements issued by the Los Angeles Regional Water Quality Control Board.</u>

<u>**SOIL&WATER-21:** Prior to the use of recycled water during the operation of the HDPP, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of recycled water used by the HDPP. The metering devices shall</u>

be operational for the life of the project, and an annual summary of daily water use shall be submitted to the CPM in the annual compliance report.

Verification: At least 30 days prior to use of recycled water for HDPP operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the recycled water line serving the project. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

CONCLUSIONS

Staff believes the project should be modified to provide for connection and interim use of the available recycled water supply and supports the eventual conversion to 100 percent recycled water use. The modification is consistent with Energy Commission water policy and California Water Code section 13550 which are intended to protect freshwater supplies for other beneficial uses. This change in water use would not result in any impacts and would be consistent with previous project analysis if the proposed changes to the existing conditions of certification are adopted and implemented. Staff anticipates HDPP will submit a petition to amend the project because of the changes that would be needed to convert to 100 percent recycled water use.

REFERENCES

CDFG 2003 -- California Department of Fish and Game. Memorandum of Understanding by and between the California Department of Fish and Game and the Victor Valley Wastewater Reclamation Authority regarding the Discharge to the Mojave River Transition Zone, dated 6/27/03.

CEC 1999 -- California Energy Commission. Staff Assessment of the High Desert Power Project, dated 1/21/99.

CEC 2000 -- California Energy Commission. Final Commission Decision for the Application for Certification of the High Desert Power Project, adopted 5/3/2000.

CEC 2006 -- California Energy Commission. Staff Analysis of Petition to Amend Condition of Certification Soil & Water-4 Water Banking Schedule Project, dated 5/26/06.

CEC 2009 -- California Energy Commission. Staff Analysis of Petition to Amend Condition of Certification Soil & Water-1: Prohibition of use of Recycled Wastewater, and Soil & Water-4: Water Banking, dated 4/20/09.

DWR 2007 -- California Department of Water Resources. Bulletin 132-06 *Management of the California State Water Project*, published 12/07.

HDPP 2008a -- High Desert Power Project, LLC. Petition for Modification to Use Reclaimed Water, dated 8/12/08. Submitted to CEC/Docket Unit on 8/14/08.

HDPP 2009a -- High Desert Power Project, LLC/M. Strauss. Response to March 4, 2009 Email and Data Requests, dated 3/13/09.

HDPP 2009b -- High Desert Power Project, LLC. Supplement to Petition for Modification to use Reclaimed Water, dated 6/4/09.

HDPP 2009c -- High Desert Power Project, LLC. Response to Data Requests, dated 7/20/09.

HDPP 2009d-- High Desert Power Project, LLC. Engineering Report for Recycled Water Use by High Desert Power Project, May 2009.

MBAW-VVWD (Mojave Basin Area Watermaster and Victor Valley Water District). 2002. Storage Agreement Between Mojave Basin Area Watermaster and Victor Valley Water District. June 1, 2002.

MWA 2005 Mojave Water Agency, 2004 Regional Water Management Plan, February 24, 2005.

ROC (Record of Conversation). 2009. Summary of conversation between Steve Munro of the California Energy Commission and Tom Bilhorn, hydrology consultant to California Department of Fish and Game (DFG), regarding interpretation of Memorandum of Understanding between DFG and Victor Valley Wastewater Reclamation Authority. March 4, 2009.

RWQCB (Lahontan Regional Water Quality Control Board). 2002. Regional Water Quality Control Board, Lahontan Region, Conditional Waiver of Waste Discharge Requirements, Resolution NO. R6V-2002-0010 WDID NO. 6B360105004 for Victor Valley Water District and High Desert Power Project Limited Liability Corporation, High Desert Power Plant – Groundwater Banking Operation. February 14, 2002.

RWQCB (Lahontan Regional Water Quality Control Board). 2004. Letter from Harold Singer, representing the Lahontan Regional Water Quality Control Board, to Stephen B. Gross, representing High Desert Power Project LLC. Subject:

Response to Aquifer Banking System Issues - High Desert Power Plant – Victorville, San Bernardino County. November 30, 2004.

VV2 (Victorville 2 Hybrid Power Project). 2007. Application for Certification to the California Energy Commission. February 27, 2007.

VVWRA (Victor Valley Wastewater Reclamation Authority). 2004. Victor Valley Wastewater Reclamation Authority, Victor Valley Wastewater Subregional Facilities Draft Program EIR/EIS. August 12, 2004.

ATTACHMENT 5

September 30, 2009 – Revised Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use of Recycled Water

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

DOCKET
97-AFC-1C
DATE 9/30/2009
RECD. 9/30/2009

DATE: September 30, 2009

TO: Interested Parties

FROM: Steve Munro, Compliance Project Manager Steve Munro

SUBJECT: **ERRATA High Desert Power Project (97-AFC-01C) Revised Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use Of Recycled Water for Project Operations**

Enclosed is a corrected copy of the cover letter and Revised Staff Analysis (RSA) that was issued on September 24, 2009, regarding removal of the prohibition of the use of recycled water for High Desert Power Project. The only textual change is on page 12 of the RSA in the second sentence of the Verification section of Condition SOIL&WATER-20. The question mark is replaced by the number 4,000. Also, the footer is updated to state the correct month of issuance. Both of these changes were due to inadvertent errors.

If you have any questions, please contact me at (916) 654-3936.

Enclosures

Mail List: 707

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

DOCKET
97-AFC-1C
DATE 9/24/2009
RECD. 9/24/2009

DATE: September 24, 2009

TO: Interested Parties

FROM: Steve Munro, Compliance Project Manager Steve Munro

SUBJECT: High Desert Power Project (97-AFC-01C)
Revised Staff Analysis of Proposed Modifications to Remove the Prohibition of the Use Of Recycled Water for Project Operations

California Energy Commission staff has issued the enclosed Revised Staff Analysis (RSA) for a 30-day public review period. The RSA is an assessment of the Petition to Amend submitted on August 12, 2008, and the Supplement to Petition for Modification to use Reclaimed Water (Supplement), submitted on June 4, 2009, by High Desert Power Project, (HDPP) LLC. The Supplement was provided in response to the initial Staff Analysis, which was issued on April 20, 2009. The Supplement requests approval to construct and use a recycled water pipeline on its property connecting with a City of Victorville recycled water supply line across the street from the project entry gate at 19000 Perimeter Road. The approximately 1700-foot pipeline would run outside the fence along the northern and western plant fence line.

The High Desert Power Project is an 830 MW combined cycle power plant located in the City of Victorville in San Bernardino County. The project was certified by the Energy Commission on May 3, 2000, and began commercial operation on April 22, 2003.

The proposed modifications would make the following changes to the project's Soil and Water Conditions of Certification :

- Modify Soil and Water-1 as follows:
    - Remove the prohibition of the use of recycled waste water to supplement or replace the power plant's current potable water supply for project operations.
    - Authorize construction of a recycled water pipeline to enable the project to use recycled tertiary-treated water for approximately 1/3 of its project cooling water needs.
    - Require a feasibility study to be completed by December 31, 2011, to determine the feasibility of converting to 100 percent recycled water use.
- Modify Condition Soil and Water-4 as follows:
    - Eliminate water banking milestones because of infeasibility of achieving the milestones and the goal of converting project cooling to 100 percent recycled water, with potable State Water Project water and banked groundwater as a backup.

- Add new Condition of Certification Soil and Water-20 to require that copies of the Executed Recycled Water Purchase Agreement be submitted prior to interconnection.

- Add new Condition of Certification Soil and Water--21 requiring that water metering systems be installed.

Energy Commission Soil and Water Resources staff, and Biological Resources staff, among others, reviewed the petition, the Supplement, and data responses and assessed the impacts of this proposal on environmental quality, public health and safety. Given the previous ground disturbance resulting from construction of the HDPP project, Soil and Water, Biological, and Cultural Resources were the only technical areas with identified potential for impacts. Staff concurs with the proposal to modify Soil and Water-1 and 4 and add Soil and Water-20 and 21 as described above. It is staff's opinion that, with the implementation of these revised and added Conditions of Certification and existing Conditions of Certification pertaining to project construction, the project will remain in compliance with applicable laws, ordinances, regulations, and standards and that the proposed modifications will not result in a significant adverse direct or cumulative impact to the environment (Title 20, California Code of Regulations, Section 1769).

The RSA and the amendment petition have been posted on the Energy Commission web site at the following web address: http://www.energy.ca.gov/sitingcases/highdesert/compliance/index.html. A Staff Workshop may be scheduled, if necessary, to address concerns from the public review process.

The Energy Commission's Order (if approved) will also be posted on the website. Energy Commission staff intends to recommend approval of the petition at the November 4, 2009 Business Meeting of the Energy Commission. If you have comments on this proposed modification, please submit them to me at the address below by 5:00 p.m. on October 8, 2009.

Steve Munro, Compliance Project Manager
California Energy Commission
1516 9th Street, MS-2000
Sacramento, CA 95814

The Energy Commission encourages comments by e-mail. Please include your name or your organization's name in the e-mail. Those submitting attachments via e-mail should provide them in either Microsoft Word format, or in Portable Document Format (PDF), to: smunro@energy.state.ca.us.

If you have any questions, please contact me at (916) 654-3936.

Enclosure
Mail List: 707

HIGH DESERT POWER PROJECT (97-AFC-1C)

Petition for Modification to use Reclaimed Water
Staff Analysis
Prepared by: Paul Marshall and Rick York
September 2009

INTRODUCTION

On August 12, 2008, High Desert Power Project, LLC (project owner) filed a Petition for Modification to use Reclaimed Water (HDPP 2008a) for its High Desert Power Project (HDPP). A preliminary Staff Analysis of the petition was issued for public review on April 20, 2009. The only comments received were from the project owner in the form of a supplement to the original petition. The Supplement to Petition for Modification to use Reclaimed Water (supplement) was submitted to the California Energy Commission (Energy Commission) on June 4, 2009 (HDDP 2009b).

Within the supplement, the project owner clarifies the three changes they are requesting to the HDPP license, which are enumerated below:

1. Removal of the prohibition on the use of reclaimed (recycled) water as set forth in Condition of Certification **SOIL&WATER-1**.

2. Authorization to interconnect to the City of Victorville's (City) existing recycled water pipeline, via a new underground water pipeline approximately 1,700 feet long that will run along the perimeter of the HDPP site, and use recycled water provided to the HDPP by the City.

3. Modification to the aquifer banking requirements in Condition of Certification **SOIL&WATER-4** to reflect recycled water use.

The proposed use of recycled water and the modification to the aquifer banking requirements have the potential to cause environmental impacts to soil and water resources due to pipeline construction and the delivery, use, and discharge of recycled water. These aspects of the proposed petition to amend have been evaluated in accordance with the California Environmental Quality Act (CEQA) and current laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

Staff has reviewed the LORS identified in the Energy Commission's Staff Assessment for the High Desert Power Project (CEC 1999) and the Energy Commission's Staff Analysis of Petition to Amend Condition of Certification Soil & Water-4 (CEC 2006) and has listed those LORS in **SOIL & WATER Table 1** that are new to this analysis.

SOIL & WATER Table 1
Laws, Ordinances, Regulations, and Standards

State LORS	
California Water Code, section 13523	Requires the Lahontan Regional Water Quality Control Board (LRWQCB) to prescribe water reuse requirements for water that is to be used as recycled water after consulting with the Department of Public Health (DPH).
California Code of Regulations, Title 17	Title 17, Division 1, Chapter 5, addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15, requires the California Department of Public Health (DPH) to review and approve new or modified recycled water projects to ensure they meet all recycled water criteria for the protection of public health.

PROJECT DESCRIPTION AND BACKGROUND

The HDPP is an 830 megawatt natural gas-fired combined-cycle power plant located in the City of Victorville (City), in San Bernardino County. The HDPP has been operational since April 2003, and its primary water supply is surface water purchased from the City through a contract with the Mojave Water Agency (MWA). The MWA is a Long-Term State Water Project (SWP) Contractor with a full entitlement of 75,800 acre-feet (AF) of SWP water (CEC 2006 and DWR 2007, Table B-4).

Because of drought and the pumping constraints that federal biological opinions have placed on the SWP, deliveries to MWA have been variable. From 2001 to 2005, deliveries of SWP water to MWA have averaged less than 10,000 AFY (DWR 2007, Table B-5B). MWA expects SWP deliveries to continue to be variable for the next ten to fifteen years due to requests for additional water by other SWP contractors and insufficient yield from SWP conservation reservoirs (MWA 2005, Chapter 4). Because the primary water supply is variable, the project owner is required to maintain a groundwater bank where contract water from the City above HDPP operational needs is injected into the underlying aquifer (groundwater bank) for retrieval when SWP water is unavailable.

Given the current allocation of SWP water available to HDPP, there is no ability for HDPP to inject more water into the bank. If the HDPP had to rely solely on its current groundwater supply, it would be able to operate for approximately 18 months. With the reduction of water available from the SWP, HDPP is at risk of being required to significantly limit or even shut down plant operation within the next two years and beyond.

Proposed Amendments

As contained in the August 4, 2008 amendment petition and the June 4, 2009 supplement, the project owner proposes to augment SWP water with recycled water and to amend the water banking schedule to reflect the availability and use of recycled water. The decrease in the annual groundwater injection volume would be reduced by a percentage equal to the amount of recycled water used for HDPP operation (CEC 2009).

The project owner proposed to amend Condition of Certification **SOIL & WATER-1** in the August 4, 2008 petition to allow the use of recycled water to augment the HDPP's SWP water supply and to eventually transition to 100 percent recycled water as it becomes available for use. Staff concurred with this request and proposed changes to this condition in the staff analysis dated April 20, 2009. With the use of recycled water for cooling purposes, a revised water banking schedule and modification to Condition of Certification **SOIL & WATER-4** was also proposed in the August 4, 2008 petition. Staff believed it was premature to amend Condition of Certification **SOIL & WATER-4** because additional information was needed to evaluate the source, volume, reliability, and method of delivery (CEC 2009). The Supplement to Petition for Modification to use Reclaimed Water (supplement) that was submitted to the California Energy Commission (Energy Commission) on June 4, 2009 (HDDP 2009b) provided additional information needed for further analysis of use of recycled water at HDPP.

ANALYSIS

Staff reviewed the project owner's June 4, 2009 supplemental petition to identify potential environmental impacts to soil and water resources and for consistency with applicable LORS. This analysis is based on information provided in the original Staff Assessment for the HDPP (CEC 1999), the Energy Commission's Staff Analysis of Petition to Amend Condition of Certification Soil & Water-4 (CEC 2006), the Energy Commission's Staff Analysis of Petition to Amend Condition of Certification Soil & Water-1: Prohibition of use of Recycled Wastewater, and Soil & Water-4: Water Banking (CEC 2009), and the project owner's July 20, 2009 data responses (HDPP 2009c).

Based on this review, staff presents the following assessment of the project owner's proposed changes to Conditions of Certification **SOIL&WATER-1 and -4**. The scope of this analysis is to evaluate:

1. The CEQA and LORS compliance of the project owner's proposal to remove from Condition of Certification **SOIL&WATER-1** the prohibition on the use of recycled water.
2. The use of tertiary treated recycled water for cooling purposes and its potential to adversely affect soil and water resources from its production, delivery (via a proposed new 1700-foot pipeline within the HDPP property), use, and discharge.
3. The CEQA and LORS compliance of the project owner's proposed modification to the aquifer banking requirements (Condition of Certification **SOIL&WATER-4**) to reflect recycled water use.

Recycled Water Analysis

Condition of Certification **SOIL&WATER-1** currently prohibits the use of recycled water from the Victor Valley Wastewater Reclamation Authority (VVWRA) for HDPP industrial purposes. This prohibition was required because the California Department of Fish and Game (CDFG) was concerned that use of VVWRA recycled water for HDPP cooling purposes would reduce surface flows in the Mojave River. CDFG believed that these reduced flows would affect riparian resources and result in significant environmental impacts. Staff agreed with CDFG and prohibited the use of recycled water for HDPP cooling in Condition of Certification **SOIL&WATER-1**, which was adopted by the Energy Commission in its Final Commission Decision (CEC 2000 and CEC 2009a).

Currently, SWP water is the primary source of industrial water supply for the HDPP. Based on its design, the HDPP has the capability to consume up to 4,000 AFY of raw surface water from the SWP. Based on operating data, the historic consumption of SWP water has been approximately 3,000 AFY based on the demand for electricity in Southern California. The project owner expects future electricity demand to increase with population growth in the Imperial Valley and the desert regions of Southern California (HDPP 2008).

Because of population growth in the Victorville area, the volume of wastewater delivered to the VVWRA Waste Water Treatment plant has increased. In 2003, CDFG and VVWRA executed a Memorandum of Understanding (MOU) that specifies discharge requirements that VVWRA must maintain to ensure there will be no impacts to riparian resources in the Mojave River. The MOU also includes a provision that requires VVWRA to discharge a portion of future increases in recycled water volume to the river (CEC 2009 and CDFG 2003).

In 2008, the Energy Commission certified the City of Victorville's Victorville 2 Hybrid Power Project (Victorville 2). This project has a recycled water supply agreement with VVWRA for the delivery of 3,150 AFY of recycled water. Since certification, the city of Victorville has decided to sell the project and progress on Victorville 2 has slowed significantly. The time necessary for acquisition and construction of the project could be on the order of 2 to 3 years. Therefore, the recycled water supply dedicated to Victorville 2 may be available for interim use by HDPP.

Based on the City's long-term projection of recycled water availability through the year 2040, the City expects to deliver up to 1,000 AF to the HDPP in 2010 and 2011. The City expects to start delivering recycled water to Victorville 2 during the second quarter of 2011 with full deliveries of up to 2,600 AFY starting in 2012. The City's long-term projection provided in its *Summary Table of Recycled Water Availability* includes all of the City's contractual obligations for recycled water (HDPP 2009c, Data Response 3).

The City has provided the project owner with a "Will Serve Letter" dated July 2, 2009 for the delivery of tertiary treated recycled water to the HDDP. The City commits to an initial delivery of 1,000 AFY (2010) and up to 4,000 AFY (2012) when the additional HDPP treatment facilities are installed and operating (HDPP 2009c, Data Responses 1 & 3). The City would meet the HDPP's increased recycled water demand (4,000 AFY) from its new Industrial Waste Water Treatment Plant that is currently under construction and is expected to be operational in the Spring of 2010.

The new Industrial Waste Water Treatment Plant in combination with the existing VVWRA facility would provide a reliable long-term supply of recycled water for the HDPP. In addition, supplying recycled water from two separate plants provides operational flexibility for treatment plant maintenance and/or forced outages (HDPP 2009c, Data Responses 1 & 3).

In the short term, *Summary Table of Recycled Water Availability* (HDPP 2009c, Data Response 3) shows that if Victorville 2 becomes operational in 2012, recycled water deliveries could be constrained and there would be limited availability for the period from 2012 to 2014. The availability of recycled water is dependent on the growth projections for the area serviced by the City and the expansion of treatment capacity necessary to meet all recycled water delivery obligations in 2015. If the growth projections are too high and the volume of wastewater available for treatment and delivery is not available, it is possible the volume of recycled water that can be delivered to HDPP and/or Victorville can be reduced and use of surface and groundwater supplies would be needed to make up supply needs on either or both projects for continued operation.

Staff believes the likelihood these fresh water supplies would be needed is low given the current schedule for development of Victorville 2 and delivery of recycled water. However, staff believes the owner should continue to bank any available SWP water supply and ensure carryover until the full reliable recycled water supply would be available in 2015 and HDPP can be modified for 100 percent recycled water use. Staff notes that if freshwater supplies are needed, Victorville 2 has been analyzed and certified to use fresh water on an interim basis so there would be flexibility in maintaining reliability while ensuring there would be no environmental impacts during this short term use. Modification of the aquifer banking requirement and proposed amendments to Condition of Certification **SOIL&WATER-1 and SOIL&WATER-4** to address this short term limitation are provided below.

To ensure the HDPP has a reliable long term supply of recycled water available and can commit to future maximum use of recycled water, staff proposes Condition of Certification **SOIL&WATER-20**. This condition would require the project owner to enter into a long term agreement with the City to supply the maximum recycled water use of 4,000 AFY at a rate of up to 6,000 gallons per minute. Staff also proposes addition of Condition of Certification **SOIL&WATER-21,** which would require the applicant to install and maintain metering devices as part of the recycled water supply and distribution system to monitor and record in gallons per day the volume of recycled water used by the HDPP. This condition will ensure the project complies with the terms of the recycled water agreement required in proposed Condition of Certification **SOIL&WATER–20**.

Recycled Water Use Laws

The production and use of recycled water is regulated under federal and state law. The State Water Resources Control Board (SWRCB) shares jurisdiction with the Regional Water Quality Control Boards (RWQCB) and with the Department of Public Health (DPH) over the use of recycled water. The SWRCB exercises general oversight over recycled water projects, while DPH is charged with the protection of public health and drinking water supplies through the development of uniform water recycling criteria. Under California Water Code, sections 13522.5, 13523, and 13523.1, any person who proposes to produce or use recycled water must file a report and obtain water reclamation requirements or a master reclamation permit from the appropriate RWQCB.

One of the primary conditions for the use of recycled water is protection of public health. The current Water Recycling Criteria (Title 22, California Code of Regulations, sections 60301 through 60355) require the submission of an engineering report to the RWQCB and DPH before recycled water projects are implemented. For existing recycled water projects, the report must be amended prior to any modifications or expansion.

In addition, Title 17, California Code of Regulations addresses the health and safety requirements of backflow prevention and cross connection of potable and non-potable water lines. Through the approval of the engineering report by DPH, that includes the backflow prevention and cross connection provisions of Title 17, the health and safety requirements of Title 17 and Title 22 would be met. To ensure compliance with federal and state laws, staff has added Condition of Certification **SOIL&WATER-20** that requires the project owner to submit a copy of an approved engineering report and any other DPH or LRWQCB requirements to the Compliance Project Manager (CPM) prior to the delivery of recycled water to the HDPP. HDPP has already made substantial progress in satisfying this condition as shown in the draft engineering report (HDPP 2009d) provided in support of the petition to amend for review and discussed in this analysis.

Compliance with Condition of Certification **SOIL&WATER-20** would ensure that a long-term recycled water supply is available for HDPP operation and that recycled water production and use complies with the Clean Water Act, the California Water Code, and the California Code of Regulations. Through compliance with federal and state law, impacts to soil or water resources from the production, delivery, use, and discharge of recycled water would be less than significant.

RECYCLED WASTEWATER

The draft Engineering Report for Recycled Water Use by High Desert Power Project (HDPP 2009d) indicates that after recycled water is blended with SWP water in the cooling tower for make-up purposes, it will be cycled through the existing zero liquid discharge system (ZLD). This system will provide for reuse of recycled water and eliminate the need for a wastewater discharge. The ZLD would however concentrate solids and chemical constituents into a semi-solid waste that would have to be disposed of. Staff believes the volume of waste that would be generated by the ZLD through the use of the recycled water supply would not change significantly but it is possible the chemistry of the waste could change. Staff believes the project owner should comply with existing Condition of Certification **Waste-1** and amend the operation waste management plan to describe the new waste stream and identify the methods of management that would be required given the waste characterization. The flow diagram in Appendix D also indicates the recycled water supply will not be interconnected with the aquifer banking system. This will eliminate any potential impacts to groundwater.

MODIFICATION TO AQUIFER BANKING REQUIREMENTS

As discussed above, the SWP deliveries can be significantly reduced during drought conditions or by environmental restrictions on Delta pumping. Therefore, HDPP's primary water supply is interruptible. Accordingly, certification of the project required HDPP to obtain a backup water supply to provide water to the project during interruptions of the primary supply. Because the Mojave groundwater basin is over drafted and no existing groundwater reserves are available, HDPP was permitted to establish a groundwater bank to provide a backup water supply. With the current reduction in deliveries of SWP water due to existing drought conditions and the variable water quality of SWP water, the current groundwater banking system does not provide a reliable long-term backup supply.

As designed, the groundwater bank is to be developed and then used on an as-needed basis when deliveries of SWP water are restricted. In accordance with **SOIL&WATER-4**, HDPP must eventually establish a water bank with a volume equivalent to the volume of water expected to be used by HDPP over a three year period of operation plus 1,000 AF. The volume of this banked water supply is based on the estimated maximum use of back up water required during a contiguous three year period when SWP water would be unavailable (3 years x 4,000 AFY) plus 1,000 AF.

Staff realizes that if the project owner does not inject sufficient water to comply with the water banking goals identified in **SOIL & WATER-4d**, the project owner may be required to construct a pre-injection reverse osmosis treatment system. Staff believes the intent of this requirement was based on the need to meet water quality requirements for the injected water. However, staff believes that where no water is available for treatment, the project owner should not be mandated to comply with the requirement for constructing and operating a treatment system.

While it is unrealistic to hold HDPP to the annual schedule as detailed in **SOIL & WATER-4** due to current SWP water availability, the cumulative volume needs to be established as soon as possible. In order to maintain a suitable volume for use as back up, HDPP should use its entire annual allotment (8,000 AFY) from the City, minus operational needs, to resupply the groundwater bank. Once full, the bank will be required to be maintained as necessary to sustain that volume. When the planned future amendment for conversion to full recycled water use is received staff can further consider whether it would be appropriate to change or eliminate the water banking requirement. Staff proposes to modify this condition and remove the schedule of milestones as shown below.

CONSTRUCTION IMPACTS

Construction of the recycled water pipeline will include excavating approximately 1,700 linear feet of trench along the north and west boundaries of the facility, placement of 18-inch diameter Polyvinyl Chloride pipe, interconnecting with VVWD's exsiting 16-inch line, and backfilling with engineered fill.

SOIL AND WATER IMPACTS - These construction activities would expose disturbed soils to wind and water erosion that could result in offsite impacts if proper control measures are not implemented. Staff recommends the applicant be required to update the erosion control and revegetation plan required in Condition of Certification **SOIL&WATER -16**. This would ensure that appropriate Best Management Practices and control measures would be implemented and pipeline construction activities would not result in any off-site impacts.

BIOLOGICAL CULTURAL AND OTHER ENVIRONMENTAL IMPACTS - Biological Resources staff has some concerns about the proposed pipeline construction since the proposed reclaimed water supply pipeline would be located immediately adjacent to (outside of) the existing fence that surrounds the power plant site. The area adjacent to the existing power plant site is desert tortoise habitat, and desert tortoise were observed in the area during the original construction. Therefore, staff agrees with the project owner's suggested approach that the current High Desert Power Project Biological Resources Mitigation Implementation and Monitoring Plan be implemented during project construction and that the Designated Biologist or a Biological Monitor be present during pipeline construction to make certain that wildlife species are not affected by pipeline construction. Staff and the Compliance Project Manager must also be provided regular project updates during construction; however staff and CDFG must be contacted immediately if a desert tortoise is encountered during pipeline construction. If a desert tortoise is encountered, staff, CDFG, and the project owner will discuss and agree upon impact avoidance measures to be implemented to avoid impacts to desert tortoise. With regard to Cultural Resources, these are of a lower order of concern, since the area of excavation has been previously disturbed, and there were no cultural resources found during the original plant construction. Implementation of the existing construction-related conditions of certification, including the approved Worker Environmental Awareness Training program for all construction workers, will prevent significant impacts on all environmental resources during the pipeline excavation and construction process.

LORS ANALYSIS

As presented in **SOIL AND WATER Table1**, new LORS were evaluated in the assessment. The proposed changes would comply with the following LORS if the new and amended conditions of certification are implemented.

- The Resource Conservation Recovery Act of 1976 by the proper handling and disposal of waste through compliance with Condition of Certification **Waste-1**.
- Title 17 of the California Code of Regulations, through the approval by San Bernardino County for backflow prevention and cross connections of potable and recycled water lines in accordance with Condition of Certification **SOIL&WATER-20**.
- Title 22 of the California Code of Regulations, through the proper use and discharge of recycled water in accordance with Condition of Certification **SOIL&WATER-20**.

PROPOSED MODIFICATIONS TO CONDITIONS OF CERTIFICATION

Staff proposes additional changes to Condition of Certification SOIL & WATER-1 that were made in staff's Analysis dated April 20, 2009. These changes are proposed to accommodate the change in water supply and additional information supplied by the project owner as discussed in the analysis above. Staff generally concurs with the changes to Condition of Certification **SOIL&WATER–1** proposed by the project owner, however staff proposes language that would commit the owner to obtaining and using the maximum amount of recycled water use consistent with Energy Commission water policy.

Staff also previously recommended a copy of an agreement between the City and HDPP for the long term supply and delivery of recycled water be provided to support the proposed amendment. Staff understands the owner is working with the City to develop this agreement. Staff concurs with the owner that an agreement can be supplied as a condition of project certification as long as the agreement is in place before delivery of recycled water. Staff has included Condition of Certification **SOIL&WATER-20** to address this requirement and commitment on the part of the owner. Therefore, staff proposes to modify Condition of Certification **SOIL&WATER–1e** to reflect this change.

Staff generally concurs with the owner proposed changes to Condition of Certification **SOIL & WATER-4.** Staff believes the water banking schedule and requirement for reverse osmosis treatment in the event the schedule cannot be maintained can be stricken. However, staff believes that the owner should be required to bank SWP water when it is available and meets water quality requirements for injection. This will ensure that if water is available it would be banked and could be used for any short term reductions or limitations in recycled water supply discussed above.

SOIL&WATER-1 ~~The only w~~Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or appropriately treated recycled waste water.

a. Whenever SWP water is available to be purchased from ~~MWA~~ the city of Victorville, or recycled waste water is available, the project owner shall use direct delivery of such water for project operation.

b. Whenever water is not available to be purchased from the ~~MWA~~ city of Victorville the project owner may use SWP water banked in the ~~seven~~ four HDPP wells ~~identified in Figure Number 1 of the Addendum Number 1 to the "Evaluation of Alternative Water Supplies for the High Desert Power Project" (Bookman-Edmonston 1998)~~ as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to **SOIL&WATER-5.**

c. If there is no SWP water available to be purchased from the ~~MWA~~ city of Victorville, and there is no reclaimed water available, and there is no banked water available to the project, as determined pursuant to **SOIL&WATER-5**, no groundwater shall be pumped, and the project shall not operate. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

~~d. The project shall not use treated water from the Victor Valley Wastewater Authority.~~

e. The project's water supply facilities shall be appropriately sized and utilized to meet project needs~~.~~ and to make maximum use of recycled waste water for power plant cooling ~~needs~~ given current equipment capabilities. ~~Prior to use of recycled waste water the project owner will provide the CPM with details of the recycled water pipeline and connections, a copy of an agreement with VVWRA or other suppliers that will deliver recycled waste water, and any other information necessary to amend the project for the proposed recycled waste water use.~~

f. The project owner shall continue with the feasibility study and developing the design for eventual conversion to 100 percent recycled water use for evaporative cooling purposes by the 4th quarter of 2012. The intent of this conversion is to eliminate fresh water use for power plant cooling consistent with Energy Commission water policy and California Water Code, section 13550. The project owner shall submit a petition to amend the project because of the changes that would be needed to convert to 100 percent recycled water. The feasibility study shall be completed by the project owner and submitted to the CPM no later than December 31, 2011.

Verification: The project owner shall provide final design drawings of the project's water supply facilities to the CPM, for review and approval, thirty (30) days before commencing project construction.

The project owner shall provide a biannual report on the progress being made on the project design for use of 100 percent recycled water for power plant cooling. The report shall include information related to design and specifications for project modification and any adjustments or changes in the schedule for converting to 100 percent recycled water use. The first report shall be due six months after adoption of this condition of certification. If the schedule for implementation of 100 percent recycled water use goes beyond the 2nd quarter of 2013, the CPM may require the owner to provide an analysis demonstrating why the necessary plant modifications can or cannot be made in a more timely manner. This analysis may be brought to the Energy Commission for consideration and further determination of what action the owner should take to make the facility modifications to 100 percent recycled water use.

Verifying compliance with other elements of Condition **SOIL&WATER-1** shall be accomplished in accordance with the provisions of the Verifications for Conditions 2, 3, ~~and~~ 6, 20, and 21 as appropriate.

SOIL&WATER-4 Injection Schedule:

a. The project owner shall inject one thousand (1000) acre-feet of SWP water within twelve (12) months of the commencement of the project's commercial operation.

b. By the end of four years and two months from the start of commercial operation, the project owner shall install and begin operation of a pre-injection ultraviolet (UV) disinfection system.

c. By the end of the fifth year of commercial operation, the project shall submit a report to the CPM demonstrating that HDPP has maintained an average THM concentration level consistent with the WDR permit requirements.

d. After the end of the fifth year of commercial operation, the project owner shall: (i) inject SWP water when it is available in excess of volumes needed to operate the project. The amount of water available to HDPP for extraction is equal to Injection minus Extraction minus Dissipation minus 1000 acre-feet, as defined in SOIL&WATER-6.

~~d. The project shall install and implement a pre-injection reverse osmosis treatment system within one (1) year if any water banking milestone is not met, as defined in the following table.~~

~~**Table of Milestones for Calculated Water Bank Reserve** (1)~~

~~Water Banking Year~~	~~Anniversary Date (2)~~	~~End of Year Milestones (3)~~	~~Contingency Plan: Criteria for Installation of Reverse Osmosis~~
~~8~~	~~April 21, 2011~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 2,500 ac-ft~~
~~9~~	~~April 21, 2012~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 5,400 ac-ft~~
~~10~~	~~April 21, 2013~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 8,300 ac-ft~~
~~11~~	~~April 21, 2014~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 9,200 ac-ft~~
~~12~~	~~April 21, 2015~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 10,100 ac-ft~~
~~13~~	~~April 21, 2016~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 11,000 ac-ft~~
~~14~~	~~April 21, 2017~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 12,000 ac-ft~~
~~15~~	~~April 21, 2018~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve < 13,000 ac-ft~~

~~(1) Calculated Water Bank Reserve = Injection minus Extraction minus Dissipation. (Amount of water available to HDPP is equal to Injection minus Extraction minus Dissipation **minus** 1000 acre-feet, as defined in **SOIL&WATER-6**.)~~
~~(2) Start of Commercial Operation: April 22, 2003.~~
~~(3) Milestones are designed to determine if injection falls significantly behind schedule.~~

~~e. No later than the end of the fifteenth (15) year of commercial operation, the amount of water injected minus the amount of banked groundwater~~

~~used for project operation, minus the amount of dissipated groundwater shall meet or exceed thirteen thousand (13,000) acre-feet.~~

~~f. After the requirement of section e. has been satisfied and until three (3) years prior to project closure, the project owner shall replace banked groundwater used for project operation as soon as SWP water is available for sale by MWA. The project owner may choose to delay replacement of a limited quantity of banked groundwater used for project operations during aqueduct outages until the cumulative amount of groundwater withdrawn from the bank reaches one thousand (1,000) acre-feet. Once the limit of one thousand (1,000) acre-feet has been reached, the project owner shall replace banked groundwater used for project operation during aqueduct outages as soon as SWP water is available for sale by MWA.~~

Verification: The project owner shall submit an installation and operation report describing the pre-injection ultraviolet disinfection system (UV) by the end of the fourth year of commercial operation. <u>Forecasted estimates of SWP water to be injected shall be included in the quarterly Aquifer and Storage Recovery Well Report.</u> The project owner shall submit a UV performance report by the fifth year of commercial operation. For other related items see the verification to Condition 5. See also the verification to Condition 12.

<u>**SOIL&WATER-20:** The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the City of Victorville (City) for the long-term supply (20 – 25 years) and delivery of tertiary treated recycled water to the HDPP. The HDPP shall not connect to the City's recycled water pipeline without the final agreement in place. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.</u>

<u>**Verification:** No later than 60 days prior to the connection to the VVWRA recycled water pipeline, the project owner shall submit two copies of the executed agreement for the long-term supply and delivery of tertiary treated recycled water to the HDPP. The agreement shall specify a maximum delivery rate of 4000 gpm and shall specify all terms and costs for the delivery and use of recycled water by the HDPP.</u>

<u>No later than 60 days prior to connection to the City's recycled water pipeline, the project owner shall submit to the CPM a copy of the Engineering Report and Cross Connection inspection and approval report from the California Department of Public Health and all water reuse requirements issued by the Los Angeles Regional Water Quality Control Board.</u>

<u>**SOIL&WATER-21:** Prior to the use of recycled water during the operation of the HDPP, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of recycled water used by the HDPP. The metering devices shall be operational for the life of the project, and an annual summary of daily water use shall be submitted to the CPM in the annual compliance report.</u>

Verification: <u>At least 30 days prior to use of recycled water for HDPP operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the recycled water line serving the project. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.</u>

CONCLUSIONS

Staff believes the project should be modified to provide for connection and interim use of the available recycled water supply and supports the eventual conversion to 100 percent recycled water use. The modification is consistent with Energy Commission water policy and California Water Code section 13550 which are intended to protect freshwater supplies for other beneficial uses. This change in water use would not result in any impacts and would be consistent with previous project analysis if the proposed changes to the existing conditions of certification are adopted and implemented. Staff anticipates HDPP will submit a petition to amend the project because of the changes that would be needed to convert to 100 percent recycled water use.

REFERENCES

CDFG 2003 -- California Department of Fish and Game. Memorandum of Understanding by and between the California Department of Fish and Game and the Victor Valley Wastewater Reclamation Authority regarding the Discharge to the Mojave River Transition Zone, dated 6/27/03.

CEC 1999 -- California Energy Commission. Staff Assessment of the High Desert Power Project, dated 1/21/99.

CEC 2000 -- California Energy Commission. Final Commission Decision for the Application for Certification of the High Desert Power Project, adopted 5/3/2000.

CEC 2006 -- California Energy Commission. Staff Analysis of Petition to Amend Condition of Certification Soil & Water-4 Water Banking Schedule Project, dated 5/26/06.

CEC 2009 -- California Energy Commission. Staff Analysis of Petition to Amend Condition of Certification Soil & Water-1: Prohibition of use of Recycled Wastewater, and Soil & Water-4: Water Banking, dated 4/20/09.

DWR 2007 -- California Department of Water Resources. Bulletin 132-06 *Management of the California State Water Project*, published 12/07.

HDPP 2008a -- High Desert Power Project, LLC. Petition for Modification to Use Reclaimed Water, dated 8/12/08. Submitted to CEC/Docket Unit on 8/14/08.

HDPP 2009a -- High Desert Power Project, LLC/M. Strauss. Response to March 4, 2009 Email and Data Requests, dated 3/13/09.

HDPP 2009b -- High Desert Power Project, LLC. Supplement to Petition for Modification to use Reclaimed Water, dated 6/4/09.

HDPP 2009c -- High Desert Power Project, LLC. Response to Data Requests, dated 7/20/09.

HDPP 2009d-- High Desert Power Project, LLC. Engineering Report for Recycled Water Use by High Desert Power Project, May 2009.

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ATTACHMENT 6

November 30, 2009 – Commission Order Approving Petition for Modification to Remove Prohibition on Use of Recycled Water in CEQA-Equivalent Approval

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of: **HIGH DESERT POWER PROJECT**	)	**Docket No. 97-AFC-1C**
	)	
HIGH DESERT POWER PROJECT, LLC	)	**Order No.** 09-1118-5
	)	**ORDER APPROVING** a Petition to Modify Soil and Water Conditions Relating to Use of Recycled Water for Project Cooling

High Desert Power Project, LLC, the owner/operator of the High Desert Power Project (HDPP), has requested to modify the SOIL and WATER Conditions of Certification to remove the prohibition of the use of recycled water for project cooling. They request authorization to build a short water pipeline to begin using recycled water for about 1/3 of their current cooling needs. They will also conduct a feasibility study to determine viability of increasing the use of recycled water for up to 100 percent of cooling needs and other industrial uses. Specifically, the proposed modifications to the conditions of certification are as follows:

Modify Soil&Water-1 to:

- Remove the prohibition of the use of recycled waste water to supplement or replace the power plant's current potable water supply for project operations.
- Authorize construction of a recycled water pipeline to enable the project to use recycled tertiary-treated water for approximately 1/3 of its project cooling water needs.
- Require a feasibility study to be completed by December 31, 2011, to determine the feasibility of converting to up to 100 percent recycled water use.

Modify Condition Soil&Water-4 to:

- Eliminate water banking milestones because of the lack of availability of State Water Project (SWP) water, and move toward the goal of converting project cooling to 100 percent recycled water, with potable State Water Project water and banked groundwater as a backup.

Add new Condition of Certification Soil&Water-20 to require that copies of the Executed Recycled Water Purchase Agreement be submitted prior to interconnection.

Add new Condition of Certification Soil&Water-21 requiring that water metering systems be installed.

STAFF RECOMMENDATION

Energy Commission staff reviewed the petition and finds that it complies with the requirements of Title 20, Section 1769(a) of the California Code of Regulations. Staff recommends approval of High Desert Power Project, LLC's petition to modify the HDPP Project and amend related Conditions of Certification.

ENERGY COMMISSION FINDINGS

Based on staff's analysis, the Energy Commission concludes that with the above exceptions the proposed changes will not result in any significant impact to public health and safety, or the environment. The Energy Commission public review process has been certified as a CEQA-equivalent, and therefore satisfies CEQA requirements. The Energy Commission finds that:

- The petition meets all the filing criteria of Section 1769(a) concerning post-certification project modifications.
- The modification will not change the findings in the Energy Commission's Final Decision pursuant to Section 1755.
- The project will remain in compliance with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code section 25525;
- The Change will be beneficial to the public because there will be a decrease in the use of potable SWP water for project operation.
- The change is based on information that was not available to the parties prior to Commission certification. The availability of fresh water from the State Water Project has diminished dramatically in comparison with estimates available at the time of certification for reasons that were not anticipated during project certification, which threatens the reliability of project operations.

CONCLUSION AND ORDER

The California Energy Commission hereby adopts Staff's recommendations and approves the following changes to the High Desert Power Project Decision. New language is shown as **underlined**, and deleted language is shown in ~~strikeout~~.

CONDITIONS OF CERTIFICATION

SOIL&WATER-1 ~~The only w~~Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or appropriately treated recycled waste water.

a. Whenever SWP water is available to be purchased from ~~MWA~~ the city of Victorville, or recycled waste water is available, the project owner shall use direct delivery of such water for project operation.

b. Whenever water is not available to be purchased from the ~~MWA~~ city of Victorville the project owner may use SWP water banked in the ~~seven~~ four HDPP wells ~~identified in Figure Number 1 of the Addendum Number 1 to the "Evaluation of Alternative Water Supplies for the High Desert Power Project" (Bookman-Edmonston 1998)~~ as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to **SOIL&WATER-5.**

c. If there is no SWP water available to be purchased from the ~~MWA~~ city of Victorville, and there is no reclaimed water available, and there is no banked water available to the project, as determined pursuant to **SOIL&WATER-5**, no groundwater shall be pumped, and the project shall not operate. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

~~d. The project shall not use treated water from the Victor Valley Wastewater Authority.~~

e. The project's water supply facilities shall be appropriately sized to meet project needs~~.~~ The project shall make maximum use of recycled waste water for power plant cooling ~~needs~~ given current equipment capabilities and permit conditions.

f. The project owner shall continue with the feasibility study evaluating the use of 100 percent recycled water for evaporative cooling purposes and other industrial uses. The feasibility study shall be completed by the project owner and submitted to the CPM no later than December 31, 2011.

Verification: The project owner shall provide final design drawings of the project's water supply facilities to the CPM, for review and approval, thirty (30) days before commencing project construction.

The project owner shall provide a biannual report on the progress being made on the feasibility study for use of 100 percent recycled water for power plant cooling and other industrial uses. The report shall include information related to project modifications that may be needed for using up to 100 percent recycled water. The first report shall be due six months after adoption of this condition of certification.

Verifying compliance with other elements of Condition **SOIL&WATER-1** shall be accomplished in accordance with the provisions of the Verifications for Conditions 2, 3, ~~and~~ 6, 20, and 21 as appropriate.

The feasibility study to be submitted by December 31, 2011, should contain, but not be limited to, the following information:

I Water Supply

A. Potential sources of recycled water, its current and projected use, and alternative pipeline routes
B. Adequacy of recycled water supplies to meet plant operation demand (provide future projections of supply and demand considering annual volumes, monthly patterns of plant water use vs. availability of water supply, and peak day supply and demand)
C. Quality of existing and recycled water supplies
D. Water treatment requirements for existing and recycled water supplies
E. Cooling cycles of concentration for existing and potential recycled water supplies

II Cooling & Process Needs

A. Consumptive water uses e.g.: cooling tower make-up, evaporative cooling of CTG inlet air, CTG compressor intercooling, and STG condensation; CTG NOx control; CTG power augmentation; boiler water makeup
B. Space requirements for additional treatment of recycled water supplies vs. space available on the plant site
C. Water balance diagrams for recycled water use and wastewater discharge for average and peak conditions to include distinctions in using existing vs. recycled water

III Wastewater Treatment & Disposal

A. Method (existing discharge via sewer system to WWTP, dedicated brine return line, deep well injection, or zero liquid discharge (ZLD) recovery)
B. Available capacity & operating limitations

IV Economic Costs of Existing Source and Recycled Sources (where applicable)

A. Capital costs
   1. water supply pipeline
   2. water supply pumping station(s)

3. well(s)
4. water treatment system
5. wastewater pipeline & facility capacity charge
6. permitting.(PM10, Legionella, discharge quality and quantities)
7. Right of Way and Easement acquisitions
8. engineering, procurement, construction inspection and testing
9. biologic surveys/environmental assessment reports

B. Annual (operating and maintenance) Costs
   1. existing and recycled water purchase cost
   2. chemicals (cooling tower & water treatment)
   3. labor
   4. energy (water supply pumping, water treatment)
   5. wastewater discharge fee
   6. solids disposal (class of waste, transportation & landfill fees)

C. Project Life – Identify project life

D. Total Project Cost (base case)

E. Installed cost per watt

F. Total Annualized Cost – expressed as the uniform end-of-year payment (A/P) of Capital Costs + Annual Costs

G. Cost of Capital

H. Debt to equity ratio

I. Average debt service coverage ratio

J. Identify internal rate of return

K. Monthly and annual energy production since becoming operational

V Expected Effects on Electric Customers

A. Description of existing electricity rate structure and current rates to customers using existing water source
B. Description of expected electricity rates to customers using recycled water over remaining life of the plant

VI Environmental Considerations for the use of Recycled Water

A. Describe the potential effects of recycled water use on the generation of hazardous waste and on the quality of its wastewater discharge
B. Describe the potential impacts to public health through the use and discharge of recycled water

C. Describe the potential effects of recycled water use and discharge on the degradation of water quality and its potential to be injurious to plant life, fish, and wildlife.

D. Describe potential effects on existing water rights or entitlements

VII Discussion of applicable California Water Code provisions

SOIL&WATER-4 Injection Schedule:

a. The project owner shall inject one thousand (1000) acre-feet of SWP water within twelve (12) months of the commencement of the project's commercial operation.

b. By the end of four years and two months from the start of commercial operation, the project owner shall install and begin operation of a pre-injection ultraviolet (UV) disinfection system.

c. By the end of the fifth year of commercial operation, the project shall submit a report to the CPM demonstrating that HDPP has maintained an average THM concentration level consistent with the WDR permit requirements.

d. After the end of the fifth year of commercial operation, the project owner shall inject SWP water when it is available in excess of volumes needed to operate the project up to a cumulative quantity of 13,000 acre feet, subject to equipment capabilities and permit requirements. The amount of water available to HDPP for extraction is equal to Injection minus Extraction minus Dissipation minus 1000 acre-feet, as defined in SOIL&WATER-6.

~~d. The project shall install and implement a pre-injection reverse osmosis treatment system within one (1) year if any water banking milestone is not met, as defined in the following table.~~

~~**Table of Milestones for Calculated Water Bank Reserve** (1)~~

~~Water Banking Year~~	~~Anniversary Date (2)~~	~~End of Year Milestones (3)~~	~~Contingency Plan: Criteria for Installation of Reverse Osmosis~~
~~8~~	~~April 21, 2011~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 2,500 ac-ft~~
~~9~~	~~April 21, 2012~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 5,400 ac-ft~~
~~10~~	~~April 21, 2013~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 8,300 ac-ft~~
~~11~~	~~April 21, 2014~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 9,200 ac-ft~~
~~12~~	~~April 21,~~	~~Water Banking~~	~~Calculated Water Bank Reserve ≤~~

	~~2015~~	~~Goal~~	~~10,100 ac-ft~~
~~13~~	~~April 21, 2016~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 11,000 ac-ft~~
~~14~~	~~April 21, 2017~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve ≤ 12,000 ac-ft~~
~~15~~	~~April 21, 2018~~	~~Water Banking Goal~~	~~Calculated Water Bank Reserve < 13,000 ac-ft~~

~~(1) Calculated Water Bank Reserve = Injection minus Extraction minus Dissipation. (Amount of water available to HDPP is equal to Injection minus Extraction minus Dissipation **minus** 1000 acre-feet, as defined in **SOIL&WATER-6.**)~~
~~(2) Start of Commercial Operation: April 22, 2003.~~
~~(3) Milestones are designed to determine if injection falls significantly behind schedule.~~

~~e. No later than the end of the fifteenth (15) year of commercial operation, the amount of water injected minus the amount of banked groundwater used for project operation, minus the amount of dissipated groundwater shall meet or exceed thirteen thousand (13,000) acre-feet.~~

~~f. After the requirement of section e. has been satisfied and until three (3) years prior to project closure, the project owner shall replace banked groundwater used for project operation as soon as SWP water is available for sale by MWA. The project owner may choose to delay replacement of a limited quantity of banked groundwater used for project operations during aqueduct outages until the cumulative amount of groundwater withdrawn from the bank reaches one thousand (1,000) acre-feet. Once the limit of one thousand (1,000) acre-feet has been reached, the project owner shall replace banked groundwater used for project operation during aqueduct outages as soon as SWP water is available for sale by MWA.~~

Verification: The project owner shall submit an installation and operation report describing the pre-injection ultraviolet disinfection system (UV) by the end of the fourth year of commercial operation. Forecasted estimates of SWP water to be injected shall be included in the quarterly Aquifer and Storage Recovery Well Report. The project owner shall submit a UV performance report by the fifth year of commercial operation. For other related items see the verification to Condition 5. See also the verification to Condition 12.

SOIL&WATER-20: The project owner shall provide the CPM two copies of the executed Recycled Water Purchase Agreement (agreement) with the Victorville Water Dsitrict (VWD) and/or City of Victorville (City) for the long-term supply (20 – 25 years) and delivery of tertiary treated recycled water to the HDPP. The HDPP shall not connect to the City's recycled water pipeline without the final agreement in place. The project owner shall comply with the requirements of Title 22 and Title 17 of the California Code of Regulations and section 13523 of the California Water Code.

Verification: At least 30 days prior to the connection to the City's recycled water pipeline, the project owner shall submit two copies of the executed agreement for the long-term supply and delivery of tertiary treated recycled water to the HDPP. The agreement shall specify a maximum delivery rate of 4000 gpm and shall specify all terms and costs for the delivery of recycled water to the HDPP.

At least 30 days prior to connection to the City's recycled water pipeline, the project owner shall submit to the CPM a copy of the Engineering Report and Cross Connection inspection and approval report from the California Department of Public Health and all water reuse requirements issued by the Lahontan Regional Water Quality Control Board.

SOIL&WATER-21: Prior to the use of recycled water during the operation of the HDPP, the project owner shall install and maintain metering devices as part of the water supply and distribution system to monitor and record in gallons per day the volume of recycled water used by the HDPP. The metering devices shall be operational for the life of the project, and an annual summary of daily water use shall be submitted to the CPM in the annual compliance report.

Verification: At least 10 days prior to use of recycled water for HDPP operation, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the recycled water line serving the project. The project owner shall provide a report on the servicing, testing, and calibration of the metering devices in the annual compliance report.

IT IS SO ORDERED.

Date: November 18, 2009

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

KAREN DOUGLAS
Chairman

ATTACHMENT 7

April 23, 2014 – Project Owner Files Petition for Modification to Use Adjudicated Groundwater from the Mojave Basin

DOCKETED

Docket Number:	97-AFC-01C
Project Title:	High Desert Power Plant (COMPLIANCE)
TN #:	202211
Document Title:	High Desert Power's Amendment Petition Alternative Water Supplies
Description:	Address Drought Related Reliability Impacts
Filer:	Karen Mitchell
Organization:	Ellison, Schneider & Harris L.L.P.
Submitter Role:	Applicant Representative
Submission Date:	4/23/2014 2:03:38 PM
Docketed Date:	4/23/2014

High Desert Power Project

(97-AFC-1C)

Amendment Petition
for
Alternative Water Supplies to Address Drought-Related Reliability Impacts

Submitted by

High Desert Power Trust

With support from
Ellison, Schneider & Harris LLP

April 23, 2014

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Overview of Amendment

High Desert Power Trust, the owner of the High Desert Power Project ("HDPP" or the "project"), files this Amendment Petition for Alternative Water Supplies to Address Drought-Related Reliability Impacts (this "Amendment"). HDPP is an 830 megawatt ("MW") combined-cycle power plant located in the City of Victorville in San Bernardino County. The project was certified by the California Energy Commission ("CEC" or the "Commission") on May 3, 2000, and commenced commercial operations in April 2003.

HDPP is authorized to use two sources of water for operations: (1) State Water Project ("SWP") water obtained by the project owner consistent with the provisions of the Mojave Water Agency's ("MWA") Ordinance 9, which may be used directly or treated and then banked (i.e., injected) into an underground aquifer for later use, and (2) recycled wastewater produced by the Victor Valley Water Reclamation Authority ("VVWRA") or by the City of Victorville Water District's Industrial Wastewater Treatment Plant (the "City IWWTP").

Due to prolonged drought conditions, SWP water, which is the sole supply for groundwater banking, will not be available in sufficient quantities to support project operations or banking. Recycled water from VVWRA and the City IWWTP has been available only on an intermittent basis. HDPP is currently not authorized to use water from any other source for operations or groundwater banking.

Accordingly, HDPP files this Amendment to authorize HDPP to use alternative water supplies to prevent curtailment and possible complete shutdown of HDPP due to drought-related water reliability impacts. Specifically, this Amendment seeks revisions to certain Conditions of Certification for two purposes.

First, because recycled water is HDPP's preferred supply (provided that recycled water can be supplied in sufficient quantity and sufficient quality to serve project operations), HDPP requests the authority to discharge backwash streams from the project's aquifer banking water treatment system to the City IWWTP to increase the supply and improve the quality of recycled water available to HDPP. Sending these backwash streams to the City IWWTP will benefit the City by providing wastewater streams of lower dissolved solids content to be recycled, which will serve as a diluent to the wastewater streams of higher dissolved solids content currently entering the City IWWTP. These backwash streams also create a new supply of water that can be recycled back to HDPP for reuse. Discharging the backwash streams to the City IWWTP will allow HDPP's water and Zero Liquid Discharge ("ZLD") systems to operate more efficiently.

<u>*To be clear: HDPP is committed to using as much recycled water of appropriate quality as can be made available and treated by the project's equipment.*</u> To date, recycled water supply has been subject to frequent interruption, and the quality has required blending with either: (i) banked groundwater (which is the best blending water for recycled water produced to date), or (ii) blending with SWP water obtained from MWA

(which is a second-best option for blending with recycled water) for use in project operations.

Discharge of the backwash streams to the City IWWTP will also benefit groundwater banking by HDPP. Currently, HDPP can bank SWP water only when HDPP is running and generating electricity because the ZLD system requires thermal input (heat) to operate and process the backwash streams. By discharging the low volume backwash streams to the City IWWTP, operating the ZLD system will not be necessary in order to allow HDPP to treat and bank SWP water, further allowing HDPP to bank water when the project is not generating electricity. This provides a significant positive benefit to the groundwater basin. The only new infrastructure required for such discharges will be a pipeline system of approximately 1,340 feet to connect the project to the existing City of Victorville sewer system. The discharge pipeline will connect with the City of Victorville's existing sewer pipeline located approximately 140 feet south of the HDPP site boundary, and connect with water treatment equipment in the northwest corner of the plant property approximately 1,200 feet north of the site boundary. (*See,* Figure 1, attached hereto.) Either an above-ground or below-ground pipeline will pass through areas that have been paved or laid with gravel on HDPP property. Areas offsite consist of previously graded, unvegetated landscape dirt located on Southern California Logistics Airport property. Equipment associated with the discharge pipeline system will potentially include isolation valves, analytical equipment, pumps, and metering devices. The discharged backwash streams will flow by gravity to the City IWWTP.

Second, HDPP requests the authority to obtain water rights consistent with the "Judgment After Trial" dated January, 1996, in *City of Barstow, et al. v. City of Adelanto, et al.* as administered by MWA (the "Judgment"). The Judgment allows any party, including HDPP, to intervene to become a Party to the Judgment and (i) acquire and use existing water rights adjudicated under the Judgment, or (ii) pay applicable Replacement Water Assessments (collectively, "Adjudicated Water Rights"). Significantly, the alternative supplies will use existing water supply infrastructure to serve HDPP, and thus no new infrastructure or construction would be required.

1.2 Summary of Environmental Impacts

Section 1769(a)(1)(E) of the Commission's Siting Regulations requires that an analysis be conducted to address any potential impacts the proposed revisions may have on the environment and proposed measures to mitigate potentially significant adverse impacts. Section 1769(a)(1)(F) requires a discussion of the impact of the proposed revisions on HDPP's ability to comply with applicable laws, ordinances, regulations, and standards ("LORS"). Section 3.0 of this document discusses the potential impacts of the Amendment on the environment, as well as a discussion of the consistency of the requested change with LORS. Section 3.0 concludes that there will be no significant adverse environmental impacts associated with this Amendment and that the project, as amended, will comply with applicable LORS.

1.3 Consistency of Amendment with License

Section 1769(a)(1)(D) of the Commission's Siting Regulations requires a discussion of the Amendment's consistency with applicable LORS and whether the modification being sought is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision. If the project is no longer consistent with the license, an explanation of why the modification should be permitted must be provided. The changes proposed herein are consistent with the project's CEC license and relevant LORS. As discussed in more detail in Sections 2.0 and 3.0 below, these proposed changes do not undermine any basis for the CEC's licensing decision.

2.0 DESCRIPTION OF PROJECT AMENDMENT

Consistent with Sections 1769(a)(1)(A) and (B) of the Commission's Siting Regulations, this section includes a complete description of the proposed project modification as well as the necessity for the Amendment.

The HDPP certification, as amended, authorizes the use of two sources of water for operations: (1) State Water Project ("SWP") water obtained by the project owner consistent with the provisions of the Mojave Water Agency's ("MWA") Ordinance 9, which may be used directly or treated and then banked underground by injection for later use, and (2) recycled wastewater from the Victor Valley Water Reclamation Authority ("VVWRA") and the City of Victorville Water District's Industrial Wastewater Treatment Plant (the "City IWWTP").

Due to prolonged drought conditions, SWP water, which is the sole supply for required groundwater banking, will not be available in sufficient quantities to support project operations or banking for the remainder of 2014 and likely beyond. Recycled water from VVWRA and City IWWTP has been available only on an intermittent basis. HDPP is currently not authorized to use water from any other source for operations or groundwater banking. The Amendment proposes two changes to ensure adequate water supplies are available to HDPP.

First, because recycled water is HDPP's preferred supply (provided that recycled water can be supplied in sufficient quantity and sufficient quality to serve project operations), HDPP requests the authority to discharge backwash streams from the project's aquifer banking water treatment system to the City IWWTP to increase the supply and improve the quality of recycled water available to HDPP. Sending these backwash streams to the City IWWTP will benefit the City by providing wastewater streams of lower dissolved solids content to be recycled, which will serve as a diluent to the wastewater streams of higher dissolved solids content currently entering the City IWWTP. These backwash streams also create a new supply of water that can be recycled back to HDPP for reuse. Discharging the backwash streams to the City IWWTP will allow HDPP's water and Zero Liquid Discharge ("ZLD") systems to operate more efficiently

Discharge of the backwash streams to the City IWWTP will also benefit groundwater banking by HDPP. Currently, HDPP can bank SWP water only when HDPP is running and generating electricity because the ZLD system requires thermal input (heat) to operate and process the backwash streams. By discharging the low volume backwash streams to the City IWWTP, operating the ZLD system will not be necessary in order to allow HDPP to treat and bank SWP water, further allowing HDPP to bank water when the project is not generating electricity. This provides a significant positive benefit to the groundwater basin. The only new infrastructure required for such discharges will be a pipeline system of approximately 1,340 feet to connect the project to the existing City of Victorville sewer system. The discharge pipeline will connect with the City of Victorville's existing sewer pipeline located approximately 140 feet south of the HDPP site boundary, and connect with equipment in the northwest corner of the plant property approximately 1,200 feet north of the site boundary. (*See*, Figure 1) Either an above-ground or below-ground pipeline will pass through areas that have been paved or laid with gravel on HDPP property. Areas offsite consist of previously graded, unvegetated landscape dirt located on Southern California Logistics Airport property. Equipment associated with the discharge pipeline system will potentially include isolation valves, analytical equipment, pumps, and metering devices. The discharged backwash streams will flow by gravity to the City IWWTP.

Second, the Amendment provides HDPP with alternative water supplies to avoid curtailment or complete shutdown. HDPP would have the authority to obtain existing Adjudicated Water Rights consistent with the Judgment as administered by MWA. Significantly, the alternative supplies will use existing water supply infrastructure to serve HDPP, and thus no new infrastructure or construction would be required.

2.1 Necessity of Proposed Amendment

Sections 1769(a)(1)(B) and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed modifications and whether the modifications are based on information known by the petitioner during the certification proceeding.

The proposed modifications are necessary to prevent HDPP from being curtailed and perhaps completely shut down due to drought-related water shortages. The need for additional water supplies is driven by the current extreme drought. The drought is the third consecutive year of below-normal precipitation in California and severely diminishes the amount of SWP water available to serve HDPP. To the extent the drought continues into 2015 and beyond, it is expected the amount of SWP water available will continue to be severely diminished.

The California Department of Water Resources ("DWR") administers the SWP. DWR's allocation of SWP water to contractors, including MWA, was reduced from five percent (5%) to zero percent (0%) on January 31, 2014 due to extreme water shortage. On April 18, 2014, DWR increased the allocation to contractors back to five percent (5%). Nonetheless, MWA has told HDPP that it does not expect to deliver SWP water to HDPP for the remainder of 2014, which illuminates the lack of reliability of SWP water.

At the time of the original certification, HDPP was allowed to use only SWP water and was expressly prohibited from using recycled water. Of its own volition, HDPP petitioned and successfully obtained an amendment to the original certification to allow for the use of recycled water. However, since that amendment was approved, the supply of recycled water available to HDPP has been intermittent on a day-to-day basis, has been unavailable for long periods of time, or has not met the quality requirements of the recycled water supply contract. These conditions are currently inhibiting HDPP's reliance on recycled water as a reliable source of water for the facility.

Moreover, because the quantity and quality of both SWP water and recycled water available to HDPP vary significantly, this Amendment is necessary to provide HDPP with the flexibility to utilize different water sources as available, whether individually or combined, as needed to ensure reliable and efficient operation of HDPP. As explained further below, each water source in and of itself is not reliable to solely support HDPP operations because of the variability in quantity and quality of each source.

SWP water is the most variable of all the water sources in terms of quantity and quality. As stated above, the availability of SWP water in sufficient quantities is highly tenuous due to the prolonged drought conditions and the recently implemented pumping restrictions to protect the Delta smelt. No SWP water deliveries to HDPP are expected to be made for the remainder of 2014. SWP water quality also varies seasonally, with the SWP water having higher conductivity and other impairments during certain runoff events and periodically during the irrigation season. The highly variable SWP water quality can (i) lower the facility water treatment system's efficiency, (ii) require more frequent water treatment system equipment maintenance, (iii) cause plant operational derates or curtailments, and (iv) prohibit groundwater banking when the dissolved solids content exceeds certain threshold concentrations.

Recycled water is the second most variable of the water sources available to HDPP. Historically, HDPP has had difficulty obtaining sufficient quantities of recycled water to reliably serve the facility. In addition, recycled water typically contains high levels of total dissolved solids ("TDS") and high concentrations of silica. These constituents impact the performance of the HDPP water treatment system (for example, by clogging the microfilter system) to the detriment of the overall efficiency and operation of the HDPP. The drought has forced HDPP to accept recycled water that does not meet the water quality limits specified in the recycled water supply contract. HDPP has learned through its operating experience that the "out of spec" recycled water must be blended with high quality banked groundwater in order to be used by the facility.

Banked groundwater is the least variable source in terms of quantity and quality. Because the quality of banked groundwater is the most consistent, HDPP is able to more accurately forecast the effects of using banked groundwater on project operations. Banked groundwater is also the most predictable source to blend with recycled water or SWP water to maintain water chemistry that allows HDPP's water treatment system to operate most efficiently.

As explained in more detail in Section 3.2.15 below, HDPP's use of groundwater from the Mojave Basin will not adversely affect groundwater resources because MWA administers the Judgment to maintain both the annual and long-term basin safe yield. The Judgment adjudicated the water rights to the basin and affirmed a physical solution to appoint a Watermaster to balance withdrawals (pumping) and recharge to maintain the safe yield of the basin. MWA is responsible for, among other things, annual monitoring and reporting on basin conditions, management of basin safe yield through enforcement of pumping limits, and importation of surface water from the SWP to replace pumped groundwater. The Judgment has significantly reduced historic groundwater pumping and has established a mechanism to ensure that future groundwater production is maintained within the safe yield. The Judgment encourages efficient use of water by allowing for the transfer of groundwater production rights from one user to another. Adjudicated Water

Rights can be transferred on an annual basis or permanently at any location within the subbasin upon notice to MWA and compliance with applicable terms and conditions. Allowing HDPP to acquire alternative water supplies consistent with the Judgment will avoid curtailment or complete shutdown due to water supply interruptions or water quality deviations from SWP or recycled water supplies.

Discharge of HDPP’s backwash streams from its aquifer banking water treatment systems to the City of Victorville municipal sewer system will create a new supply of water that can be recycled back to HDPP for reuse. Discharging the backwash streams to the City IWWTP will allow HDPP’s water and ZLD systems to operate more effectively, increasing HDPP’s overall efficiency.

It is unknown how the drought will affect the availability of recycled water statewide. It is also unknown whether 2014 will mark the end of the current drought cycle or whether it will be another year in a multi-year drought cycle. In either event, it is logical to assume that reduced water usage though conservation and efficiency measures will result in lower inflows to wastewater treatment plants, likely reducing the available supply of water to be recycled.

The current record drought, its impacts on the availability of SWP water, along with other biological regulatory restrictions that have reduced SWP water pumping and delivery, and the intermittent nature of recycled water service to date were not known at the time of the original certification.

3.0 ENVIRONMENTAL ANALYSIS OF THE AMENDMENT

This section examines whether obtaining Adjudicated Water Rights consistent with the Judgment administered by MWA and the discharge of backwash streams from the aquifer banking water treatment system to the City IWWTP may result in additional environmental impacts. An environmental analysis for this Amendment is included below.

3.1 Alternative Water Supplies and Banking Unused Adjudicated Water Rights

Obtaining Adjudicated Water Rights consistent with the Judgment administered by MWA will not require new infrastructure or construction of any kind. The alternative supplies to be obtained will use existing water supply infrastructure to serve HDPP. Accordingly, obtaining Adjudicated Water Rights is not a "Project" as defined by CEQA because it is neither "an activity [with] the potential to cause direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." (California Public Resources Code § 21065.)

With respect to LORS compliance, any such additional supplies will be obtained pursuant to the Judgment. Therefore, the Amendment will comply with all LORS.

3.2 Discharge to the City IWWTP

HDPP proposes to discharge backwash from the project's aquifer banking water treatment system to the City IWWTP. Sending these backwash streams to the City IWWTP will benefit the City by providing wastewater streams of lower dissolved solids content to be recycled which will serve as a diluent to the wastewater streams of higher dissolved solids content currently entering the City IWWTP. These backwash streams also create a new supply of water that can be recycled back to HDPP for reuse. Discharging the backwash streams to the City IWWTP will allow HDPP's water and ZLD systems to operate more effectively, increasing HDPP's overall efficiency.

Discharge of the backwash streams to the City IWWTP will also benefit groundwater banking by HDPP. Currently, HDPP can only bank SWP water when HDPP is running and generating electricity because the ZLD system requires thermal input (heat) to operate and process the backwash streams. By discharging the low volume backwash streams to the City IWWTP, operating the ZLD system will not be necessary in order to allow HDPP to treat and bank SWP water, further allowing HDPP to bank water when the project is not generating electricity, which is also a significant positive benefit to the groundwater basin.

The only new infrastructure required for such discharges will be a pipeline system of approximately 1,340 feet to connect the project to the existing City of Victorville sewer system. The discharge pipeline will connect with the City of Victorville's existing sewer pipeline located approximately 140 feet south of the HDPP site boundary, and connect with equipment in the northwest corner of the plant property approximately 1,200 feet north of the site boundary. (*See,* Figure 1.) Either an above-ground or below-ground pipeline will pass through areas that have been paved or laid with gravel while on HDPP property. Areas offsite consist of previously graded, unvegetated landscape dirt located on Southern California Logistics Airport property. Equipment associated with the discharge pipeline system will potentially include isolation valves, analytical equipment, pumps, and metering devices. The discharged backwash streams will flow by gravity to the City IWWTP.

The short pipeline needed to allow HDPP to connect to the existing City of Victorville sewer system is precisely the sort of activity that is exempt from CEQA. Specifically, Section 15304 of the CEQA Guidelines, "Minor Alterations To Land," provides a "Categorical Exemption" to CEQA that states as follows:

> Class 4 consists of minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry or agricultural purposes. Examples include, but are not limited to:
> * * *
> (f) Minor trenching and backfilling where the surface is restored.

The pipeline will involve minor trenching and backfilling where the surface is restored and thus qualifies for this CEQA Exemption.

In addition to this applicable Categorical Exemption from CEQA, there is also an applicable "Statutory Exemption" from CEQA for such an underground pipe. Section 15282(k) of the CEQA Guidelines, under the title of "Other Statutory Exemptions," includes a Statutory Exemption for "The installation of new pipeline or maintenance, repair, restoration, removal, or demolition of an existing pipeline as set forth in Section 21080.21 of the Public Resources Code, as long as the project does not exceed one mile in length."

In addition to the Categorical and Statutory Exemptions, the CEQA Public Resources Code section cited, Section 21080.21, subdivision (a) provides as follows:

> This division [CEQA] does not apply to any project of less than one mile in length within a public street or highway or any other public right-of-way for the installation of a new pipeline or the maintenance, repair, restoration, reconditioning, relocation, replacement, removal, or demolition of an existing pipeline.

As the authorities above definitively demonstrate, the short pipeline system required to connect to the existing City of Victorville sewer system is exempt by the express provisions of the CEQA statute, Categorical Exemption, and Statutory Exemption.

Therefore, the Commission can appropriately cite to the statute and the Categorical and Statutory Exemptions to fulfill CEQA's mandates. Nevertheless, given the need for expedited consideration of this Amendment, additional environmental information is provided below for completeness and timely consideration of this Amendment.

3.2.1 Air Quality

The installation of a short pipeline system, which will include approximately 1,340 feet of piping, will involve the use of some equipment for a very limited time period. These potential emissions are temporary and negligible, especially if the approximately 1,200 feet within the project site boundaries is above-ground piping, so much so that no permits or approvals are required from the Air District. Standard fugitive dust control BMPs will be implemented, most likely watering as required to suppress dust. The potential impacts will be less than significant.

3.2.2 Biological Resources

The only new infrastructure required for discharges will be a pipeline system of approximately 1,340 feet to connect the project to the existing City of Victorville sewer system. The discharge pipeline will connect with the City of Victorville's existing sewer pipeline located approximately 140 feet south of HDPP's site boundary, and connect with equipment in the northwest corner of the plant property approximately 1,200 feet north of the site boundary. (*See*, Figure 1.) Either an above-ground or below-ground pipeline will pass through areas that have been paved or laid with gravel while on HDPP property. Areas offsite consist of previously graded, unvegetated landscape dirt located on Southern California Logistics Airport property. Equipment associated with the discharge pipeline system will potentially include isolation valves, analytical equipment, pumps, and metering devices

There is no critical habitat or other habitat value within this area. In addition, HDPP will adhere to the requirements of the Biological Resources Mitigation Implementation and Monitoring Plan ("BRMIMP") in performing the work on the discharge water line. The potential impacts will be less than significant.

3.2.3 Cultural Resources

The soil that is on the site has been highly disturbed and previously developed. The site is completely stabilized with gravel and pavement and no further development or ground disturbance is needed for the proposed pipeline. Therefore, the pipeline will not result in any cultural resource impacts.

3.2.4 Geologic Hazards and Resources

The minor trenching and backfilling for the pipeline will not result in geologic impacts. The minor trenching does not have the ability to affect any geological resources.

3.2.5 Hazardous Materials Management

The proposed construction area will not be used for the temporary storage of hazardous materials. Construction crews will use industry standard BMPs to prevent issues related to hazardous materials handling. The potential impacts will be less than significant.

3.2.6 Land Use

HDPP is located within an industrial zoned area. The surrounding uses are also industrial. No impacts to land use will occur from the requested modifications.

3.2.7 Noise

The construction of the pipeline will result in temporary and minor noise impacts, mainly resulting from the use of equipment loading or offloading materials. Any noise impacts resulting from construction of the pipeline will be short-term and less than significant.

3.2.8 Paleontological Resources

The soil that is on the site has been highly disturbed and previously developed. The site is completely stabilized with gravel. The pipeline will not result in any impacts to paleontological resources.

3.2.9 Public Health

The installation of the pipeline will have no Air Quality impacts and no other impacts that are a threat to public health. No acutely hazardous materials will be stored onsite during the very brief construction period.

3.2.10 Socioeconomics

The installation of the pipeline will have minor, positive economic benefits, providing employment for the contractor and staff selected to perform the construction. Some materials may be acquired locally, but the positive economic benefits associated with such short-term work are difficult to ascertain, yet positive. There will be no significant socioeconomic impacts associated with the pipeline.

3.2.11 Soils & Agriculture

The site and the pipeline routing are all within industrial lands. No agricultural activities occur on or near this location, and thus the pipeline will not result in any impacts to agricultural and soil resources. The entire site is zoned industrial and currently paved and graveled. No special activities are required for use or subsequently to return it in its current condition once use of the installation is completed. Storm water BMPs and fugitive dust control, consistent with those already in place will be used as needed. Therefore, the activities proposed in this Amendment will not create a significant adverse impact to agricultural or soil resources.

3.2.12 Traffic & Transportation

The short-term temporary work will result in a few additional truck and vehicle trips for the work crews. The roads in the vicinity all operate at adequate levels of service (LOS). There is no possibility that these few vehicle trips could significantly affect local or regional traffic patterns in this industrially zoned area. The activities proposed in this Amendment will not create a significant adverse impact to traffic and transportation resources.

3.2.13 Visual Resources

Upon completion of the installation of the pipeline, there will be no visual impacts associated with the operation of the pipeline. Construction related impacts will be temporary and less than significant from a visual perspective. The construction activities will be consistent with other activities in this industrial zone area. The impacts will be less than significant.

3.2.14 Waste Management

The installation of the pipeline will result in small amounts of construction related waste. The contractor will be responsible for the proper disposal of any waste generated. The potential impacts will be less than significant.

3.2.15 Water Resources

During construction, the site will be monitored for compliance with the General National Pollutant Discharge Elimination System Permit ("NPDES") for Storm Water Associated with Construction Activity and the Stormwater Pollution Prevention Plan ("SWPPP"). The site is relatively level with stabilized, compacted gravel or paved surfaces. The Amendment will have beneficial water resources impacts. Sending the backwash streams to the City IWWTP will benefit the City by providing wastewater streams of lower dissolved solids content to be recycled which will serve as a diluent to the wastewater streams of higher dissolved solids content currently entering the City IWWTP. These backwash streams also create a new supply of water that can be recycled back to HDPP for reuse. Discharging the backwash streams to the City IWWTP will allow HDPP's water and ZLD systems to operate more effectively, increasing HDPP's overall efficiency.

Discharge of the backwash streams to the City IWWTP will also benefit groundwater banking by HDPP. Currently, HDPP can only bank SWP water when HDPP is running and generating electricity because the ZLD system requires thermal input (heat) to operate and process the backwash streams. By discharging the low volume backwash streams to the City IWWTP, operating the ZLD system will not be necessary in order to allow HDPP to treat and bank SWP water, further allowing HDPP to bank water when the project is not generating electricity. This is also a significant positive benefit to the groundwater basin. The only new infrastructure required for such discharges will be a pipeline system of approximately 1,340 feet to connect the project to the existing City of Victorville sewer system. The discharge pipeline will connect with the City of Victorville's existing sewer pipeline located approximately 140 feet south of HDPP's site boundary, and connect with equipment in the northwest corner of the plant property approximately 1,200 feet north of the site boundary. (*See,* Figure 1.) Either an above-ground or below-ground pipeline will pass through areas that have been paved or laid with gravel while on HDPP property. Areas offsite consist of previously graded, unvegetated landscape dirt located on Southern California Logistics Airport property. Equipment associated with the discharge pipeline system will potentially include isolation valves, analytical equipment, pumps, and metering devices. The discharged backwash streams will flow by gravity to the City IWWTP.

HDPP use of groundwater from the Mojave Basin will not adversely affect groundwater resources because MWA administers the Judgment[1] to maintain both the annual and long-term basin safe yield. The Judgment adjudicated the water rights to the basin and affirmed a physical solution to appoint a Watermaster to balance withdrawals (pumping) and recharge to maintain the safe yield of the basin. The Judgment was substantially affirmed by the California Supreme Court in August 2000, shortly after HDPP was licensed by the Commission. (*City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.) The Superior Court of Riverside County maintains continuing jurisdiction over the Judgment.

MWA serves as Watermaster of the Mojave River stream system and groundwater basin ("basin") on the appointment of the Court. (Judgment, ¶¶ 4(nn); 23(c)); MWA responsibilities include, among other things, annual monitoring and reporting on basin conditions, management of basin safe yield through enforcement of pumping limits, and importation of surface water from the SWP to replace pumped groundwater. (*See*, generally, Judgment, ¶¶ 24-29.)

The Judgment has significantly reduced historic groundwater pumping and has established a mechanism to ensure that future groundwater production is maintained within the safe yield. The Judgment mitigates the effects of groundwater withdrawal by the following primary methods:

- Assigning each adjudicated water right a "Base Annual Production," or "BAP," in acre-feet per water year (October 1 through September 30) (Judgment, ¶ 4(g));
- Establishing a "Free Production Allowance" (FPA), which is the percentage of the BAP that can be pumped within the water year without payment of a pumping charge (¶ 4(k));
- Allowing a right holder to delay, or carry over, a FPA to a subsequent water year ("Carry Over") (¶ 4(i));
- Imposing an obligation to pay for "replacement water" for any water pumped in excess of the FPA ("Replacement Water Assessments"), which is used by MWA to acquire SWP water to recharge the basin (¶¶ 4(dd), 24(g) 4(ee), 25(b), 27, 28);

[1] The Judgment is available at http://www.mojavewater.org/files/Judgment.pdf.

- Directing MWA to maintain the basin in safe yield by recommending annual adjustments to the FPA and by importing SWP water to replace pumped water in excess of the native safe yield (¶¶ 9(a), 24(g), 24(o), 27);
- Authorizing MWA to recommend adjustments to the Replacement Water Assessments for each subbasin each year (¶¶ 9(b), 27(b)).

MWA has recommended, and the court has approved, FPAs tailored to the specific water uses and hydrologic conditions of each subbasin. In the Alto subbasin where HDPP is located, the FPA is currently set at 60% for industrial water use and 80% for agricultural use in recognition of differences in return flows from different types of water uses.

The Replacement Water Assessment provision of the Judgment and MWA's SWP contract has allowed MWA to build a substantial water supply surplus in the basin. MWA uses the Replacement Water Assessments to acquire surplus SWP water available in above normal years for percolation into the basin. MWA has banked about 80,000 acre-feet of surplus water in the basin, which provides a buffer for drought water years like 2014 when SWP water is not available. Note that MWA recharges raw SWP water by percolation and does not believe that treatment and injection required by the Commission for HDPP is necessary.

The Judgment encourages efficient use of water by allowing for the transfer of groundwater production rights from one user to another. Water rights can be transferred on an annual basis or permanently within each subbasin at any location within the subbasin upon notice to MWA and compliance with applicable terms and conditions. (¶ 24(n), 24(r), 34; Ex. F, ¶ 2.) The transfer of groundwater production rights will also be subject to a BAP adjustment (reduction) by MWA to not cause an increased consumptive use of water. (¶ 24(q), Ex. F, ¶ 2.) The consumptive use adjustment for industrial use is determined by MWA on a case-by-case basis. The effect of the consumptive use adjustment is to permanently retire some portion of the BAP, thus reducing the total amount of groundwater production that is not subject to Replacement Water Assessments.

The Judgment allows any person or entity within the basin, including HDPP, to intervene to become a Party to the Judgment by executing a stipulation with MWA. (¶ 40.) Once a Party, HDPP can acquire existing BAP and FPA groundwater production rights adjudicated under the Judgment or HDPP can pay applicable Replacement Water Assessments without acquiring existing groundwater production rights.

3.2.16 Worker Safety & Health

Construction work will be performed by a licensed contractor in compliance with all applicable health and safety rules, including those implemented by OSHA. Moreover, Air Quality and Public Health impacts are avoided by the temporary construction activities. The pipeline system will not cause any significant Worker Safety or Health issues.

3.2.17 Cumulative Impacts

Section 15355 of the CEQA Guidelines defines "cumulative impacts" as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Subsection b of Section 15355 states, in part, that "The cumulative impact *from several projects* is the change in the environment which results from *the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects*." (Emphasis added.) Thus, cumulative impacts under CEQA involve the potential interrelationships of two or more projects, not the impacts from a single project. Specifically, under Section 15130 of the CEQA Guidelines, an EIR is required to discuss cumulative impacts when the project's incremental effect is "cumulatively considerable." Section 15065(a)(3) then defines "cumulatively considerable" as meaning "that the incremental effects of an individual project are significant when viewed in connection with the effects of *other* closely related past projects, the effects of *other* current projects and the effects of probable *future* projects." (Emphasis added.)

The impacts from the installation of the pipeline are temporary. Potential cumulative impacts from construction and operation of the pipeline will not occur. The pipeline's effects are exempt from CEQA, both in Statutory and Categorical Exemptions, as well as Public Resources Code provisions. The temporary activities will not result in impacts in combination with other closely related past, present, and reasonably foreseeable future projects. No cumulative impacts will result.

3.2.18 Laws, Ordinances, Regulations, Standards

The construction and operation of the pipeline will be in compliance with all applicable LORS, and the Amendment will not alter the assumptions or conclusions made in the CEC's Final Decision for HDPP, as amended. HDPP will continue to be consistent with all applicable LORS.

4.0 PROPOSED MODIFICATIONS TO THE CONDITIONS OF CERTIFICATION

Consistent with the requirements of Section 1769(a)(1)(A) of the Commission's Siting Regulations, potential modifications to the project's Conditions of Certification were evaluated. As set forth in Attachment A, minor language changes are proposed to the following Conditions: Soil&Water-1 and Soil&Water-7.

5.0 POTENTIAL EFFECTS ON THE PUBLIC

Consistent with Section 1769(a)(1)(G) of the Commission's Siting Regulations this section discusses whether the Amendment will have potential effects on the public. The proposed project modifications contained in this Amendment are short-term in nature, will have no significant impacts on the environment, and will be in compliance with all applicable LORS and Conditions of Certification. Accordingly, there will be no adverse impacts on the public associated with this Amendment.

6.0 LIST OF PROPERTY OWNERS

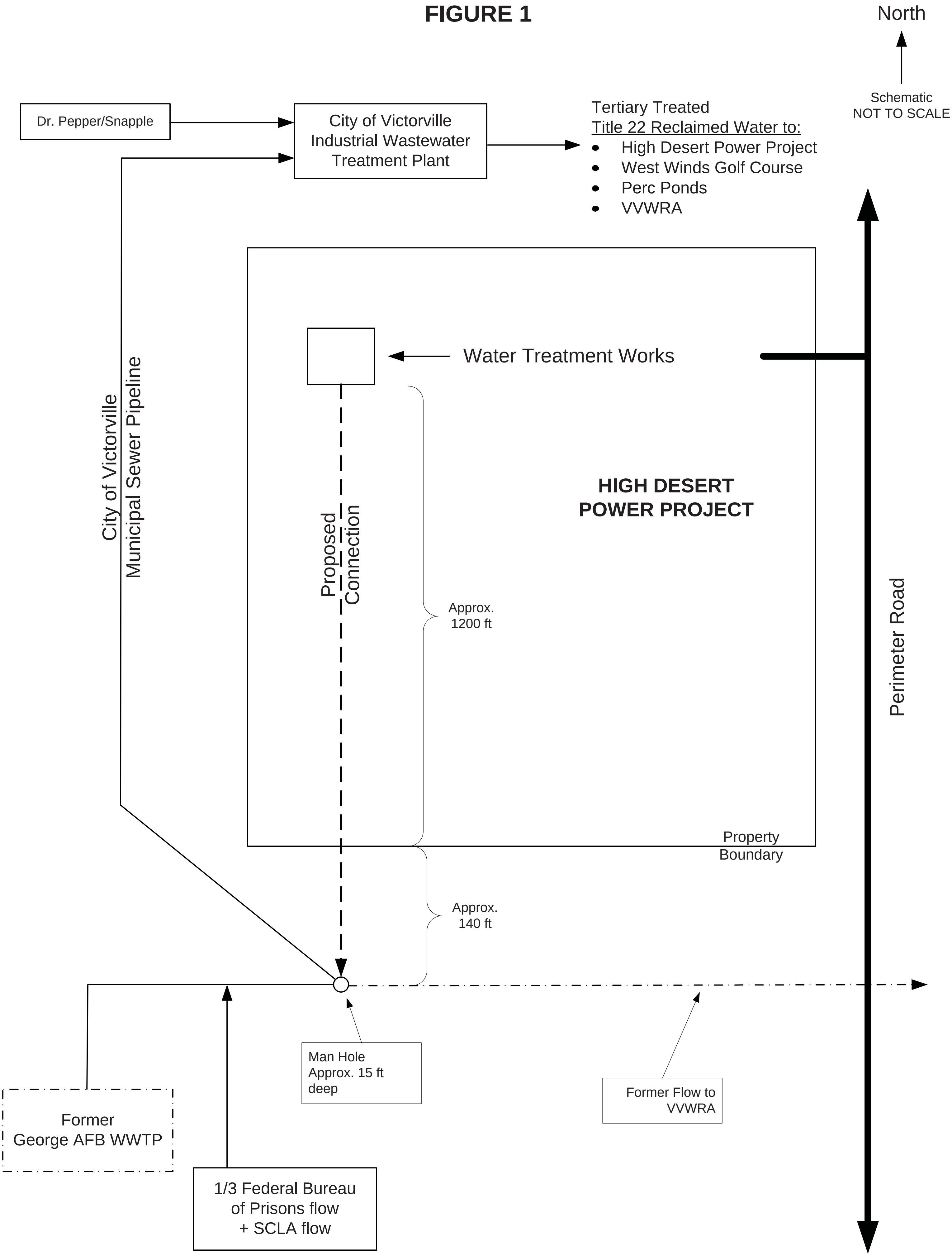
Section 1769(a)(1)(H) of the Commission's Siting Regulations requires a list of the property owners potentially affected by the proposed modifications. All property within one mile of HDPP is part of the Southern California Logistics Airport ("SCLA") property, the former George Air Force Base. Current tenants of the SCLA property are listed in Attachment B.

7.0 POTENTIAL EFFECTS ON PROPERTY OWNERS

Consistent with Section 1769(a)(1)(I) of the Commission's Siting Regulations this section addresses potential effects of the proposed Amendment on nearby property owners, the public, and parties in the application proceeding. Due to the short-term nature of the modification proposed by this Amendment, there will not be any significant impacts to nearby property owners and the public. Nearby businesses will not be impacted.

FIGURE 1
LOCATION OF PROPOSED PIPELINE SYSTEM

FIGURE 1


North
Schematic
NOT TO SCALE
Dr. Pepper/Snapple
City of Victorville
Industrial Wastewater
Treatment Plant
Tertiary Treated
Title 22 Reclaimed Water to:
High Desert Power Project
West Winds Golf Course
Perc Ponds
VVWRA
Water Treatment Works
City of Victorville
Municipal Sewer Pipeline
Proposed
Connection
HIGH DESERT
POWER PROJECT
Approx.
1200 ft
Perimeter Road
Property
Boundary
Approx.
140 ft
Man Hole
Approx. 15 ft
deep
Former Flow to
VVWRA
Former
George AFB WWTP
1/3 Federal Bureau
of Prisons flow
+ SCLA flow

ATTACHMENT A

REVISIONS TO CONDITIONS OF CERTIFICATION SOIL&WATER-1 AND SOIL&WATER-7

SOIL&WATER-1 Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9~~ and/or~~, appropriately treated recycled waste water, and/or an alternative water supply obtained consistent with the "Judgment After Trial" dated January, 1996, in City of Barstow, et al. v. City of Adelanto, et al. (Riverside County Superior Court Case No. 208568) as administered by MWA (the "Judgment") (collectively, "Adjudicated Water Rights").

a. Whenever recycled waste water of quality sufficient for project operations is available to be purchased from the City of Victorville, the project owner shall use direct delivery of such water for project operations.

~~a. Whenever SWP water is available to be purchased from the city of Victorville, or recycled waste water is available, the project owner shall use direct delivery of such water for project operation.~~

b. Whenever the quantity or quality of recycled waste water is not sufficient to support project operations, the project may supplement recycled water supplies with SWP water, banked SWP water, and/or Adjudicated Water Rights.

~~b. Whenever water is not available to be purchased from the city of Victorville, the project owner may use SWP water banked in the four HDPP wells as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to **SOIL&WATER-5.**~~

c. ~~If there is no SWP water available to be purchased from the city of Victorville, and there is no reclaimed water available, and there is no banked water available to the project, as determined pursuant to **SOIL&WATER-5**, no groundwater shall be pumped, and the project shall not operate~~. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

d. The project's water supply facilities shall be appropriately sized to meet project needs. The project shall make maximum use of recycled waste water for power plant cooling given current equipment capabilities and permit conditions.

f. The project owner shall continue with the feasibility study evaluating the use of 100 percent recycled water for evaporative cooling purposes and other industrial uses. The feasibility study shall be completed by the project owner and submitted to the CPM.

[No changes to Verification]

SOIL&WATER-7 The project owner shall retain ownership and operational control of the water treatment facility. The project may also discharge waste water streams from the project's water treatment systems to the City of Victorville municipal sewer system.

Verification: Should the project owner choose to transfer ownership or operational control of the water treatment facility, it must apply for an amendment to the Energy Commission Decision, and include an evaluation of any environmental effects associated with the transfer of ownership or operational control to another entity. The project owner shall provide a copy of the discharge permit or permits issued by the City of Victorville to the CEC CPM within thirty (30) days of its receipt by the project owner.

ATTACHMENT B

LIST OF PROPERTY OWNERS

COMPANIES CURRENTLY LOCATED AT SOUTHERN CALIFORNIA LOGISTICS AIRPORT

2014

BOEING (RAMS) .... 760-530-2219 18368 Readiness St. Victorville, CA 92394 Aircraft Repair	LEADING EDGE .... 760-426-1651 AVIATION SERVICES 13516 Phantom Victorville, CA 92394 Aircraft Painting Facility
BOEING CAPITAL .... 760-246-9666 18368 Readiness St. Victorville, CA 92394 Aircraft Financing	MILLION AIR .... 760-246-7794 18590 Readiness St. Victorville, CA 92394 FBO (Flight Based Operation)
DR. PEPPER SNAPPLE GROUP www.drpeppersnapplegroup.com/careers	NEWELL-RUBERMAID .... 760-246-2720 17182 Nevada Ave. Victorville, CA 92394 Warehouse Distribution
GENERAL ELECTRIC .... 760-530-5200 18000 Phantom Victorville, CA 92394 Aircraft Repair	SOUTHERN CALIFORNIA .... 760-530-2400 AVIATION (SCA) 18438 Readiness St. Victorville, CA 92394 Aircraft Parts/Inventory
HIGH DESERT .... 760-530-2300 CONSTELLATION POWER PLANT 19000 Perimeter Rd. Victorville, CA 92394 Power Plant	PLASTIPAK PACKAGING, INC. www.plastipak.com
STOODY .... 760-530-0765 18475 Finance St. Victorville, CA 92394 Welding Supply Wholesale House	PTL ELECTRIC .... 760-403-4004 18499 Phantom West, Ste 8 Victorville, CA 92394 Electric Repair
FEDERAL PRISON EMPLOYMENT Federal Bureau of Prisons 3289 Air Expressway Victorville, CA 92394 www.bop.gov (link to BOP hires)	PRATT & WHITNEY .... 760-530-2400 18260 Phantom West Victorville, CA 92394 Engine Storage & Parts Distribution
EMPLOYMENT .... 760-552-6550 DEVELOPMENT DEPARTMENT (EDD) Victorville Office And SAN BERNARDINO COUNTY JOBS & EMPLOYMENT SERVICES	PACIFIC AEROSPACE .... 760-530-1767 RESOURCES & TECHNOLOGIES (PART) 18384 Readiness St. Victorville, CA 92394 Aircraft
CITY OF VICTORVILLE .... 760-261-1508 24-HOUR JOB LINE (Recorded information) www.ci.victorville.ca.us	ARM AND HAMMER (Church & Dwight) www.churchdwight.com click on work with us tab to apply

ATTACHMENT 8

August 28, 2014 – Project Owner Files Petition for Staff Approved Modification to Install an Ultraviolet Treatment System and Enhance the Existing Cold Lime Softening System to Improve Treatment of Cooling Tower Blowdown and Improve the Overall Performance, Efficiency and Reliability of the Facility

DOCKETED

Docket Number:	97-AFC-01C
Project Title:	High Desert Power Plant (COMPLIANCE)
TN #:	202996
Document Title:	Petition for Staff Approved Modification
Description:	N/A
Filer:	Joe Douglas
Organization:	High Desert Power Trust
Submitter Role:	Applicant
Submission Date:	8/28/2014 9:05:53 AM
Docketed Date:	8/28/2014

High Desert Power Trust

14302 FNB Parkway, Suite 400 I Omaha, Nebraska 68154-5212
402-691-9500 I FAX: 402-691-9727

July 21, 2014

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission
Siting, Transportation, and
Environmental Protection Division
1516 9th Street, MS-15
Sacramento, California 95814

RE: High Desert Power Project (97-AFC-1C) Petition for Staff Approved Modification

Dear Mr. Douglas:

Pursuant to Section 1769(a)(2) of the Commission's Regulations,[1] High Desert Power Trust ("HDPT") hereby submits to the California Energy Commission ("Commission" or "CEC") this petition for staff approved modification ("Petition") of the certification for the High Desert Power Project ("HDPP" or "Project", 97-AFC-01), approved May 3, 2000 (hereinafter the "Final Decision").

Because there is no possibility that the improvements described herein may have a significant effect on the environment, and the improvements will not result in a change or deletion of a condition in the Final Decision or make changes that would cause the Project not to comply with any applicable laws, ordinances, regulations, or standards, HDPT requests that Commission Staff make a determination pursuant to Section 1769(a)(2) that Commission approval is not required for the proposed improvements to the existing water treatment system. HDPT requests that Commission Staff issue its determination by August 22, 2014, to facilitate the timely installation of these improvements.

HDPT is proposing to incorporate two improvements to the existing water treatment system: (1) an ultraviolet treatment system (the "UV System") and (2) an enhancement to the existing cold lime softening system (the "Cold Lime System"). These improvements to the existing water treatment system will reduce water consumption and improve the overall efficiency and reliability of the HDPP. These capital improvements are part of HDPT's systematic and comprehensive approach to upgrading existing systems by removing process "bottlenecks". In this case, the improvements will, among other benefits, facilitate and enhance the capability to remove silica from the cooling tower blowdown stream. The silica enters the facility as a constituent in the recycled water and State Water Project ("SWP") water.

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[1] 20 C.C.R. § 1001 *et seq.*

1. DESCRIPTION OF PROPOSED PROCESS IMPROVEMENTS

Section 1769(a)(1)(A) of the Commission's regulations requires a complete description of the proposed modification, including new language for any conditions that will be affected. The UV System and the Cold Lime System will incorporate into the existing HDPP water treatment system to improve the microfiltration process of the Project. No condition language is affected by these improvements.

The UV System will be incorporated inside the existing water treatment facilities. The purpose of the UV system is to destroy the total organic content ("TOC") in the cooling tower blowdown that binds magnesium and fouls the microfilter membranes. High energy UV lamps emitting UV energy at 185 nm are used to trigger the photolysis of water, producing very powerful hydroxyl free radicals (i.e., OH molecules). These hydroxyl free radicals attack organic compounds, breaking them down into carbon dioxide and water when fully oxidized. The UV System consists of two 100% UV reactors capable of providing 100 mJ/cm2 at 300 gpm. (*See,* Attachment A, Figures 1 and 2.) The UV System is equipped with a recirculation loop with a UV recirculation control valve that maintains flow through UV to reduce excessive start/stops and increase overall TOC destruction. The UV reactors will be the first treatment in the cooling tower blowdown system, and will be installed in the blowdown system after the cooling tower blowdown and before the cold lime softening system.

The Cold Lime System will include the minor alteration of an existing structure containing the two existing tanks already in the HDPP water treatment system. A third tank will be added to increase contact time. (*See,* Attachment A, Figures 2 and 3.) The minor alteration to the existing structure will shelter the third tank and will be a "bump out" of approximately 15.5 feet by 27.5 feet. The "bump out" will add only approximately 426 square feet to an existing building. The bump out will be on the existing asphalt surface surrounding the water treatment facility. (*See,* Attachment A, Figure 3 for a detailed view.)

This bump out of the existing building will shelter the third, 20,000-gallon Cold Lime Softening ("CLS") Reaction Tank No. 3. The new Reaction Tank No. 3 and related facilities will be piped in series after existing Reaction Tank No. 2 and before the existing Concentration Tanks. (*See*, Attachment A, Figure 1.) The CLS Reaction Tank No. 3 will supply additional reaction time (i.e., "contact time") to allow magnesium hydroxide to completely precipitate, improving recycled water use, and overall HDPP efficiency and reliability.

2. NECESSITY OF PROPOSED MODIFICATION

Section 1769(a)(1)(B) of the Commission's regulations requires a discussion of the necessity of the proposed modification. Since commissioning, the Project's microfiltration process has not performed efficiently, as the current system is undersized for efficient Project use of recycled water. Increased dispatch of the Project and the changes in water sources for Project operations over the years have made it apparent that the microfiltration process is a bottleneck in plant operations, negatively affecting the Project's performance. The proposed improvements will provide a more robust pretreatment system for the microfilters for all sources of water utilized by the Project, which will in turn improve Project performance and efficiency. The improved performance will enhance the HDPP's ability to use recycled water and State Water Project water, when available for use and banking.

3. IS THE AMENDMENT BASED ON INFORMATION KNOWN AT THE TIME OF THE CERTIFICATION PROCEEDING?

Section 1769(a)(1)(C) of the Commission's regulations requires a discussion of whether "the modification is based on information that was known by the petitioner during the certification proceeding." The proposed improvements are not based on information known by HDPT during the certification proceeding. The decision to incorporate the UV System and Cold Lime System improvements to the existing water treatment system was made after certification of the HDPP as part of HDPT's ongoing efforts to improve the performance and efficiency of the HDPP.

4. IS THE AMENDMENT BASED ON NEW INFORMATION THAT CHANGES OR UNDERMINES THE ASSUMPTIONS, RATIONALE, FINDINGS, OR OTHER BASES OF THE FINAL DECISION?

Section 1769 (a)(1)(D) of the Commission's regulations requires a discussion of whether the proposed modification is based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the final decision, and if so, an explanation of why the change should be permitted. The improvements are not based on new information that changes or undermines the assumptions, rationale, findings, or other bases of the Final Decision, but rather is based on the decision by HDPT to improve Project performance and efficiency through improvements to the microfiltration process.

5. ENVIRONMENTAL ANALYSIS OF THE PROPOSED IMPROVEMENTS.

Section 1769 (a)(1)(E) of the Commission's regulations requires an analysis of the impacts the modification may have on the environment. As explained below, there is no possibility that the improvements may have a significant effect on the environment.

The UV System will be housed completely within the existing water treatment building facilities. (*See,* Attachment A, Figure 2.) The installation will not result in any physical changes to the environment, and will therefore not have a significant effect on the environment.

The California Environmental Quality Act ("CEQA") only applies to "projects," which is a legal term that is defined in California Public Resources Code Section 21065. A "project" is "an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following . . . (c) An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies."

But for the Commission's exclusive jurisdiction, the UV System would be installed without a building permit from the County. Moreover, even if a building permit would be required but for the Commission's jurisdiction, the issuance of a building permit is a "ministerial action" (i.e., the County retains no discretion as to whether to issue the permit if the requirements set forth in local ordinances have been satisfied), and would be exempt from review under CEQA.[2]

With respect to the Cold Lime System, a third tank will be installed to complement the two existing tanks within the existing structures. To ensure efficient functioning of the Cold Lime System, HDPP will add a "bump out" of only approximately 426 square feet to the existing structure. Such a small structural alteration fits within existing CEQA exemptions. Specifically, Section 15301 of the CEQA Guidelines contains the following categorical exemption: "the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public or private structures, facilities, mechanical equipment, or topographical features, *involving negligible or no expansion of use* beyond that existing at the time of the lead agency's determination." (Emphasis added.) The key consideration is whether the Project involves "negligible or no expansion of an existing use." The minor alteration to the building for the Cold Lime System falls within the existing facility exemption provided for in Subsection 15301(e): "Additions to existing structures provided that the addition will not result in an increase of more than: (1) 50 percent of the floor area of the structures before the addition, or 2,500 square feet, whichever is less; or 10,000 square feet if: (A) The project is in an area where all public services and facilities are available to allow for maximum development permissible in the General Plan, and (B) The area in which the project is located is not environmentally sensitive."

In this case, the improvements will not result in an increase of either 50 percent of the floor area of the structure before the addition, or 2,500 square feet. Moreover, the Project is in an area designated or industrial use, and the Project is not located in an environmentally sensitive area. Thus, the minor alteration of the existing structure to accommodate the Cold Lime system constitutes a negligible expansion of an existing use, and is categorically exempt from environmental review under CEQA.

To further document that there is no possibility that the improvements to the Cold Lime System will have a potentially significant effect on the environment and thus facilitate the staff approved modification request, we discuss below the potential impacts that could be associated with the Cold Lime System's addition of the third tank, and explain how such impacts will not result in a significant, or potentially significant impact to the environment or human health.

[2] Cal. Pub. Res. Code Sec. 12080(b)(1) states that CEQA does not apply to "Ministerial projects proposed to be carried out or approved by public agencies". *See also:* CEQA Guideline Sec. 15268(a); according to CEQA Guideline Sec. 15268(b)(1), building permits are presumed to be ministerial actions.

Air Quality and Public Health

The addition of approximately 426 square feet to the existing structure to house the Cold Lime System will involve the use of some minor equipment for a very limited time period. These potential emissions are temporary and negligible. Installation of the Cold Lime System will not result in any changes to the potential emissions levels or types of emissions generated by the Project. The Project will continue to comply with all permitted emissions levels; therefore no permits or approvals are required from the Air District. The bump out addition is on already paved asphalt, meaning no fugitive dust will be generated. The potential impacts will be less than significant. Therefore, there will be no adverse air quality or public health impacts from the improvements.

Biological Resources

The Cold Lime System will be installed on asphalt within the boundaries of the existing powerplant. There are no sensitive or critical habitats located on the Project site. The improvements will not conflict with any local policies or ordinances protecting biological resources, or conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other habitat conservation plan. The potential impacts to biological resources are less than significant.

Cultural and Paleontological Resources

The Cold Lime System will be installed on highly disturbed and previously developed asphalt. The site is completely stabilized. The Project Owner will continue to comply with all cultural resources and paleontology conditions of certification during installation of the System, which will ensure that any potential impacts to unknown cultural or paleontological resources are less than significant. Therefore, there will be no adverse impacts to cultural or paleontological resources from the improvements.

Hazardous Materials Management

Sodium hydroxide (NaOH, 50%) will continue to be used by HDPP for pH control in the Cold Lime System. Weak citric acid (10%) will be used periodically to clean the UV System. Additional quantities of these chemicals above those currently stored will not be required. All hazardous materials will continue to be managed in accordance with Cal OSHA and other applicable regulations consistent with other hazardous materials management practices employed at the Project. Best management practices and compliance with all applicable LORS will ensure that the improvements will not have significant impacts.

Land Use

HDPP is located within an industrial zoned area. The surrounding uses are also industrial. No impacts to land use will occur from the requested improvements.

Noise

Installation of the Cold Lime System might result in temporary and minor noise impacts, mainly resulting from the use of equipment loading or offloading materials. Any noise impacts resulting from construction will be short-term and less than significant. Additional noise during operation should be negligible because all new equipment will be inside of the building.

Socioeconomics

The Cold Lime System will have minor, positive economic benefits, providing employment for the contractor and staff selected to perform the construction. Some materials may be acquired locally, but the positive economic benefits associated with such short-term work are difficult to ascertain, yet positive. There will be no significant socioeconomic impacts associated with installation of the Cold Lime System.

Soil and Water Resources

The entire site is zoned industrial, and is currently paved and graveled. No special activities are required for use or subsequently to return it to its current condition once the installation of the Cold Lime System is completed. Storm water BMPs and fugitive dust control already in place will be used. Furthermore, the improvements will not increase the amount of water used by the Project. In fact, the improvements are part of HDPT's endeavor to increase the efficiency of overall water use (i.e., less water used per MWHr of generation through efficiency improvements) which will allow for increased usage of reclaimed water. Therefore, there will be no adverse significant impacts to soil and water resources.

Traffic & Transportation

The short-term temporary work will result in a few additional truck and vehicle trips for the work crews. The roads in the vicinity all operate at adequate levels of service (LOS). There is no possibility that these few vehicle trips could significantly affect local or regional traffic patterns in this industrially zoned area. The activities proposed in this Petition will not create a significant adverse impact to traffic and transportation resources.

Visual Resources

Construction related impacts from the Cold Lime System will be temporary and less than significant from a visual perspective. The small "pop out" will screen the tank from off-site viewers. The construction activities will be consistent with other activities in this industrial zone area. The Project is located in an industrial area, and the minor addition to the existing structure to accommodate the Cold Lime System will be consistent with the industrial character of the area. The installation of the Cold Lime System will not impact any scenic resources. Therefore, there will be no impacts to visual resources.

6. COMPLIANCE WITH APPLICABLE LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Section 1769(a)(1)(F) of the Commission's regulations requires a discussion of the impact of the modification on the Project's ability to comply with applicable LORS. The improvements will not impact the Project's ability to comply with applicable LORS, and will be built and operated consistent with all conditions of certification in the Final Decision. Therefore, the improvements will not impact the Project's ability to comply with applicable LORS.

7. POTENTIAL EFFECTS ON THE PUBLIC RELATED TO THE PROPOSED AMENDMENT

Section 1769(a)(1)(G) requires a discussion of whether the modification affects the public. As discussed above in Section 6 the improvements will not result in any significant physical changes to the environment, and will not result in adverse environmental impacts. Therefore, the improvements will not adversely affect the public and will not change the conclusions regarding the environmental or public health impact of the Project contained in the Final Decision.

8. POTENTIAL EFFECTS ON PROPERTY OWNERS RELATED TO THE PROPOSED AMENDMENT AND LIST OF PROPERTY OWNERS

Section 1769(a)(1)(H) requires a list of property owners potentially affected by the modification. The UV System improvements are housed within the existing water treatment facility and the Cold Lime System improvements are all within the HDPP project site. No property owners will be affected by the improvements. However, a list of property owners has been previously submitted to the Commission, and can be provided to Commission Staff upon request.

9. CONCLUSION

The improvements for the UV System and the Cold Lime System will not result in significant environmental impacts, and will not affect the Project's compliance with applicable LORS. Approval of the improvements will benefit the efficiency and overall performance of the Project. Therefore, pursuant to Section 1769(a)(2) of the Commission's Regulations, Staff should find that Commission approval of the proposed improvements to the existing water treatment system is not required. HDPT requests that Commission Staff issue its determination by August 22, 2014, to facilitate the timely installation of these improvements.

Sincerely,

Bradley K Heisey

High Desert Power Trust
By: High Desert Power Project, LLC,
Certificate Trustee

Bradley K. Heisey
Senior Vice President

ATTACHMENT A

HIGH DESERT POWER PROJECT (97-AFC-1C)
PETITION FOR STAFF APPROVED MODIFICATION

FIGURES

Figure 1 – Schematic of Water Treatment Equipment

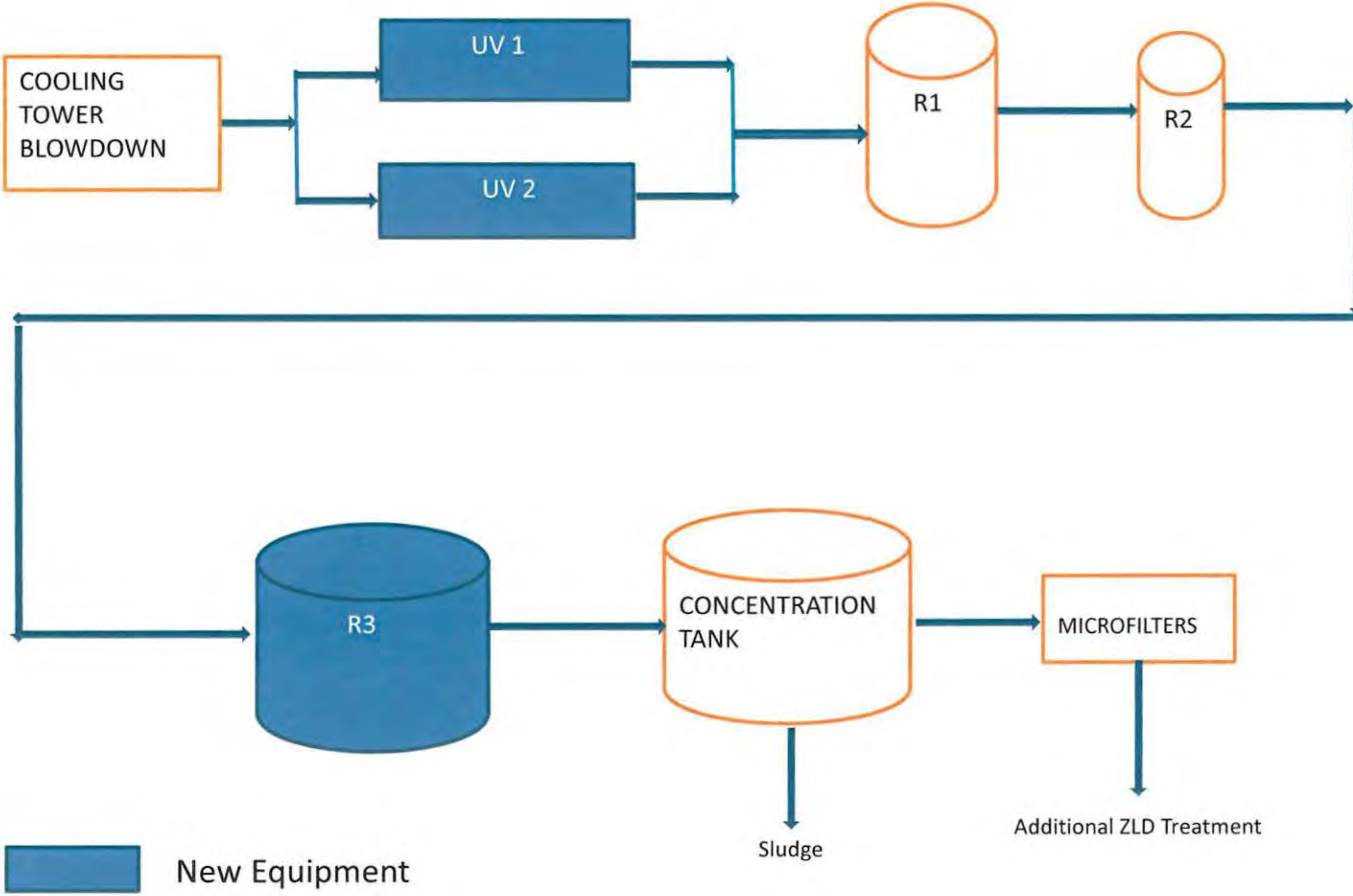


Figure 2 – Location of Water Treatment Equipment

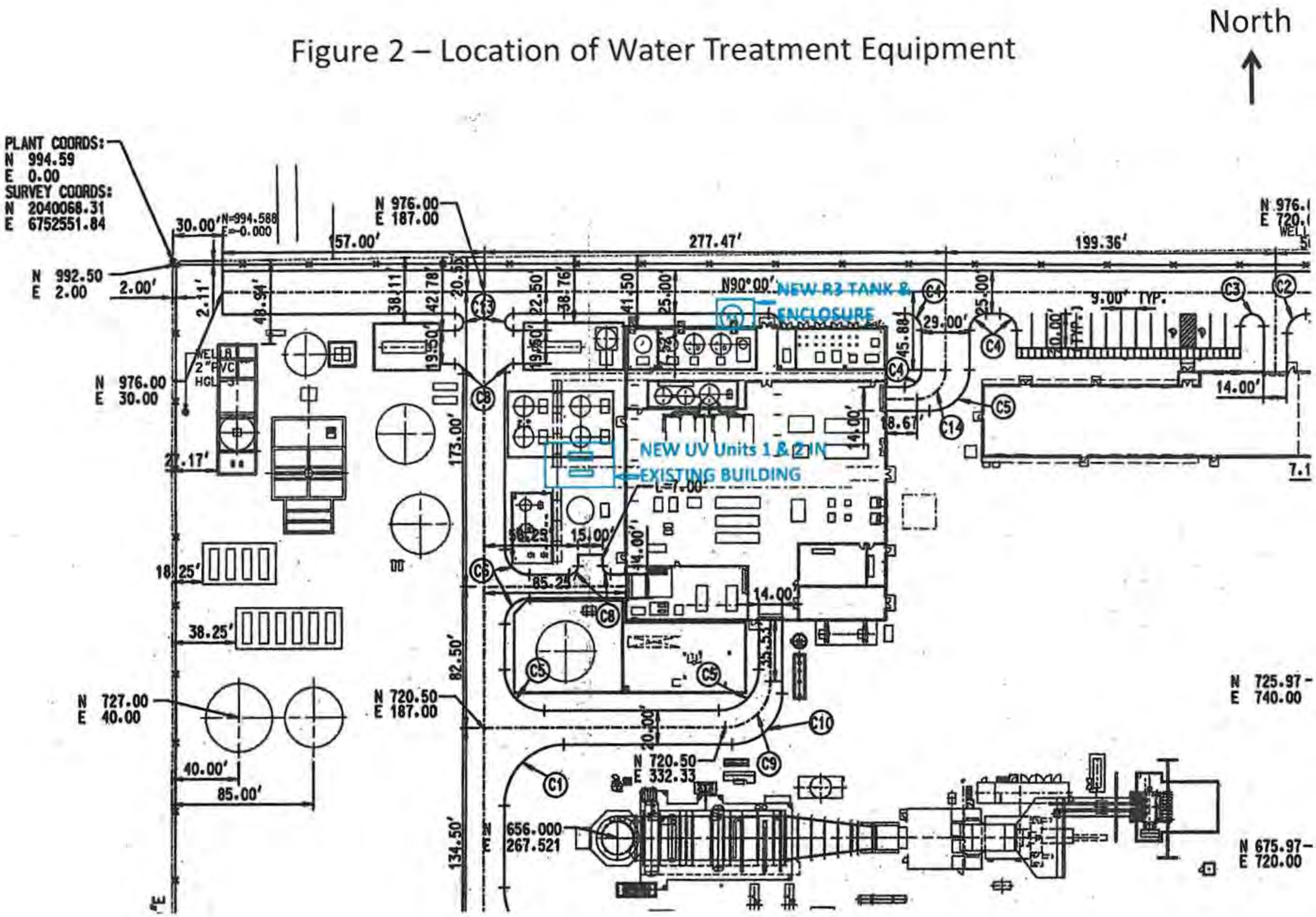
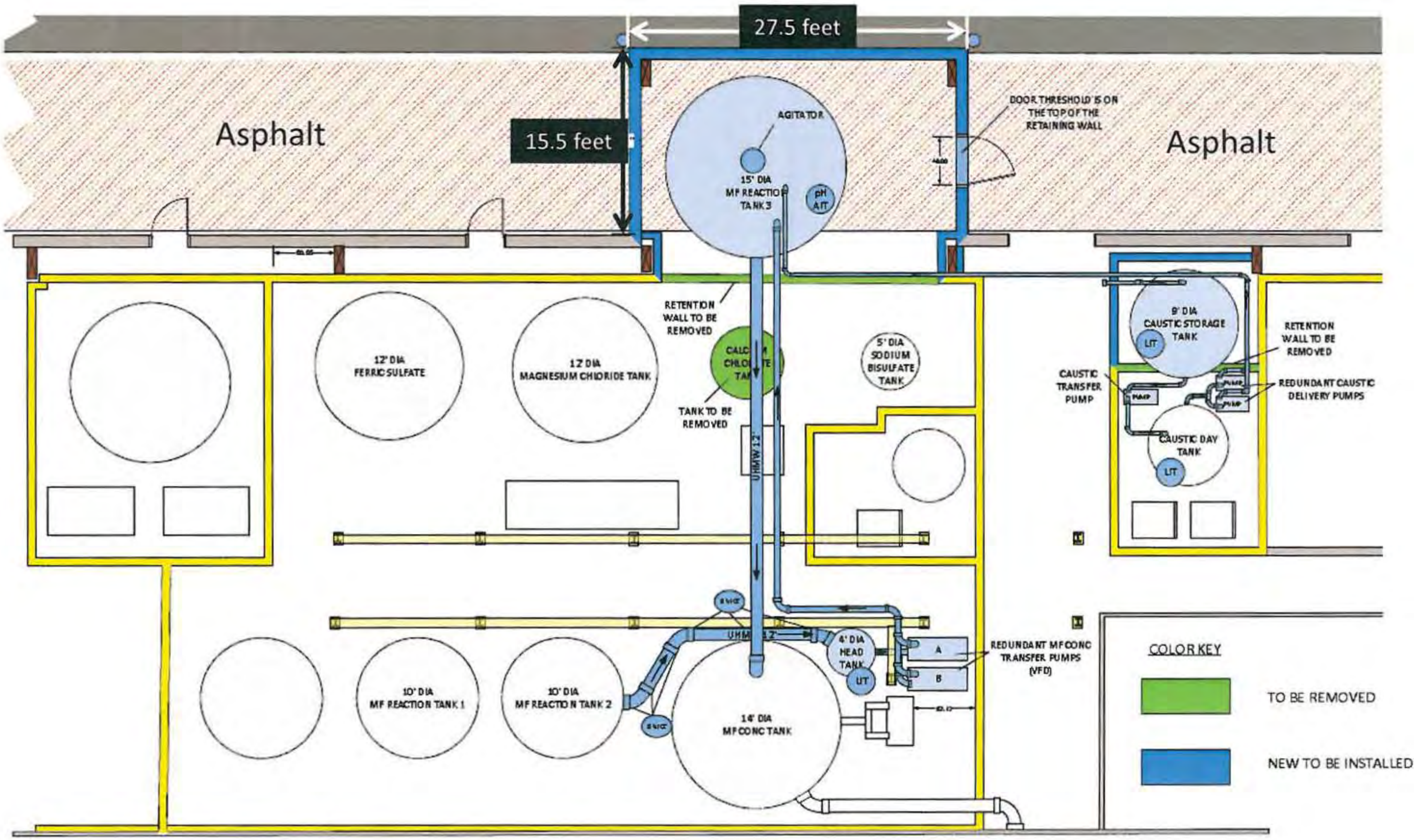


Figure 3 – Cold Lime System Layout (Detail)



ATTACHMENT 9

September 26, 2014 – Commission Approves Use of Adjudicated Groundwater for Two Year Period in CEQA-Equivalent Approval

DOCKETED

Docket Number:	97-AFC-01C
Project Title:	High Desert Power Plant (COMPLIANCE)
TN #:	203108
Document Title:	Order Approving Petition to Amend
Description:	N/A
Filer:	Joe Douglas
Organization:	CEC/ Douglas/ Hochschild/ McAllister/ Scott/ H. Kallemeyn
Submitter Role:	Energy Commission
Submission Date:	9/26/2014 8:01:24 AM
Docketed Date:	9/26/2014

STATE OF CALIFORNIA

Energy Resources Conservation
And Development Commission

In the Matter of: The Application for For the High Desert Power Project [HDPP]	)	Docket No. 97-AFC-01C Order No. 14-0910-2 **ORDER APPROVING PETITION TO AMEND**

ENERGY COMMISSION FINDINGS

Based on staff's analysis, the Energy Commission concludes that the proposed changes to Condition of Certification **SOIL&WATER-1** will not result in any significant impact to public health and safety, or the environment. The Energy Commission public review process has been certified as a CEQA-equivalent, and therefore satisfies CEQA requirements. The Energy Commission finds that:

- The petition meets all the filing criteria of Section 1769(a) concerning post-certification project modifications;
- The modification will not change the findings in the Energy Commission's Final Decision pursuant to Section 1755;
- The project will remain in compliance with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code section 25525;
- The change will be beneficial to the public;
- The change is based on information that was not available to the parties prior to Commission certification.

CONCLUSION AND ORDER

The California Energy Commission hereby adopts the following changes to the High Desert Power Project Decision. New language to Condition of Certification **SOIL&WATER-1** is shown as <u>underlined</u>, and deleted language is shown in ~~strikeout~~. The proposed changes to SOIL&WATER-7 regarding the installation of a brine wastewater pipeline is not approved.

CONDITION OF CERTIFICATION

SOIL&WATER-1

Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or appropriately treated recycled waste water, and/or an alternative water supply obtained from the Mojave River Basin ("MRB") consistent with the "Judgment After Trial" dated January, 1996, in City of Barstow, et al. v. City of Adelanto, et al. (Riverside County Superior Court Case No. 208568) (collectively, "MRB Adjudicated Water Rights") as administered by the MWA Watermaster (the "Judgment").

a. ~~Whenever SWP water is available to be purchased from the city of Victorville, or recycled waste water is available, the project owner shall use direct delivery of such water for project operation~~ Whenever recycled waste water of quality sufficient for project operations is available to be purchased from the City of Victorville, the project owner shall use direct delivery of maximum quantities of such water for project operations. Whenever the quantity or quality of recycled waste water is not sufficient to support project operations, the project may supplement recycled water supplies with SWP water, banked SWP water from the four HDPP wells as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to SOIL&WATER-5, and/or MRB Adjudicated Water Rights. The Project Owner shall consume no more than 2,000 AF in water year 2014/2015 (October 1 2014-September 30, 2015) and no more than 2,000 AF in water year 2015/2016 (October 1, 2015-September 30, 2016) of MRB Adjudicated Water Rights and the acquisition, use and transfer of MRB Adjudicated Water Rights shall be in compliance with the Judgment and Rules and Regulations of the MWA Watermaster. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

b. ~~Whenever water is not available to be purchased from the city of Victorville, the project owner may use SWP water banked in the four HDPP wells as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to SOIL&WATER-5.~~ The project owner shall report all use of water from all sources to the Energy Commission CPM on a monthly basis in acre-feet.

c. ~~If there is no SWP water available to be purchased from the MWA city of Victorville, and there is no reclaimed water available and there is no banked water available to the project, as determined pursuant to SOIL&WATER 5, no groundwater shall be pumped, and the project shall not operate. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.~~ The 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.

d. (Item Deleted)

e. The project's water supply facilities shall be appropriately sized and utilized to meet project needs. The project shall make maximum use of recycled waste water for power plant cooling given current equipment capabilities and permit conditions.

f. The project owner shall continue with the feasibility study evaluating the use of 100 percent recycled water for evaporative cooling purposes and other industrial uses. The feasibility study shall be completed by the project owner and submitted to the CPM.

Verification: The project owner shall provide final design drawings of the project's water supply facilities to the CPM, for review and approval, thirty (30) days before commencing project construction. The project owner shall submit to the CPM documentation showing the agreements entered into between the project owner, MWA Watermaster, and water right owners in MRB regarding the acquisition, use and transfer of MRB Adjudicated Water Rights. The project owner shall report all use of water from MRB to the Energy Commission CPM on a monthly basis.

The project owner shall provide a biannual report on the progress being made on the project design for use of 100 percent recycled water for power plant cooling. The report shall include information related to project modifications that may be needed for using up to 100 percent recycled water. The first report shall be due six months after adoption of this condition of certification, and the final feasibility report shall be submitted to the CPM no later than November 1, 201~~3~~4. Verifying compliance with other elements of Condition SOIL&WATER-1 shall be accomplished in accordance with the provisions of the Verifications for Conditions 2, 3, 6, 20, and 21 as appropriate.

The project owner shall submit a 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.

The final feasibility study should contain, but not be limited to, the following information:

I- Water Supply

A. Potential sources of recycled water, its current and projected use, and alternative pipeline routes
B. Adequacy of recycled water supplies to meet plant operation demand (provide future projections of supply and demand considering annual volumes, monthly patterns of plant water use vs. availability of water supply, and peak day supply and demand)
C. Quality of existing and recycled water supplies

D. Water treatment requirements for existing and recycled water supplies
E. Cooling cycles of concentration for existing and potential recycled water supplies

II- Cooling & Process Needs

A. Consumptive water uses e.g.: cooling tower make-up, evaporative cooling of CTG inlet air, CTG compressor intercooling, and STG condensation; CTG NOx control; CTG power augmentation; boiler water makeup
B. Space requirements for additional treatment of recycled water supplies vs. space available on the plant site
C. Water balance diagrams for recycled water use and wastewater discharge for average and peak conditions to include distinctions in using existing vs. recycled water

III- Wastewater Treatment Disposal

A. Method (existing discharge via sewer system to WWTP, dedicated brine return line, deep well injection, or zero liquid discharge (ZLD) recovery)
B. Available capacity & operating limitations

IV- Economic Costs of Existing Source and Recycled Sources (where applicable)

A. Capital costs
    1. water supply pipeline
    2. water supply pumping station(s)
    3. well(s)
    4. water treatment system
    5. wastewater pipeline & facility capacity charge
    6. permitting .(PM 10, Legionella, discharge quality and quantities)
    7. Right of Way and Easement acquisitions
    8. engineering, procurement, construction inspection and testing
    9. biologic surveys/environmental assessment reports

B. Annual (operating and maintenance) Costs
    1. existing and recycled water purchase cost
    2. chemicals (cooling tower & water treatment)
    3. labor
    4. energy (water supply pumping, water .treatment)
    5. wastewater discharge fee
    6. solids disposal (class of waste, transportation &landfill fees)

C. Project Life - Identify project life
D. Total Project Cost (base case)
E. Installed cost per watt
F. Total Annualized Cost - expressed as the uniform end-of-year payment (AIP) of Capital Costs + Annual Costs
G. Cost of Capital
H. Debt to equity ratio
I. Average debt service coverage ratio

V- Expected Effects on Electric Customers

A. Description of existing electricity rate structure and current rates to customers using existing water source
B. Description of expected electricity rates to customers using recycled water over remaining life of the plant

VI- Environmental Considerations for the use of Recycled Water

A. Describe the potential effects of recycled water use on the generation of hazardous waste and on the quality of its wastewater discharge
B. Describe the potential impacts to public health through the use and discharge of recycled water
C. Describe the potential effects of recycled water use and discharge on the degradation of water quality and its potential to be injurious to plant life, fish, and wildlife
D. Describe potential effects on existing water rights or entitlements

VII- Discussion of applicable California Water Code provisions

IT IS SO ORDERED.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of an Order duly and regularly adopted at a meeting of the California Energy Commission held on September 10, 2014.

AYE: Douglas, Hochschild, McAllister, Scott
NAY:
ABSENT: Weisenmiller
ABSTAIN:

H. Kallemeyn
Harriet Kallemeyn,
Secretariat

ATTACHMENT 10

October 20, 2014 – CEC Staff Approves Petition for Staff Approved Modification to Install Ultraviolet Treatment System and Cold Lime Softening System in CEQA-Equivalent Approval

DOCKETED

Docket Number:	97-AFC-01C
Project Title:	High Desert Power Plant (COMPLIANCE)
TN #:	203216
Document Title:	Order Approving Petition to Modify the Project Description
Description:	N/A
Filer:	Joe Douglas
Organization:	California Energy Commission
Submitter Role:	Energy Commission
Submission Date:	10/20/2014 1:30:56 PM
Docketed Date:	10/20/2014

CALIFORNIA ENERGY COMMISSION
1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

In the Matter of:	)	
The Application for	)	**Docket No. 08-AFC-7C**
For the High Desert Power Project (HDPP)	)	
	)	**Order No. 14-1007-5**
	)	
	)	**ORDER APPROVING PETITION TO MODIFYTHE PROJECT DESCRIPTION**
	)	

On July 21, 2014, High Desert Power Trust, the owner of the High Desert Power Project (HDPP), filed a petition with the California Energy Commission (Energy Commission) requesting to modify the project. The 830-megawatt, combined-cycle power plant was certified by the Energy Commission on May 3, 2000, and began commercial operations in April, 2003. The facility is located in the City of Victorville, in San Bernardino County.

The modifications proposed in the petition would modify the project to allow HDPP to install an ultraviolet treatment system within the existing water treatment facilities, and an enhancement to the existing cold lime softening system. The cold lime system will require a slight alteration to an existing structure and an additional tank to increase system efficiency. All modifications will remain on existing asphalt surfaces surrounding the water treatment facility. According to the petition and Staff's analysis, these modifications will reduce water consumption and improve overall efficiency and reliability of the HDPP.

ENERGY COMMISSION FINDINGS

Based on Staff's analysis, the Energy Commission concludes that the proposed changes to the project description will not result in any significant impact to public health and safety, or the environment. The Energy Commission public review process has been certified as a CEQA-equivalent, and therefore satisfies CEQA requirements. The Energy Commission finds that:

- The petition meets all the filing criteria of Title 20, section 1769 (a), of the California Code of Regulations, concerning post-certification project modifications;
- The modification will not change the findings in the Energy Commission's Decision, pursuant to Title 20, section 1755, of the California Code of Regulations;
- The project will remain in compliance with all applicable laws, ordinances, regulations, and standards, subject to the provisions of Public Resources Code, section 25525;
- The modifications will be beneficial because they will enable the project owner to optimize operations and reduce water consumption; and
- There has been a substantial change in circumstances since the Energy Commission certification justifying the modifications based on information that was not available to the parties prior to Energy Commission certification.

CONCLUSION AND ORDER

The California Energy Commission hereby adopts staff's recommendations and approves the changes to the Project Description for the High Desert Power Project.

IT IS SO ORDERED.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of an Order duly and regularly adopted at a meeting of the California Energy Commission held on October 7, 2014.

AYE: Weisenmiller, Douglas, McAllister, Hochschild
NAY: None
ABSENT: None
ABSTAIN: None

Harriet Kallemeyn,
Secretariat

ATTACHMENT 11

November 30, 2014 – Project Owner Files Recycled Water Feasibility Study Report

DOCKETED

Docket Number:	97-AFC-01C
Project Title:	High Desert Power Plant (COMPLIANCE)
TN #:	203306
Document Title:	High Desert Power Project Recycled Water Feasibility Study Report
Description:	N/A
Filer:	Karen Mitchell
Organization:	Ellison, Schneider & Harris L.L.P.
Submitter Role:	Applicant Representative
Submission Date:	11/3/2014 3:41:03 PM
Docketed Date:	11/3/2014

HIGH DESERT
POWER PROJECT

High Desert Power Project, LLC

14302 FNB Parkway I Omaha, Nebraska 68154-5212
402-691-9500 I FAX: 402-691-9727

November 3, 2014

Joseph Douglas
Compliance Unit
Siting, Transmission and Environmental Protection (STEP) Division
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: High Desert Power Project (97-AFC-1C): Compliance Filing: SOIL&WATER-1

Dear Mr. Douglas:

Pursuant to Condition SOIL&WATER-1, High Desert Power Project, LLC ("HDPP"), hereby submits the attached compliance filing, "*High Desert Power Project Recycled Water Feasibility Study Report*."

If you have any questions, please contact Randy Cullison at (402) 691-9586. Thank you.

Sincerely,

Bradley K Heisey

Bradley K. Heisey
Senior Vice President
High Desert Power Project, LLC

High Desert Power Project Recycled Water Feasibility Study Report
November 1, 2014

Table of Contents

Exhibit H. HDPP Recycled Water Feasibility Study Report in CEC Conditions of Certification Format

EXECUTIVE SUMMARY

High Desert Power Trust, LLC ("HDPT") owns an 830-megawatt ("MW") combined-cycle power plant (the "Facility") located in the City of Victorville within San Bernardino County, which is operated by High Desert Power Project, LLC ("HDPP"). The Facility was certified by the California Energy Commission ("CEC") on May 3, 2000 and commenced commercial operations in April 2003 using State Water Project ("SWP") water as its only source of water supply. That source of water could be used immediately by the Facility for cooling or other industrial purposes ("SWP Water") or treated and injected into an aquifer for later use ("Banked SWP Water"). The Facility was expressly prohibited from using recycled water at the time of the 2000 certification.

The Facility's primary consumptive water uses for industrial purposes include: (i) water evaporated from the cooling tower which is used to cool exhaust steam from the steam turbine generator, and (ii) water evaporated in the combustion turbines evaporative coolers when the evaporative coolers are in service. Consumption from cooling tower evaporation is significantly higher than consumption from the combustion turbine evaporative coolers.

Because the Facility was originally prohibited from using recycled water, the Facility's water treatment systems were designed and constructed to treat SWP Water and Banked SWP Water, which are higher quality water sources with lower amounts of impurities compared to recycled water. As a result of evaporation in the cooling tower, the impurities in the Facility's supply waters are concentrated in the cooling tower basin water because they do not evaporate and are left behind. In addition to evaporation, a very small amount of unevaporated cooling tower water droplets are carried out of the cooling tower (commonly called cooling tower drift) that have the same amount of impurities as water in the cooling tower basin. The impurities entrained within the cooling tower drift droplets are treated as PM_{10} emissions and these emissions are limited by the Facility's environmental permits. One of the primary purposes of the Facility's water treatment systems is to remove the impurities from the cooling tower basin water such that the Facility PM_{10} emissions can be maintained within its permitted limits. If the Facility's water treatment systems cannot remove a sufficient amount of impurities and the Facility's PM_{10} emissions approach the permitted limit, the Facility must reduce its power output or completely shut down in order to maintain compliance with its environmental permits. In addition to helping control PM_{10} emissions from the cooling tower, removing impurities from the cooling tower basin water is important because the high concentration of impurities can result in harmful deposits and fouling in Facility systems that use cooling tower water such as the cooling tower, the Facility cooling water piping systems, the steam turbine's condenser and certain water treatment system equipment.

The design basis for the Facility's annual water requirement for producing power is 4,000 acre-feet ("AF") per year ("AFY"). The design basis for the Facility's instantaneous water requirement is up to 4,000 gallons per minute ("gpm"), 24 hours per day on all days of the year excluding days when the Facility takes planned maintenance outages. A reliable water supply for the Facility must be able to meet both the annual and instantaneous requirements in order for the Facility to maintain a high availability for every hour of every day each year excluding days when the Facility is undergoing planned maintenance.

In 2008, HDPP petitioned the CEC requesting approval to use recycled water to the extent the Facility's existing water treatment system could treat recycled water. At that time, HDPP estimated the Facility could use and treat about 33% recycled water when it was blended with SWP Water. In 2009, the CEC approved HDPP's petition to use recycled water conditioned upon a requirement to study the feasibility of using up to 100% recycled water for evaporative cooling and other industrial uses at the Facility (the "Recycled Water Feasibility Study"). In 2014, the Mojave Water Authority reduced the Facility's SWP Water supply significantly for the 2014 water year due to drought-induced shortages of SWP Water. In September 2014, the CEC authorized HDPP to use up to 2,000 acre-feet per year of Mojave River Basin groundwater ("MRB Water") for water years 2015 and 2016.

The City of Victorville, through its Victorville Water District ("VWD"), is the provider of recycled water to the Facility. VWD provides recycled water produced at its Industrial Wastewater Treatment Plant (the "IWWTP") and at the Victor Valley Wastewater Reclamation Authority's ("VVWRA") Shay Road wastewater treatment plant (the "VVWRA Shay Road Plant"). These two sources provide 100% of the recycled water delivered to the Facility (individually or in aggregate, "Recycled Water").

After receiving the CEC's 2009 approval to use Recycled Water, the facilities required to deliver Recycled Water to the Facility and the facilities needed within the Facility to receive recycled water were completed in 2011 and at that time, HDPP began receiving, testing and studying the use of Recycled Water at the Facility. To assist with the study, HDPP retained third-party, independent services from two respected firms: (1) Kiewit Power Engineers ("Kiewit"), the engineering company that originally designed the Facility when it was constructed, was retained to study several options which would enable the Facility to use 100% Recycled Water; and (2) Cardno ENTRIX ("Cardno") was retained to study the availability of Recycled Water and determine whether sufficient amounts of Recycled Water are available to meet the Facility's requirements under various scenarios. HDPP further evaluated the Facility's operations in the energy market to evaluate the economic component of the Recycled Water Feasibility Study.

This Recycled Water Feasibility Study concludes that it is not feasible for the Facility to operate using 100% Recycled Water for cooling and other industrial purposes because:

(i) HDPP's Recycled Water supplier is projected in some years in the future to not have sufficient Recycled Water supply as required to meet the Facility's 4,000 AFY design basis requirement.

(ii) HDPP's Recycled Water supplier is unable to provide Recycled Water in quantities and qualities on a 24 hours per day on all days of the year as required by the Facility for it to maintain high availability for generating power.

(iii) The Facility's water treatment system cannot operate reliably on a 100% Recycled water supply because its existing water treatment system was not designed to treat and remove the higher amount of impurities associated with using 100% Recycled Water as required to maintain cooling tower PM_{10} emissions within the Facility's permitted limits and to protect the Facility's cooling systems and equipment from harmful deposits associated with high amounts of impurities in cooling tower water.

(iv) The capital costs to upgrade the water treatment system are extremely high and the costs of further treating additional quantities of Recycled Water so that is of adequate quality for use at the Facility are significantly higher than the cost of the other sources of water to the Facility. Unlike utilities in California who have a retail customer base upon which it can recover the incremental capital and operating and maintenance costs associated with using Recycled Water, HDPP is a merchant generating facility and the amount of revenue it earns to pay for its costs is subject to market forces. Using 100% Recycled Water will not provide HDPP with increased energy or increased capacity revenue opportunities therefore it is not economically feasible for HDPP to incur these additional costs associated with the use of 100% Recycled Water. Accordingly, additional Recycled Water may not be furnished for a reasonable cost and the use of additional Recycled Water at the Facility is not mandated by California Water Code section 13550.

HDPP has already demonstrated a commitment to maximizing the use of Recycled Water at the Facility by petitioning and receiving permission from the CEC to use Recycled Water for cooling purposes. From 2009 through the present, HDPP has invested in the costs for permitting, engineering, design and construction of new on-site and off-site infrastructure, upgrades to the Facility's existing water treatment systems, and for third party experts, in seeking to maximize the use of Recycled Water.

Although this Recycled Water Feasibility Study finds it is not feasible for HDPP to convert the Facility to using 100% Recycled Water, HDPP is committed to using as much Recycled Water as feasible given the limitations on the Facility's existing water treatment systems, Recycled Water quantities and quality, Recycled Water delivery infrastructure, and Recycled Water delivery reliability. To this end, regarding the Petition to Amend that the CEC has required HDPP to file no later than November 1, 2015, HDPP will propose criteria describing how the Facility will maximize use of Recycled Water to the extent feasible.

Table of Acronyms and Abbreviations

ABS – Aquifer Banking System

AF – acre-feet

AFY – acre-feet per year

CAISO – California Independent System Operator

CARB – California Air Resources Board

CEC – California Energy Commission

CTBD System – Cooling Tower Blowdown System

FERC – Federal Energy Regulatory Commission

GPM – gallons per minute

HDPP – High Desert Power Project, LLC

HDPT – High Desert Power Trust

IWWTP – Industrial Wastewater Treatment Plant

MRB Water – Mojave River Basin Groundwater

MW – megawatts

MWA – Mojave Water Authority

NPDES – National Pollutant Discharge Elimination System

O&M – operations and maintenance

PM_{10}– particulate matter up to 10 microns

RA – Resource adequacy

RO – Reverse osmosis

SWP Water – State Water Project Water

TDS – Total Dissolved Solids

VVWRA – Victor Valley Wastewater Reclamation Authority

VWD – Victorville Water District

ZLD – Zero Liquid Discharge

1 1 Introduction and Background

1.1 High Desert Power Project.

High Desert Power Trust ("HDPT") owns, and High Desert Power Project, LLC ("HDPP") operates an 830-megawatt ("MW") combined-cycle power plant (the "Facility") located in the City of Victorville within San Bernardino County. The Facility was certified by the California Energy Commission ("CEC") on May 3, 2000 and commenced commercial operation in April 2003. The Facility's steam turbine generator exhaust steam is cooled by a heat transfer process using a water-cooled condenser and an induced draft cooling tower. Water evaporated from the cooling tower must be made up from the Facility's makeup water supply sources.

1.2 HDPP Petition to Use Recycled Water.

In 2008, HDPP petitioned the CEC requesting approval to use Recycled Water for cooling purposes to the extent the Facility's existing water treatment system could treat Recycled Water. At that time, HDPP estimated the Facility could use and treat approximately 33% Recycled Water when it was blended with SWP Water. In 2009, the CEC approved HDPP's petition.

1.3 Requirement to Study the Feasibility of Using 100% Recycled Water.

As part of the CEC's approval for the Facility to use Recycled Water, the CEC required HDPP to study the feasibility of using up to 100% Recycled Water for evaporative cooling and other industrial uses (the "Recycled Water Feasibility Study").

1.4 Plant Consumptive Water Uses for Industrial Purposes.

The Facility is not permitted to discharge wastewater. As a result, the Facility was designed to be a zero liquid discharge ("ZLD") plant where process wastewater streams are treated, water is recovered and reused while solids and other impurities are collected and disposed off-site in a manner consistent with the plant's environmental permits. The Facility's primary consumptive water uses include: (i) water evaporated from the cooling tower which is used to cool exhaust steam from the steam turbine generator and (ii) water evaporated in the combustion turbines evaporative coolers when the evaporative coolers are in service. A description of these two major water uses is provided below including the design basis instantaneous consumption, expressed in gallons per minute ("gpm"), on a 98 degree Fahrenheit ("F") day.

1.4.1 Cooling Tower Evaporation (3,584 gpm).

The cooling tower provides cold water to the Facility's steam turbine condenser so it can cool and condense the steam turbine's exhaust steam. The warm water returning to the cooling tower from the steam turbine condenser is cooled by exchanging heat in the water to air circulating through the cooling tower. Some of the warm water evaporates which cools the remaining water in the cooling tower. Impurities in the cooling tower water do not evaporate and gradually increase in concentration as more cooling tower water evaporates and more impurities are left behind. Water evaporated from the cooling tower is not recovered by the Facility and must be replaced by new sources of supply water (i.e.: Recycled Water, SWP Water, Banked SWP Water, MRB Water or a combination of these waters).

1.4.2 Combustion Turbine Evaporative Coolers (123 gpm when in service).

The combustion turbine evaporative coolers evaporate high quality water upstream of the combustion turbine inlets, reducing the air temperature to the inlets, which results in the combustion turbines producing higher power output. Water evaporated in the evaporative coolers is not recovered by the plant and must be replaced by new sources of supply water. The combustion turbine evaporative coolers typically operate when the plant ambient temperature is above 59 degrees F during the months of May through November of each year.

1.5 Facility Systems Impacted by Recycled Water Use.

Because Recycled Water has higher amounts of impurities than SWP Water, Banked SWP Water and MRB Water, use of Recycled Water will impact certain Facility systems that directly or indirectly use or treat Recycled Water. The following sections describe the impact the use of Recycled Water will have on the existing Facility water systems.

1.5.1 Cooling Tower.

As water evaporates from the cooling tower, the concentration of impurities left behind in the water will increase if the impurities are not removed. As the concentration of impurities increases, a small portion of those impurities are emitted to the atmosphere in the form of PM_{10} emissions contained within small water droplets entrained in the air that is forced through the cooling tower. These entrained water droplets are known as cooling tower "drift". PM_{10} emissions from the cooling tower drift are calculated based on the amount of impurities in the cooling tower basin water. If the cooling tower PM_{10} emissions approach HDPP's permitted 1.2 lb PM_{10}/hour emission limit, the Facility's power output must be curtailed, or the Facility must be shut down in order to maintain compliance with the emission limit.

1.5.2 Cooling Tower Blowdown Water Treatment System ("CTBD System").

To maintain the amount of impurities in the cooling tower basin water and the amount of cooling tower PM_{10} emissions within acceptable limits, a stream of water with concentrated impurities from the cooling tower basin is withdrawn and replaced with less concentrated waters (i.e.: Recycled Water, SWP Water, Banked SWP Water or MRB Water). This stream of water is known as cooling tower blowdown water. The CTBD System removes impurities (dissolved and suspended solids) from the concentrated cooling tower blowdown stream by water softening, filtration and reverse osmosis ("RO") processes.

1.5.3 Crystallizer.

The crystallizer receives water with highly concentrated dissolved solids (brine) from the CTBD System RO units. The dissolved solids are precipitated out in the crystallizer and are discharged as a slurry to a centrifuge for further water removal. The solids are discharged from the centrifuge and the remaining high quality feed water is returned to the Facility water systems. The more impurities in the water supplies, the greater the load on the Crystallizer.

1.5.4 Aquifer Banking System ("ABS").

The ABS consists of gravity filters to remove course suspended solids and ultrafiltration to remove smaller suspended solids. The ABS treats clarified SWP Water and sends it to a nearby City of Victorville well system for injection into an underground aquifer ("Banked SWP Water").   When SWP Water, Recycled Water, or MRB Water of sufficient quantity or quality is not available to the Facility, the City of Victorville uses the well system to withdraw Banked SWP Water from the aquifer and delivers it to the Facility.

1.5.5 Other Facility Systems.

Other Facility water systems can be potentially impacted by the use of Recycled Water if the Facility's water treatment system is not effective in removing the impurities found in Recycled Water. The impurities that are not removed can cause harmful deposits and can foul Facility systems such as water piping systems, the steam turbine condenser, heat exchangers and other Facility equipment cooled by water from the cooling tower.

1.6 Facility Water Supply Requirements.

A reliable water supply for the Facility must be able to meet both of the annual supply and instantaneous requirements described below in order for the Facility to maintain high availability for every hour of every day each year excluding days when the Facility is undergoing planned maintenance.

1.6.1 Annual Requirement.

The Facility's design basis annual water requirement for producing power (excluding water for banking) is 4,000 AFY.

1.6.2 Instantaneous Requirement.

The Facility's design basis instantaneous water requirement (excluding banking) is up to 4,000 gpm 24 hours per day on all days of the year excluding days when the Facility takes one planned maintenance outage in the spring and one planned outage in the fall. The length of most of the Facility's planned outages is 10 days. The Facility's instantaneous requirement is dependent upon the Facility power output level and on the ambient temperature at the Facility. At higher Facility power output levels, more steam passes through the steam turbine which requires more cooling load from the Facility steam turbine condenser and more cooling load on the cooling tower. The higher cooling load on the cooling tower results in more evaporation requiring higher volumes of makeup water supply to the cooling tower. When ambient temperatures at the Facility are higher, more evaporation occurs in the cooling tower requiring higher volumes of makeup water supply to the cooling tower.

1.7 Facility Water Sources.

The Facility currently is authorized to use the four water sources described below.

1.7.1 Recycled Water.

1.7.1.1 Recycled Water History.

The CEC originally prohibited HDPP from using Recycled Water for cooling purposes. During HDPP's initial application for certification proceedings in the year 2000, there were concerns about the availability of Recycled Water and the impacts of reduced discharge of Recycled Water to the Mojave River and the groundwater basin and uncertainty about the effectiveness of the Mojave River Basin adjudication to reduce the overdraft of the groundwater basin. The Mojave River Basin adjudication was finalized after the Facility was certified, and the Mojave Water Authority ("MWA") now manages the basin to maintain a sustainable yield. Given this stability in the Mojave River Basin, in 2008, HDPP petitioned the CEC requesting approval to use Recycled Water to the extent the Facility's existing water treatment system could treat Recycled Water. At that time, HDPP estimated the Facility could use and treat approximately 33% Recycled Water when it was blended with SWP Water. In 2009, the CEC approved HDPP's petition.

As part of the CEC's approval for HDPP to use Recycled Water, the CEC required HDDP to study the feasibility of using up to 100% Recycled Water for evaporative cooling and other industrial uses (the "Recycled Water Feasibility Study").

1.7.1.2 Recycled Water Supply Agreement.

Recycled Water is delivered to the Facility under an agreement between HDPT and the Victorville Water District ("VWD"). VWD provides recycled water produced at its Industrial Wastewater Treatment Plant (the "IWWTP") and the Victor Valley Wastewater Reclamation Authority's ("VVWRA") Shay Road wastewater treatment plant (the "VVWRA Shay Road Plant").

1.7.1.3 Recycled Water Quality.

Recycled Water contains more impurities (TDS, silica, and other impurities) than SWP Water, Banked SWP Water and MRB Water as further discussed below. See Kiewit's confidential report in Exhibit B for detailed analysis of the composition of Recycled Water.

Recycled Water from the VVWRA Shay Road Plant has generally met the water quality specifications in the Recycled Water supply agreement between HDPT and the VWD.

The IWWTP's Recycled Water generally does not meet the water quality specifications in the Recycled Water supply agreement between HDPT and the VWD. In February 2014, due to the California drought and HDPP's desire to preserve its Banked SWP Water supply, HDPP temporarily waived the water quality specification because blending the IWWTP's relatively low volume of Recycled Water with Banked SWP Water resulted in a water quality that the Facility's water treatment system could treat. The Facility began receiving Recycled Water from the IWWTP plant on February 11, 2014.

1.7.1.4 Recycled Water Compatibility with Existing Facility Water Treatment Systems.

Since the existing Facility water treatment system was designed to treat the higher quality SWP Water and Banked SWP Water, the existing Facility water treatment system was not designed to remove the higher amount of impurities associated with the Facility running on 100% Recycled Water.

1.7.1.5 Recycled Water Cost.

The current cost for Recycled Water is provided in confidential Exhibit F. Recycled Water, without further treatment, is the lowest-cost existing water supply for the Facility.

1.7.2 State Water Project Water ("SWP Water")

1.7.2.1 SWP Water History.

SWP Water was the Facility's only industrial water source when the Facility was originally certified by the CEC in 2000.

1.7.2.2 SWP Water Supply Agreement.

SWP Water is delivered to the Facility under an agreement between HDPP and the City of Victorville. The City receives SWP Water from the MWA.

1.7.2.3 SWP Water Quality.

SWP Water contains fewer impurities (TDS, Silica, and other impurities) than Recycled Water but more impurities than Banked SWP Water and MRB Water. SWP Water quality varies seasonally such that removing the impurities from the water requires continuous analysis of the water quality and changes to the water treatment process. See Kiewit's report in Exhibit B for detailed analysis of the composition of SWP Water.

1.7.2.4 SWP Water Compatibility with Existing Plant Water Treatment Systems.

The Facility's existing water treatment system was designed to treat SWP Water. However, when the quality of SWP Water decreases materially, for example due to seasonal variations, the Facility's water treatment system's performance can degrade.

1.7.2.5 SWP Water Cost.

SWP Water cost has historically been more than Recycled Water but less than Banked SWP Water (due to the costs of receiving, treating, injecting, and re-delivering SWP Water). The current cost of SWP Water delivered to the Facility is provided in confidential Exhibit F.

1.7.2.6 SWP Water Annual Volumes Available.

HDPP's maximum annual allocation of SWP Water available for use for power production and for producing Banked SWP Water is 8,000 AF which is based on the Facility using 4,000 AF for power production purposes and 4,000 AF for treating SWP Water and producing Banked SWP Water. For 2008-2010, HDPP requested an allocation of 8,000 AF but, due to lower amounts of SWP Water available in California, received only 3,280, 2,706 and 3,486 AF respectively. For 2011-2013, HDPP requested and received an allocation of 6,500 AF. For 2014, HDPP requested an allocation of 6,500 AF, but received an allocation of 565 AF due to drought conditions in the State.

1.7.2.7 <u>SWP Water Supplier's Delivery Capability.</u>

The City of Victorville's and the MWA's SWP Water delivery infrastructure has demonstrated an ability to deliver the Facility's 4,000 gpm design basis volume requirement 24 hours per day.

1.7.2.8 <u>SWP Water Delivery Reliability.</u>

When the City of Victorville and the MWA have SWP Water to deliver to the Facility, the reliability of their systems to deliver SWP Water to the Facility has been good. From 2007 through November 2013, the MWA experienced relatively few unplanned curtailment of SWP Water and the curtailments that did occur did not significantly impact the Facility's reliability to generate power. The MWA curtailed delivery of SWP Water for the entire month of December 2013 due to planned maintenance on their system. During this period, the Facility operated on Banked SWP Water.

1.7.3 <u>Banked SWP Water</u>

1.7.3.1 <u>Banked SWP Water History.</u>

HDPP was originally certified by the CEC to produce and store Banked SWP Water for use when SWP Water was not available to the Facility. HDPP began banking SWP Water when the Facility began commercial operation in 2003.

1.7.3.2 <u>Banked SWP Water Agreement.</u>

Banked SWP Water is received, treated, injected, and re-delivered to the Facility under an agreement between HDPP and the VWD. Under that agreement, VWD owns and operates a group of four wells that are used to inject and extract Banked SWP Water for the Facility. The wells are located approximately 4 to 5 miles from the Facility. HDPP reimburses VWD for the cost to maintain and operate the wells.

1.7.3.3 <u>Banked SWP Water Quality.</u>

Banked SWP Water has a lower amount of impurities than Recycled Water, and therefore is a higher quality water compared to Recycled Water. See Kiewit's report in Exhibit B for detailed analysis of the composition of Banked SWP Water.

1.7.3.4 <u>Banked SWP Water Compatibility with Existing Plant Water Treatment Systems.</u>

Because Banked SWP Water has a lower amount of impurities and is a higher quality water compared to SWP Water, the Facility's existing cooling tower blowdown system and crystallizer can reliably treat the cooling tower blowdown streams that occur when the Facility runs on Banked SWP Water.

1.7.3.5 Banked SWP Water Cost.

The current cost of Banked SWP Water delivered to the Facility is provided in confidential Exhibit F. The water cost component of Banked SWP Water is already paid by HDPP under the SWP Water supply agreement. The costs under the Banked SWP Water agreement include the cost for VWD to maintain and operate the well system used to bank and withdraw water from the aquifer for the use by the Facility.

1.7.3.6 Banked SWP Water Annual Volumes Available.

The volume of Banked SWP Water available to the Facility is limited to the volume of water HDPP has injected into the aquifer less 1,000 AF and less the amount of dissipated groundwater in accordance with SOIL&WATER-6. The Facility is prohibited from banking SWP Water if any one of multiple water quality limits exceed a permitted threshold. This limitation on banking has reduced the amount of Banked SWP Water available to the Facility. During the ongoing 2014 drought period when the Facility received only a fraction of its historical SWP Water allocation, HDPP has demonstrated the ability to blend Recycled Water with Banked SWP Water in order to minimize the use of its Banked SWP Water supply.

1.7.3.7 Banked SWP Water Supplier's Delivery Capability.

The VWD's well and pipeline delivery system is designed to deliver 100% of the Facility's instantaneous water requirement of 4,000 gpm.

1.7.3.8 Banked SWP Water Delivery Reliability.

The historical delivery reliability of the Banked SWP Water supply to the Facility has been good. Prior to December 2013, the Banked SWP Water was used infrequently and for short periods of time. During December 2013 when the SWP Water system was unavailable due to planned maintenance, and from February 2014 through the present when SWP Water was unavailable due to the 2014 drought, the Banked SWP Water delivery system has been used continuously and has performed with good reliability.

1.7.4 Mojave River Basin Groundwater.

1.7.4.1 MRB Water History.

On September 10, 2014, in response to a drought induced curtailment of SWP Water, the CEC approved an amendment to the Facility's CEC conditions of certification allowing HDPP to obtain an alternative water supply. The amendment allows HDPP to obtain water rights consistent with the "Judgment After Trial" dated January, 1996, in City of Barstow, et al. v. City of Adelanto, et al. as administered by MWA (the

"Judgment"). The Judgment allows any party, including HDPP, to intervene to become a Party to the Judgment and (i) acquire and use existing water rights adjudicated under the Judgment, or (ii) pay applicable Replacement Water Assessments (collectively, "MRB Water"). The CEC limited HDPP's consumption of MRB Water to no more than 2,000 AF in water year 2014/2015 and no more than 2,000 AF in water year 2015/2016.

1.7.4.2 MRB Water Agreement.

Because MRB Water will physically come from the same underground aquifer that holds Banked SWP Water, HDPP anticipates MRB Water will be delivered to the Facility by the same well system that delivers Banked SWP Water to the Facility. HDPP is seeking to enter into a new agreement with the VWD for delivery of MRB Water to the Facility.

1.7.4.3 MRB Water Quality.

Because MRB Water will physically come from the same underground aquifer that holds Banked SWP Water, MRB Water quality will be identical to the quality of Banked SWP Water.

1.7.4.4 MRB Water Compatibility with Existing Facility Water Treatment System.

Similar to Banked SWP Water, MRB Water has a lower amount of impurities and is a higher quality water compared to SWP Water. The Facility's existing cooling tower blowdown system and crystallizer can reliably treat the cooling tower blowdown streams that occur when the plant runs on MRB Water.

1.7.4.5 MRB Water Cost.

HDPP has not yet acquired MRB Water from third parties or as provided for under the Judgment. For the purposes of the Recycled Water Feasibility Study, HDPP assumes the delivered cost of MRB Water will be the same as the delivered cost of Banked SWP Water.

1.7.4.6 MRB Water Delivery Capability.

The delivery capability of the well and pipeline system is adequate to meet the Facility's needs as described in Section 1.7.3.7 above.

2 Recycled Water Feasibility Study.

2.1 Recycled Water Feasibility Study Scope.

In 2011, the facilities required by the VWD to deliver Recycled Water and the facilities needed within the Facility to receive Recycled Water were completed, the Facility began receiving Recycled Water and HDPP began studying the use of Recycled Water ("the Recycled Water Feasibility Study"). The Recycled Water Feasibility Study consisted of the following scope:

(i) Recycled Water Supply Adequacy – A study of HDPP's Recycled Water supplier's current and projected Recycled Water supplies to determine if there is sufficient supply to meet the Facility's 4,000 AFY annual requirement.

(ii) Recycled Water Supply Reliability – A study of HDPP's Recycled Water supplier's delivery and storage infrastructure capability to deliver the Facility's instantaneous water requirement of up to 4,000 gpm, 24 hours per day, 365 days per year excluding periods when the Facility is undergoing planned maintenance.

(iii) Technical Feasibility – A study of the most feasible method to manage the additional amount of impurities found in the cooling tower blowdown water when the Facility operates on 100% Recycled Water.

(iv) Economic Feasibility – A study of the economic feasibility of implementing capital improvement projects required and the impact on operations and maintenance costs for the Facility to operate on 100% Recycled Water.

2.2 Recycled Water Supply Adequacy.

HDPP engaged Cardno ENTRIX ("Cardno") to study the availability of Recycled Water in amounts sufficient to meet the Facility's requirements. As described in their report in Exhibit A, Cardno studied three forecast scenarios regarding the amount and reliability of Recycled Water available to the Facility including (1) assuming that the Recycled Water supply will increase based upon anticipated residential and commercial growth in the service area, (2) assuming that the Recycled Water supply will have lower growth rates than assumed in Scenario (1) and 10% lower flows in the Mojave River, and (3) assuming that both the HDPP Facility and the Victorville 2 Hybrid Power Project are built and both use 100% Recycled Water. Cardno's report concluded:

(i) Based upon the assumptions in Scenario 1, in 3 years out of 10 there would be insufficient Recycled Water to meet the full 4,000 AFY of the Facility's demand (30%).

(ii) Based upon the assumptions in Scenario 2, there would be shortages of Recycled Water in 5 years out of 10 years (50%).

(iii) Based upon the assumptions in Scenario 3, operation of both the Facility and the CEC-approved Victorville 2 project would cause there to be insufficient Recycled Water availability in 8 out of 10 years (80%).

Cardno's report also stated "Outages at either the VVWRA Shay Road Plant or IWWTP will continue to occur in the future with potential durations of days, to several weeks, or even months. These future outages, whether planned or unplanned, coupled with uncertainty about Mojave River flows and potential diversion of supply to the new subregional wastewater reclamation facilities, compel the Facility to continue to have access to and to use an alternative source of water supply to sustain operations. Having a portfolio of usable water supplies to draw upon on an instantaneous basis is important to the Facility's reliability."

2.3 Recycled Water Supply Reliability.

From July 2011 through September 2014, HDPP maintained logs of the quantity, quality and reliability of Recycled Water used by the Facility (see Exhibit C). HDPP's experience during this period concluded that:

(i) The VVWRA Shay Road Plant, one of two wastewater treatment plants that provide Recycled Water to the Facility, can deliver about 1,650 gpm of Recycled Water on a continuous basis when the plant is available to provide Recycled Water to the Facility.

(ii) From mid-April 2012 through June 2013 and from September 2013 through January 2014, the VVWRA Shay Road Plant did not deliver Recycled Water to the Facility. It is HDPP's understanding the first outage was related to planned capital upgrades at the VVWRA Shay Road Plant and the second outage was due to equipment problems that prevented the plant from being able to produce Title 22 Recycled Water.

(iii) From March 1, 2014 through September 30, 2014, the VVWRA Shay Road plant fully or partially curtailed delivery of Recycled Water to the Facility on 38 days (18% of the days) during the period. HDPP understands the curtailments are generally due to planned and unplanned maintenance events at the VVWRA Shay Road Plant.

(iv) The IWWTP, the other wastewater treatment plant that provides Recycled Water to the Facility, can provide about 350 gpm of Recycled Water on a continuous basis when the plant is available to provide Recycled Water to the Facility.

(v) From February 11, 2014 through September 30, 2014, the IWWTP reliably delivered about 350 gpm of Recycled Water to the Facility without interruption.

(vi) The maximum average Recycled Water delivery rate VWD sustained over a 24 hour period when both the VVWRA Shay Road Plant and the IWWTP were available was 2406 gpm on July 31, 2014.

(vii) On March 18, 2014, HDPP ran a "maximum flow test" by opening the Facility's Recycled Water inlet valve and measuring the maximum flow VWD could deliver on an instantaneous basis from its one million gallon storage tank. The maximum flow observed was greater than 5,250 gpm for a one minute period.

(viii) Based on HDPP's experience receiving Recycled Water from March 2014 through September 2014, and the maximum flow rate test in March 2014, the piping supplying the Facility from the VWD one million gallon storage tank is capable of supplying more than 4,000 gpm. However, the existing piping, pumping capacity and storage facilities are not capable of delivering 4,000 gpm 24 hours per day.

2.4 Recycled Water Technical Feasibility.

HDPP retained Kiewit Power Engineers ("Kiewit"), the engineering company that originally designed the Facility when it was constructed, to study several options for the Facility to use 100% Recycled Water. Kiewit's study is attached as confidential Exhibit B. Kiewit studied how to treat or dispose of cooling tower blowdown water containing higher amounts of impurities due to higher amounts of impurities found in Recycled Water compared to SWP Water and Banked SWP Water. Kiewit initially considered on-site or off-site discharge options including discharging the cooling tower blowdown water off-site under a new National Pollutant Discharge Elimination System ("NPDES") permit, discharging to an off-site wastewater treatment plant, discharging by deep well injection, and by treating the blowdown water on-site by adding new water treatment facilities and/or by upgrading the Facility's existing water treatment system. After Kiewit's initial consideration of on-site or off-site cooling tower blowdown disposal options, they concluded that treating the cooling tower blowdown water on-site was the best option for HDPP after taking into consideration costs, permitting requirements and concerns about third parties controlling a key function of the Facility's process.

Kiewit studied the impact of using Recycled Water in the Facility's existing water treatment system from 2011 through September 2014 so it could identify what improvements were needed to allow the Facility to use 100% Recycled Water.

Kiewit concluded that the most optimal process for the Facility to use 100% Recycled Water was to upgrade the existing Facility water treatment systems using any one of the three upgrade projects described below:

(i) 100% Makeup Pretreatment Option. This option provides for the pre-treatment of 100% of the Recycled Water supplied to the Facility to remove a considerable portion of the higher amounts of impurities found in Recycled Water before it is used in the Facility's cooling tower. The estimated capital cost for this option is provided in confidential Exhibit B. The estimated schedule for obtaining local permits and approvals, designing, procuring equipment and installing this option is 147 weeks. This schedule allows for 24 weeks to obtain the CEC and environmental permits. Any additional time required to secure those permits will result in a day-for-day increase in total project schedule.

(ii) Side-stream Treatment Option. This option provides for Recycled Water with higher amounts of impurities to be supplied into the cooling tower basin water while concurrently taking a small, constant volume (a "side-stream") of the cooling tower basin water from the basin and treating it to remove a portion of the incremental impurities found in the cooling tower due to the use of Recycled Water. The estimated capital cost of this option is provided in confidential Exhibit B. The estimated schedule for obtaining permits and approvals, designing, procuring equipment and installing this option is 147 weeks. This schedule allows for 24 weeks to obtain the CEC and environmental permits. Any additional time required to secure those permits will result in a day-for-day increase in total project schedule.

(iii) Cooling Tower Blowdown Evaporator Option. This option would replace an existing portion of the Facility's water treatment system that was not designed to remove the increased amount of impurities associated with Recycled Water and replace it with a new evaporator. The new evaporator would be sized to evaporate all of the cooling tower discharge water separating most of the impurities from the evaporated water. The estimated capital cost for this option is provided in confidential Exhibit B. The estimated schedule for obtaining permits and approvals, designing, procuring equipment and installing this option is 164 weeks. This schedule allows for 24 weeks to obtain the CEC and environmental permits. Any additional time required to secure those permits will result in a day-for-day increase in total project schedule.

Kiewit's report noted that the existing Facility site may not be large enough to accommodate the upgrade projects described above and that HDPP may need to acquire additional land. The costs and schedules noted above do not include the time or cost required to acquire or lease additional land.

Confidential Exhibit F provides details on the incremental costs of chemicals, labor, and disposal fees associated with the Facility using 100% Recycled Water. These costs were based on the incremental chemical and waste disposal requirements, the additional staffing required and the incremental Facility energy (auxiliary load) requirements identified in Kiewit's Exhibit B.

2.5 Recycled Water Economic Feasibility.

Condition SOIL&WATER-1 lists very specific economic information required for this Recycled Water Feasibility Study. Some of the requested information is more suited for a regulated investor-owned utility than for independent power producers like HDPP. HDPP is an exempt wholesale generator pursuant to the Federal Energy Regulatory Commission's ("FERC's") regulations and is authorized to sell energy and capacity pursuant to its market-based rate tariff. Unlike a regulated investor-owned utility, HDPP does not have a retail customer base from which it can charge rates based upon a "revenue requirement" that is based upon its costs including a rate of return on investor equity. Rather, HDPP's ability to earn revenues from energy and capacity sales is subject to market forces. HDPP is not guaranteed revenue upon which to recover its costs and to earn a return on its invested capital. Thus, many of the items outlined in Section IV of SOIL&WATER-1are not applicable to HDPP's business structure. In confidential Exhibit D, HDPP provides economic information including information on the availability of revenues to fund major capital projects.

The information provided in Exhibit D dictates two primary conclusions: (1) as a merchant energy generator without the guarantee of long term energy and capacity contracts that provide sufficient revenues to fund large capital expenditures, HDPP is facing economic uncertainty in California's power markets, and (2) based on HDPP's recent historical and future forecasted estimate of cash flows, there are insufficient revenues available from its operations to allow HDPP to fund the large capital expenditures and increased operating and maintenance costs required for HDPP to operate using 100% Recycled Water.

As discussed in Exhibit E, the economic feasibility of Recycled Water use at the Facility is further evaluated against the backdrop of applicable State laws governing the use of recycled water, principally Water Code section 13350. Water Code section 13350 states that the use potable domestic water for nonpotable uses, including industrial uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if recycled water is available which is "of adequate quality for these uses and is available for these uses" and "may be furnished for these uses at a reasonable cost to the user." The determination of whether recycled water is of adequate quality requires consideration of all relevant factors, including the level and types of specific constituents in the recycled water affecting these uses, on a user-by-user basis. (Water Code § 13550 (a)(1).)

Recycled water is of "reasonable cost" when the "cost of supplying the treated recycled water is comparable to, or less than, the cost of supplying potable domestic water," after having considered all relevant factors, including, but not limited to, the "present and projected costs of supplying, delivering, and treating potable domestic water for these uses and the present and projected costs of supplying and delivering recycled water for these uses." (Water Code § 13550 (a)(2).)

The Facility currently uses all Recycled Water that is made available by VWD and VVWRA and that is capable of being used at the Facility with existing infrastructure. The current supply of Recycled Water is not of adequate quality for use at the Facility without blending with higher quality MRB Groundwater and SWP Water.

The costs of further treating additional quantities of Recycled Water such that it is of adequate quality for use at the Facility is significantly higher than the cost of supplying the other sources of water to the Facility. Accordingly, additional Recycled Water may not be furnished for a reasonable cost, and the use of additional Recycled Water at the facility is not mandated by California Water Code section 13550.

2.6 Recycled Water Feasibility Study Conclusions.

Based on the information provided in this report, the Recycled Water Feasibility Study concludes it is not feasible for the Facility to convert to using 100% Recycled Water because:

(i) HDPP's Recycled Water supplier is projected in some years in the future to not have sufficient Recycled Water supply as required to meet the Facility's 4,000 AFY design basis requirement. A reliable water supply for the Facility must be able to meet this annual requirement in order for the Facility to maintain high availability for generating power.

(ii) HDPP's Recycled Water supplier is unable to provide Recycled Water in quantities and qualities required by the Facility on a 24 hours per day, 7 days per week and 12 months per year basis. A reliable water supply for the Facility must be able to meet this instantaneous requirements in order for the Facility to maintain high availability for generating power.

(iii) The Facility's water treatment system cannot operate on a 100% Recycled water supply because the water treatment system was not designed to treat and remove the higher amount of impurities associated with using 100% Recycled Water as required to maintain the amount of impurities in the cooling tower basin water at acceptable levels to control PM10 emissions within the Facility's permitted limits and to protect the Facility's cooling systems and equipment from harmful deposits associated with high amounts of impurities in cooling tower water.

(v) The capital costs to upgrade the water treatment system are extremely high and the costs of further treating additional quantities of Recycled Water so that is of adequate quality for use at the Facility are significantly higher than the cost of the other sources of water to the Facility. Unlike utilities in California who have a retail customer base upon which it can recover the incremental capital and operating and maintenance costs associated with using Recycled Water, HDPP is a merchant generating facility and the amount of revenue it earns to pay for its costs is subject to market forces. Using 100% Recycled Water will not provide HDPP with increased energy or increased capacity revenue opportunities therefore it is not economically feasible for HDPP to incur these additional costs associated with the use of 100% Recycled Water. Accordingly, additional Recycled Water may not be furnished for a reasonable cost and the use of additional Recycled Water at the Facility is not mandated by California Water Code section 13550.

3 HDPP Commitment to Maximize Use of Recycled Water.

HDPP has demonstrated a commitment to maximizing the use of Recycled Water at the Facility. As described above, HDPP was originally prohibited from using Recycled Water and in 2008 and 2009, petitioned and received the CEC's permission to use Recycled Water. From 2009 through the present, HDPP has invested in the costs for permitting, engineering, design and construction of new on-site and off-site infrastructure, upgrades to the Facility's existing water treatment systems, and for third party experts, in seeking to maximize the use of Recycled Water. In 2014, HDPP sought approval from the CEC to modify the Facility to allow it to discharge certain wastewaters to the IWWTP. The volume of discharged wastewaters would be returned by the IWWTP as Recycled Water thereby increasing the amount of Recycled Water available for the Facility's use. In addition, this modification would enable the Facility to treat and bank SWP Water when the Facility is not generating power. Finally, in 2014, HDPP sought and received approval from the CEC to modify the Facility to provide for more effective treatment of cooling tower blowdown water when the Facility is using SWP Water and Recycled Water.

Although this Recycled Water Feasibility Study finds it is not feasible for HDPP to convert the Facility to using 100% Recycled Water, HDPP is committed to using as much Recycled Water as feasible given the limitations on the Facility's existing water treatment system, Recycled Water quantities and quality, Recycled Water delivery infrastructure, and Recycled Water delivery reliability. To this end, in the Petition to Amend that the CEC has required HDPP to file no later than November 1, 2015, HDPP will propose criteria describing how the Facility will maximize use of Recycled Water to the extent feasible.

Exhibit A.
Cardno Entrix Report - Availability and Use of Recycled Water at the High Desert Power Project

FILED CONCURRENTLY WITH AN APPLICATION FOR CONFIDENTIAL DESIGNATION

Exhibit B.
Kiewit Power Engineers Exhibit - Recycled Water Technical Feasibility Study

FILED CONCURRENTLY WITH AN APPLICATION FOR CONFIDENTIAL DESIGNATION

Exhibit C.
Recycled Water Delivery and Use Logs

FILED CONCURRENTLY WITH AN APPLICATION FOR CONFIDENTIAL DESIGNATION

Exhibit D.
HDPP Report - Recycled Water Economic Analysis

FILED CONCURRENTLY WITH AN APPLICATION FOR CONFIDENTIAL DESIGNATION

Exhibit E.
Discussion of the Applicable California Legal Authorities

Exhibit E. Discussion of the Applicable California Legal Authorities

1. Applicable California Legal Authorities.

This section summarizes California regulations related to the use of recycled water by both the supplier, or discharger, (VVWRA, which operates the Shay Road Plant, and VWD, which operates the IWWTP) and the user (HDPP). These regulations are from the California Water Code (CWC), Titles 17, 22, and 23 of the California Code of Regulations (CCR), and the Health and Safety Code. It is State policy to promote the use of recycled water to the maximum extent in order to supplement existing surface and groundwater supplies to help meet water needs (CWC sections 13510-13512). One of the primary conditions on the use of recycled water is protection of public health (CWC sections 13521, 13522, 13550(a)(3)). Recycled water is defined in CWC Section 13050, and reclaimed water is defined in CWC Section 13523; they are synonymous and refer to treated wastewater suitable for reuse.

CWC Section 13523 provides the authority by which the Water Board can prescribe water reclamation (recycling) requirements for users and/or producers of recycled water, following consultation with the California Department of Public Health (CDPH). Title 22 establishes the requirements for recycled water treatment, quality, and allowable use. Approved uses of recycled water under Title 22 depend on the level of treatment, disinfection, and potential for public contact. Title 22 Sections 60301 through 60355 include the California Water Recycling Criteria, which address the following:

(i) Recycled water quality and wastewater treatment requirements for the various types of uses.
(ii) Reliability features required in the treatment facilities to ensure safe performance.
(iii) Use area requirements pertaining to the actual recycled water use location.

Title 17 establishes the requirements for backflow protection of the potable water supply and cross-connection regulations. Title 23 addresses the need for pretreatment programs.

2. VVWRA and VWD (Discharger) Requirements.

VVWRA and VWD, which operate the Shay Road Plant and IWWTP, respectively, are required to produce water that satisfies Title 22 requirements and are responsible for monitoring the quality of the recycled water. If the water quality does not achieve the Title 22 recycled water criteria, VVWRA and VWD are not allowed to provide recycled water for distribution to the HDPP. VVWRA must report any noncompliance with the water recycling requirements to the Water Board, San Bernardino County Department of Public Health, and the CDPH. VWD has similar reporting requirements.

3.1 California Water Code.

The CWC has specific requirements for notifications to the Water Board involving changes in conditions and identifies penalties for failing to provide or falsifying information that apply to both the VVWRA and the VWD.

Section 13267(b) specifies that the Discharger shall immediately notify the Water Board whenever adverse conditions have occurred as a result of discharge (e.g., spills of petroleum products or damage to control facilities that could affect compliance). All sampling and analytical results are to be provided to the Water Board upon request. Additionally, pursuant to CWC

13267(b), the VVWRA must comply with the Monitoring and Reporting Program in Board Order No. R6V-2009-0138 (Water Board 2009). VWD must comply with the Monitoring and Reporting Program specified in Board Order R6V-2014-0002 (Water Board 2014).

Section 13260(c) specifies that any proposed material change in the character of the waste, manner of treatment or disposal, increase of discharge, or location of discharge, shall be reported to the Water Board at least 120 days in advance.

Section 13268 indicates that any person failing or refusing to furnish technical or monitoring reports or falsifying information provided therein is guilty of a misdemeanor and may be liable for civil penalties. Civil liability and criminal penalties also are discussed in the CWC for violations or threatened violations of the Waste Discharge Requirements.

3.2 Title 22, California Code of Regulations.

Recycling criteria are included in Title 22, Sections 60301 through 60355, and the recycled water supplied by the producer (VVWRA and VWD) to the user must meet all requirements of Title 22, Section 60306 (use of recycled water for cooling), and related sections of Title 22. An agreement has been established per Board Order No. R6V-2009-0138 (Water Board 2009) assuring that recycled water from VVWRA to HDPP is delivered and used in conformance with these criteria, which include water recycling specifications, such as maximum instantaneous flow rate, treatment processes and standards, personnel qualifications, contingency planning, preventive maintenance, records and reports, alarms, emergency storage or disposal, and monitoring. Board Order R6V-2014-0002 (Water Board 2014) also includes similar provisions that apply to VWD.

Section 60321 specifies sampling and analysis protocols to be followed. Section 60323 requires the submittal of an Engineering Report to CDPH, and obtaining CDPH approval for the production, distribution, and use of recycled water. An amended Title 22 Engineering Report also would need to be submitted for any changes or expansions of recycled water and must describe how the project will comply with the Title 22 Water Recycling Criteria. These sections are applicable to both the VVWRA and VWD.

3.3 Title 17, California Code of Regulations.

Title 17 focuses on measures to prevent cross-connections and backflow and are applicable to both the VVWRA and VWD facilities.

Section 7585 specifies that the water supplier shall evaluate the degree of potential health hazard to the public water supply, which may be created as a result of conditions existing on a user's premises. The water supplier, however, shall not be responsible for abatement of cross-connections, which may exist within a user's premises. At a minimum, the evaluation should consider the existence of cross-connections, the nature of materials handled on the property, the probability of a backflow occurring, the degree of piping system complexity and the potential for piping system modification.

Section 7601 requires backflow preventers to pass laboratory and field evaluation tests performed by a recognized testing organization, which has demonstrated their competency to perform such tests to the CDPH.

Sections 7602 through 7604 provide standards for backflow preventers, the location of backflow preventers, and the type of protection required to ensure prevention of backflow into the public water supply.

3.4 Title 23, California Code of Regulations.

Under Section 2233(a), the Water Board may require a discharger to have and enforce a pretreatment program. VVWRA produces recycled water from municipal wastewater that has gone through sedimentation, oxidation, coagulation, filtration, and disinfection processes after having passed through screening, primary, and secondary treatment processes to ensure that it meets Title 22 requirements (Water Board 2009).

Per Board Order No. R6V-2014-0002 (Water Board 2014), according to the Report of Waste Discharge, the IWWTP design is for 60 percent of the facility flow from domestic wastewater and 40 percent from industrial wastewater at the SCLA complex. Currently, the largest industrial source to the IWWTP is the Dr. Pepper/Snapple plant. Future industrial sources have yet to be identified. Industrial sources may contribute constituents at concentrations that, if not controlled by the Discharger, will have the potential to pass through or interfere with the facility, and may cause degradation or pollution in the receiving groundwater. Given the need to protect the groundwater resource, Board Order No. R6V-2014-0002 requires the Discharger to have and implement a pretreatment program that may include salinity control methods to achieve the effluent and receiving water limitations specified in the Order.

The U.S. Environmental Protection Agency (EPA) standards for an adequate pretreatment program are specified in 40 CFR 403.9 and are applicable to both the VVWRA and the IWWTP. Section 2233(c) requires an annual report on the effectiveness of the pretreatment program.

3.5 California Health and Safety Code.

Section 116805 states that local health officers may maintain programs, in cooperation with water suppliers, to protect against backflow through service connections into the public water supply, and, with the consent of the water supplier, may collect fees from the water supplier to offset the costs of implementing these programs. Requirements to prevent backflow are applicable to the VVWRA and the VWD.

3.6 State Water Board Resolutions.

State Water Board Resolution 68-18 is the Board's policy statement intended to implement the Legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state (the "Anti-Degradation Policy").

State Water Board's Recycled Water Policy, Resolution 2013-003, establishes a mandate to increase the use of recycled water in California by 200,000 afy by 2020 and by an additional 300,000 afy by 2030 to be achieved through the cooperation and collaboration of the State Water Board, the Regional Water Boards, the environmental community, water purveyors and the operators of publicly owned treatment works. The Policy provides that agencies producing recycled water that is available for reuse and not being put to beneficial use shall make that recycled water available to water purveyors for reuse on reasonable terms and conditions. Such terms and conditions may include payment by the water purveyor of a fair and reasonable share of the cost of the recycled water supply and facilities. The Recycled Water Policy encourages groundwater recharge with recycled water for later extraction and use in accordance with this Policy and state and federal water quality law provided that compliance with the State's Anti-Degradation Policy is demonstrated. Groundwater recharge is consistent with the Anti-Degradation Policy if it complies with the applicable salt/nutrient management plan for the basin or alternative criteria specified in the Recycled Water Policy.

a. HDPP (User) Requirements

3.7 California Water Code.

Section 13550 states that the use potable domestic water for nonpotable uses, including industrial uses, is a waste or an unreasonable use of the water within the meaning of Section 2 of Article X of the California Constitution if the State Water Board finds that recycled water is available which is "of adequate quality for these uses and is available for these uses" and "may be furnished for these uses at a reasonable cost to the user." Recycled water is of adequate quality if, after having considered all relevant factors, including the level and types of specific constituents in the recycled water affecting these uses, on a user-by-user basis. (CWC 13550 (a)(1).) In determining whether recycled water is of adequate quality for the use, the State Water Board shall also consider the effect of the use of recycled water in lieu of potable water on the generation of hazardous waste and on the quality of wastewater discharges subject to regional, state, or federal permits. (CWC 13550 (a)(1).) Recycled water is of "reasonable cost" when the "cost of supplying the treated recycled water is comparable to, or less than, the cost of supplying potable domestic water," after having considered all relevant factors, including, but not limited to, the "present and projected costs of supplying, delivering, and treating potable domestic water for these uses and the present and projected costs of supplying and delivering recycled water for these uses." (CWC 13550 (a)(2).) The Water Board will not mandate the use of recycled water if such use will adversely affect downstream water rights, degrade water quality, or be injurious to plantlife, fish, and wildlife. (CWC 13550 (a)(3).) In making the determination of whether the use of recycled water shall be mandated, the State Board will consider the impact of the cost and quality of the recycled water on the specific individual user. (CWC 13550 (b).

Section 13552.8(a) indicates that any public agency may require the use of recycled water in cooling towers if all of the following requirements are met:

- (i) Recycled water is available to the user and meets the requirements set forth in Section 13550, as determined by the State Board after notice and a hearing.
- (ii) The use of recycled water does not cause any loss or diminution of any existing water right.
- (iii) If public exposure to aerosols, mist, or spray may occur, appropriate mist mitigation or mist control is provided.
- (iv) The person intending to use recycled water has prepared an Engineering Report pursuant to Section 60323 of Title 22 of the CCR.

Therefore, use of recycled water in cooling towers is an approved use and its expanded use would not affect an existing water right or expose the public to mist or spray because appropriate controls are in place. CDPH and the Water Board approved the Engineering Report submitted for the use of a blend of recycled water and treated SWP water for cooling tower makeup water in a letter dated September 24, 2009. An amended Title 22 Engineering Report (approved by the CDPH and the Water Board) must also be submitted for any changes or expansions of recycled water and must describe how the project will comply with the Title 22 Water Recycling Criteria.

The Facility currently uses all recycled water that is made available by VWD and VVWRA and that is capable of being used at the Facility with existing infrastructure. The current supply of recycled water is not of adequate quality for use at the Facility without blending with higher quality MRB Water and SWP water.

Consistent with the Section 13550(a)(1) standard that the State Water Board may require use of recycled water that it is of "adequate quality" and "available" to serve uses at the Facility, this HDPT feasibility analysis examines changes to facilities and processes to improve the quality of the recycled water in order to allow HDPT to use greater quantities of recycled water at the Facility. Consistent with Section 13550(a)(2), additional recycled water "may be furnished for these uses [at the Facility] at a reasonable cost" if the projected costs of treating and delivering additional quantities of recycled water to Facility is comparable to, or less than, HDPT's cost of supplying potable domestic water to the Facility. The potential effects from increased sludge generated from the additional treatment of recycled water (CWC 13550 (a)(1)) and reduced discharge of recycled water to the Mojave River (CWC 13550 (a)(3)) are also relevant factors for evaluating the feasibility of increased use of recycled water at the Facility.

3.8 Title 22, California Code of Regulations.

The use of recycled water for industrial purposes, such as makeup for cooling towers, is specifically permitted by Section 60306 under the following conditions:

a. Recycled water used for industrial or commercial cooling or air conditioning that involves the use of a cooling tower, evaporative condenser, spraying or any mechanism that creates a mist shall be a disinfected tertiary recycled water.

b. Use of recycled water for industrial or commercial cooling or air conditioning that does not involve the use of a cooling tower, evaporative condenser, spraying, or any mechanism that creates a mist shall be at least disinfected secondary-23 recycled water.

c. Whenever a cooling system, using recycled water in conjunction with an air conditioning facility, utilizes a cooling tower or otherwise creates a mist that could come into contact with employees or members of the public, the cooling system shall comply with the following:

   1. A drift eliminator shall be used whenever the cooling system is in operation.

   2. A chlorine, or other, biocide shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other microorganisms.

Such requirements are incorporated into the design and operation of the HDPP, along with detailed specifications described in Board Order No. R6V-2009-0138 (Water Board 2009).

Section 60315 indicates that the public water supply shall not be used as a backup or supplemental source of water for a dual-plumbed recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of sections 7602 (a) and 7603 (a) of CCR Title 17, and approval of the public water system has been obtained.

Section 60316 requires periodic inspections of dual plumbed systems for possible cross connections with the potable water system. The recycled water system shall also be tested for possible cross connections at least once every four years. The recycled water agency shall notify the department of any incidence of backflow from the dual-plumbed recycled water system into the potable water system within 24 hours of the discovery of the incident. Any backflow prevention device installed to protect the public water system serving the dual-plumbed recycled water system shall be inspected and maintained in accordance with Section 7605 of CCR Title 17.

Section 60323 requires the submittal of an Engineering Report to the CDPH for any proposed wastewater reuse; refer to the discussion under Section 7.2.1.

3.9 Title 17, California Code of Regulations.

The sections of Title 17 requiring the prevention of backflow and cross-connection described in Section 7.1.3 are applicable to the HDPP. As discussed under Section 6.2, no cross-connections are possible given the plant's configuration, and the plant is in compliance with all applicable regulations.

3.10 California Health and Safety Code.

Section 116800 states that local health officers may maintain programs for the control of cross-connections by water users, within the users' premises where public exposure to drinking water contaminated by backflow may occur. The programs may include inspections within water users' premises to identify cross-connection hazards and determine appropriate backflow protection. Water users shall comply with all orders, instructions, regulations, and notices from the local health officer with respect to installation, testing, and maintenance of backflow prevention devices. The local health officer may collect fees from those water users subject to inspection to offset the costs of implementing cross-connection control programs. As discussed under Section 6.2, no cross-connections are possible given the plant's configuration, and the plant is in compliance with all applicable regulations.

3.11 State Water Board Resolutions.

State Water Board Resolution 75-58 establishes the Board policy that powerplant cooling water should come from the following sources in this order of priority depending on site specifics such as environmental, technical and economic feasibility consideration: (1) wastewater being discharged to the ocean, (2) ocean, (3) brackish water from natural sources or irrigation return flow, (4) inland wastewaters of low TDS, and (5) other inland waters. The State Water Board will approve an application to appropriate fresh inland surface waters for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Resolution 75-58 also states that the State Board encourages the use of wastewater for powerplant cooling where it is appropriate. A January 20, 2010 letter from the Water Board to the California Energy Commission clarifies that Board Resolution 75-58 does not apply to the use of groundwater, and that the use of recycled water for power plant cooling should be evaluated consistent with Water Code section 13550.

State Water Board Resolution 88-63 declares that all groundwater and surface water of the state are considered suitable for municipal or domestic water supply with the exception of those waters that exceed a TDS of 3,000 mg/L or meet other specified conditions.

Exhibit F.
Impact of 100% Recycled Water Use on Facility Operations and Maintenance Costs

FIILED CONCURRENTLY WITH AN APPLICATION FOR CONFIDENTIAL DESIGNATION

Exhibit G.
Monthly and Annual Energy Production since Becoming Operational

FIILED CONCURRENTLY WITH AN APPLICATION FOR CONFIDENTIAL DESIGNATION

Exhibit H

HDPP Recycled Water Feasibility Study Report in CEC Conditions of Certification Format

Exhibit H
HDPP Recycled Water Feasibility Study Report in CEC Conditions of Certification Format

CEC Feasibility Study Report Requirement	HDPP Response
I Water Supply A. Potential sources of recycled water, its current and projected use, and alternative pipeline routes B. Adequacy of recycled water supplies to meet plant operation demand (provide future projections of supply and demand considering annual volumes, monthly patterns of plant water use vs. availability of water supply, and peak day supply and demand) C. Quality of existing and recycled water supplies Water treatment requirements for existing and recycled water supplies D. Water treatment requirements for existing and recycled water supplies E. Cooling cycles of concentration for existing and potential recycled water supplies	A. See Exhibit A. B. See Exhibit A. C. See Exhibit B. D. See Exhibit B. E. See Exhibit B.
II Cooling & Process Needs A. Consumptive water uses e.g.: cooling tower make-up, evaporation cooling of CTG inlet air, CTG compressor intercooling, and STG condensation; CTG NOx control; CTG power augmentation; boiler water makeup B. Space requirements for additional treatment of recycled water supplies vs. space available on the plant sit C. Water balance diagrams for recycled water use and wastewater discharge for average and peak conditions to include distinctions in using existing vs. recycled water	A. See Exhibit A B. See Exhibit B C. See Exhibit B.

CEC Feasibility Study Report Requirement	HDPP Response
III Wastewater Treatment & Disposal A. Method (existing discharge via sewer system to WWTP, dedicated brine return line, deep well injection, or zero liquid discharge (ZLD) recovery) B. Available capacity & operating limitations	A. Zero liquid discharge. B. See Exhibit B.
IV Economic Costs of Existing Source and Recycled Sources (where applicable) A. Capital Costs 1. water supply lines 2. water supply pumping station(s) 3. well(s) 4. water treatment system 5. wastewater pipeline & facility capacity charge 6. permitting (PM10, Legionella, discharge quality and quantities) 7. Right of Way and Easement acquisitions 8. engineering, procurement, construction inspection and testing 9. biologic surveys/environmental assessment reports B. Annual (operating and maintenance) Costs 1. existing and recycled water purchase cost 2. chemicals (cooling tower & water treatment) 3. labor 4. energy (water supply pumping, water treatment) 5. wastewater discharge fee 6. solids disposal (class of waste, transportation & landfill fees)	A. See Exhibit B. B. See Exhibit F.

CEC Feasibility Study Report Requirement	HDPP Response
IV (cont'd) C. Project Life – Identify project life D. Total Project Cost (base case) E. Installed cost per watt F. Total Annualized Cost – expressed as the uniform end-of-year payment (A/P) of Capital Costs + Annual Costs G. Cost of Capital H. Debt to equity ratio I. Average debt service coverage ratio J. Identify internal rate of return K. Monthly and annual energy production since becoming operational	 C – E. See Exhibit B. F – J. See Exhibit D. K. See Exhibit G.
V. Expected Effects on Electric Customers A. Description of existing electricity rate structure and current rates to customers using existing water source B. Description of expected electricity rates to customers using recycled water over remaining life of the plant	 A. See Exhibit D. B. See Exhibit D.

CEC Feasibility Study Report Requirement	HDPP Response
VI Environmental Considerations for the use of Recycled Water A. Describe the potential effects of recycled water use on the generation of hazardous waste and on the quality of its wastewater discharge B. Describe the potential impacts to public health through the use and discharge of recycled water Describe the potential effects of recycled water use and discharge on the degradation of water quality and its potential to be injurious to plant life, fish, and wildlife. C. Describe potential effects on existing water rights or entitlements D. Describe potential effects on existing water rights or entitlements.	 A. through D. See Exhibit A.
VII. Discussion of applicable California Water Code provisions	See Exhibit E.

ATTACHMENT 12

October 30, 2015 – Project Owner Files Petition for Modification to Drought-Proof the High Desert Power Project

DOCKETED

Docket Number:	97-AFC-01C
Project Title:	High Desert Power Plant (COMPLIANCE)
TN #:	206468
Document Title:	Applicant's Petition for Modification to Drought-Proof the High Desert Power Project
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High Desert Power Project
(97-AFC-1C)
Petition
for
Modification
to
Drought-Proof the
High Desert Power Project

Submitted by

High Desert Power Project, LLC

October 30, 2015

TABLE OF CONTENTS

EXECUTIVE SUMMARY

High Desert Power Project, LLC ("HDPP" or "Project Owner") files this Petition for Modification ("Petition") as directed in the California Energy Commission's ("Commission") September 10, 2014 Order Approving Petition to Amend, and as necessary to bring the Commission's certification for the High Desert Power Plant (the "Facility") up to date with events and circumstances unforeseen by the Commission and the Project Owner's predecessor when the Facility was licensed in May of 2000. Circumstances that were unforeseen by the Project Owner and the Commission have reshaped the water supply landscape for the Facility.

First, in August of 2000, three months after the Commission's certification of the Facility, the California Supreme Court substantially affirmed the Judgment of the Riverside County Superior Court adjudicating the water rights in the Mojave Basin and appointing the Mojave Water Agency ("MWA") to act as the Watermaster to implement the adjudication. Through MWA's leadership, the Mojave Basin has been well-managed, serving as a model for the landmark Sustainable Groundwater Management Act of 2014.

Second, by Memorandum of Understanding ("MOU") dated June 27, 2003 (more than three years after the Commission's certification of the Facility), the California Department of Fish and Wildlife (then California Department of Fish and Game) and 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. This MOU settled, and fundamentally reshaped, how water is used and managed for the benefit of the environment and water users in the Mojave Basin.

Third, starting in 2007, water deliveries from the State Water Project ("SWP Water") 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. As a result — and acting of its own volition — in 2008 HDPP petitioned the Commission to lift the prohibition and allow for the use Recycled Water at the Facility.

Fourth, HDPP and the Commission both shared the reasonable expectations that the local water suppliers would improve their treatment and delivery systems to provide water of sufficient quality and quantity as needed for reliable operations. With respect to Recycled Water, while the local purveyors have made great strides, the quantity and quality of water required has not materialized as anticipated. On average, there may very well be sufficient supplies; however, by definition, no single year is an "average" year and flexible power plants such as the Facility — which California will depend on as it moves toward 50% renewable energy and while eliminating use of imported coal-fired energy and once-through cooling power plants — do not run on "average." Instead, they run in real time meaning they must be capable of varying their output from minimum to maximum on an hourly, daily, monthly and annual basis as required by market conditions. Rather than giving up on Recycled Water supplies materializing, the Petition seeks the flexibility needed to blend other sources of water and to operate the Facility, not on average, but under all energy demand and water supply conditions.

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, or when the Delta Smelt Biological Opinion reshaped the water landscape.

In response to these and other circumstances, HDPP has filed this Petition to drought proof the Facility. As described herein, under normal or even average circumstances, the Facility will need little to no MWA-administered groundwater to efficiently and reliably operate. Moreover, to assure that the Facility will use as much Recycled Water and as little groundwater as feasible, the Petition proposes a "Loading Sequence" for use of various water supplies. Under the Loading Sequence, lower quality water supplies will be used first and preferentially such that Recycled Water is the Facility's primary supply and that SWP Water, Banked SWP Water and MRB Adjudicated Water are the Facility's backup supplies for blending.

To objectively verify the Facility's commitment to implement the Loading Sequence, HDPP will monitor and report on two important water quality parameters: (1) cooling tower blowdown rate and (2) the levels of chloride in the cooling tower water. Specifically, HDPP will continue to maximize use of Recycled Water as the Facility's primary water supply blended with other available water sources in ratios needed to maintain the "CT Blowdown Rate" and the chloride concentration within acceptable levels.

With respect to CT Blowdown Rate, the Facility operators will monitor the actual CT Blowdown Rate and compare it to the CT Blowdown Rate required to maintain cooling water quality within the limits required to maintain permitted cooling tower PM_{10} emissions and to protect the Facility's cooling systems and equipment. With respect to chloride concentrations, when chloride concentration is greater than 980 mg/L, defined as the "Threshold Chloride Concentration," the circulating cooling water is not of acceptable quality. Whenever the actual CT Blowdown Rate is less than the required rate or whenever the cooling water chloride concentration is above the Threshold Chloride Concentration, then blending makeup water using supplies of higher quality is required to maintain compliance with air quality requirements and reliable operations. These two criteria, CT Blowdown Rate and Threshold Chloride Concentration, will ensure that the Facility uses its available water supplies consistent with the Loading Sequence, favoring Recycled Water as much as feasible for blending with other supplies.

Finally, in reviewing the Petition, it will be vitally important for the Commissioners to distinguish between (a) how HDPP expects the Facility to operate versus (b) the permitting flexibility needed to operate this merchant Facility in a competitive marketplace. As discussed in detail in this Petition, the expectation is that only under extreme circumstances will the Facility use MRB Adjudicated Water to operate reliability. Nevertheless, to compete in the marketplace and to ensure the Facility can reliably serve the State of California, HDPP needs the permitting flexibility to respond to the extreme events over which the Facility has no control. Accordingly, HDPP proposes to secure access to groundwater as may be needed under extreme circumstances, limited by using a five year rolling average to account for the annual variability in water quality, quantities, supplies and circumstances beyond its control.

As demonstrated in the Petition, permitting flexibility, tempered with the accountability proposed in revisions to Condition SOIL&WATER-1, is required to drought proof the Facility.

1.0 INTRODUCTION

1.1 Overview of Petition

High Desert Power Project, LLC ("HDPP") operates the High Desert Power Project (the "Facility" or "Project"), an 830 Megawatt ("MW") combined-cycle power plant located in the City of Victorville in San Bernardino County. The Facility was certified by the California Energy Commission ("CEC" or the "Commission") on May 3, 2000, and commenced commercial operations in April 2003.

The Commission's September 10, 2014 Order ("2014 Order") modifying the May 2000 final decision, as amended ("Final Decision"), adopted revisions to Condition of Certification SOIL&WATER-1 and required HDPP to file by no later than November 1, 2015 a petition for modification of SOIL&WATER-1 that will implement reliable primary and backup water supplies, or in the vernacular, "drought-proof" the Facility.[1] In furtherance of the Commission's directive, this 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. Having already spent millions of dollars on securing and maximizing Recycled Water use, implementing additional upgrades required to use 100% Recycled Water is not economically feasible.

Findings presented in HDPP's November 1, 2014 High Desert Power Project Recycled Water Feasibility Study Report (the "Feasibility Report")[2,3] demonstrate that without a more diverse and reliable water supply, the Facility will not be drought-proof in circumstances when currently permitted water sources are not of sufficient quality or quantity to reliably operate the Facility. As the Feasibility Report concludes, "HDPP's Recycled Water supplier is unable to provide Recycled Water in quantities and qualities on a 24 hours per day [basis] on all days of the year as required by the Facility for it to maintain high availability for generating power."[4] Given the potential for inadequate supply, HDPP requires continued access to more than one water supply to drought-proof the Facility.

HDPP has retrofitted the Facility and invested millions of dollars in on-site and off-site capital improvements to maximize the use of Recycled Water (see Section 2.1.3 below). It should also be noted that, as the least expensive source of water, it is in HDPP's financial interest to maximize use of Recycled Water. Why then must the Facility rely on blending water from more than one source to ensure the safe and reliable operation of the Facility? The answer lies in

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[1] TN # 203003. *Staff Analysis of the Proposed Petition to Allow High Desert Power Project to use Alternative Water Supplies.* August 28, 2014, pp. 4, 7, 12-15.

[2] TN # 203306. *High Desert Power Project Recycled Water Feasibility Study Report.* Docketed Date November 3, 2014.

[3] CEC's "*Staff Analysis of the High Desert Power Plant Recycled Water Feasibility Report*" was docketed on October 9, 2015. HDPP's comment and response have not been included in this Petition due to time constraints.

[4] TN # 203306. *High Desert Power Project Recycled Water Feasibility Study Report.* Docketed Date November 3, 2014, p. 5.

both the quantity and quality of Recycled Water required for safe and reliable operation of the Facility.

With respect to Recycled Water *quantity*, and despite HDPP having invested millions of dollars in on-site and off-site capital improvements, the Recycled Water suppliers' treatment and storage facilities do not supply Recycled Water at the sustained flow rates necessary to meet the Facility's maximum water demand.

With respect to Recycled Water *quality*, when constructed the Facility was explicitly prohibited from using Recycled Water and simply cannot operate reliably on a 100% Recycled Water supply. Despite HDPP's investment to use Recycled Water, the results in the Feasibility Report demonstrate that the Facility's water treatment system cannot effectively treat and remove the higher amount of impurities associated with using 100% Recycled Water as required to maintain permitted cooling tower PM_{10} emissions limits and to protect the Facility's cooling systems and equipment. Clogging or "fouling" of the Facility's water treatment filtration systems has occurred with use of Recycled Water requiring mitigation by blending in higher quality water sources.

Further, the Facility's water treatment system was designed to treat SWP Water, which historically has been of higher quality than Recycled Water. The Facility's water treatment system was not designed to remove the greater amounts of impurities found in Recycled Water and, as described in the Feasibility Report, it is not economically feasible to upgrade the water treatment system to reliably treat 100% Recycled Water. Consequently, Recycled Water must always be blended with other water sources.

In recognition of the Facility's need to blend multiple water sources, as well as drought-induced shortages of State Water Project water ("SWP Water"), the Commission in September 2014 approved HDPP's petition to add the use of adjudicated groundwater from the Mojave River basin ("MRB Adjudicated Water," also referred to as "MRB Water Rights" in Condition of Certification SOIL&WATER-1) to the already authorized use of Recycled Water, SWP Water, and SWP Water stored in HDPP's aquifer bank ("Banked SWP Water"). The Commission also ordered HDPP to submit this Petition to "implement reliable primary and backup HDPP water supplies that are consistent with state water policies or an alternate cooling system like dry cooling."

This Petition accomplishes the mandate to implement reliable primary and backup HDPP water supplies through three primary modifications to the Final Decision: (1) prioritizing the use of the different sources of water at the Facility in accordance with State law and policy and other water quality factors (the "Loading Sequence"), such that Recycled Water is the Facility's primary supply and that SWP Water, Banked SWP Water and MRB Adjudicated Water are the Facility's backup supplies for blending; (2) comparing the required cooling tower blowdown rate to the actual rate, as well as monitoring chloride concentration in the circulating cooling water, to objectively determine when backup supplies for blending are required to maintain acceptable cooling tower performance and ensure the reliable operation of the Facility; and (3) obtaining authorization to use MRB Adjudicated Water as a backup water supply with access up to 3,090 acre-feet per year ("AFY") as measured on a 5-year rolling average.

Subsequent to the Commission's 2014 Order to drought-proof the Facility and as discussed herein, HDPP through various engineering and technical evaluations conducted during 2015 has identified the cooling tower blowdown rate ("CT Blowdown Rate", as defined below) and the chloride concentration in the circulating cooling tower water as key factors which can be monitored to provide a scientifically and *objectively verifiable* method to ensure that Recycled Water use is maximized while the Facility is drought-proofed through the blending of water supplies as necessary to maintain acceptable cooling tower performance. With respect to chloride concentrations, when chloride concentration is greater than 980 mg/L, defined as the "Threshold Chloride Concentration," the circulating cooling water is not of acceptable quality.

HDPP restates and affirms its commitment to use as much Recycled Water as feasible. As a merchant-based power plant, HDPP's commitment to use as much Recycled Water at the Facility as feasible is also aligned with its desire to minimize variable expense and use the least cost water supply while satisfying operating conditions in the Facility. In order to satisfy the requirements of the Commission's Order to drought-proof the Facility, HDPP requires access to more than one water supply for backup purposes and the ability to blend supplies with Recycled Water as reliability needs require.

To memorialize its commitment to use as much Recycled Water as feasible, HDPP proposes to use water for cooling and other industrial needs by implementing a "Loading Sequence" which is briefly introduced below and described in more detail in Section 2.4.

HDPP will continue to maximize use of Recycled Water as the Facility's primary water supply blended with other available water sources in ratios needed to maintain the CT Blowdown Rate *and* chloride concentration at levels necessary to reliably operate the Facility, as further described herein. If either the CT Blowdown Rate or chloride concentration indicates that backup sources of water are needed for blending to maintain either at its acceptable level, then the Facility will preferentially seek to follow a defined sequence to blend water of higher quality with Recycled Water.

The Loading Sequence is as follows:

First, Recycled Water, if available, blended with SWP Water, if available and of suitable quality, in ratios needed to maintain the CT Blowdown Rate and keep chloride concentration below the Threshold Chloride Concentration.

Second, Recycled Water, if available, blended with SWP Water, if available and of suitable quality, and/or Banked SWP Water, if available, in ratios needed to maintain the CT Blowdown Rate and keep chloride concentration below the Threshold Chloride Concentration.

Third, Recycled Water, if available, blended with SWP Water, if available and of suitable quality, and/or Banked SWP Water, if available, and/or MRB Adjudicated Water in ratios needed to maintain the CT Blowdown Rate and keep chloride concentration below the Threshold Chloride Concentration.

Finally, While HDPP would endeavor to use the Loading Sequence hierarchy of supplies, the efficient and reliable operation of the Facility may require blending two or more supplies during startup, shutdown, upset conditions, disruptions in water supply, and other abnormal circumstances.

Once the CT Blowdown Rate and chloride concentration have reached acceptable levels, the ratios will be adjusted to maximize Recycled Water use while keeping the CT Blowdown Rate and chloride concentration at acceptable levels.

It is important to note that the water sources listed in the Loading Sequence above are also in rank order of relative cost to HDPP. That is, Recycled Water is the least cost and MRB Adjudicated Water is the highest cost. Consequently, as a merchant-based power plant, the Facility will minimize variable operating expense and preferentially use the least-cost water supply, turning to MRB Adjudicated Water only as the final backup selection.

Continued access to MRB Adjudicated Water will be necessary due to the variability in quantity and quality of Recycled Water and SWP Water. HDPP seeks approval to use MRB Adjudicated Water, limited to an amount not exceeding 3,090 AFY, measured on a five-year rolling average basis. This volume will provide Facility operators with the flexibility to both maintain reliability and drought-proof water supplies in reasonably foreseeable climatic and operating conditions. MRB Adjudicated Water will be purchased by the Facility from the Victorville Water District (“VWD”)[5] under VWD’s adjudicated water right (discussed below). As a condition to use this water source, the fee charged to the Project Owner by VWD (retailer) allows for payment to MWA (State Water Project contractor and wholesaler) to replace MRB Adjudicated Water sold to the Facility on a 2:1 basis, resulting in a net benefit to the Mojave groundwater basin (the “Basin”) through MWA’s replacement water program.

The Project Owner was ordered to file this Petition no later than November 1, 2015 “to ensure that the HDPP is drought proof for the long term.”[6] Approval of this Petition with the proposed language changes to SOIL&WATER-1, as presented in Section 4 of this Petition, will result in HDPP’s use of as much Recycled Water as feasible while also providing HDPP with access to other backup water supplies, appropriately limited, that can be blended to drought-

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[5] The Victorville Water District is a County Water District and subsidiary district of the City of Victorville.
[6] TN # 203003. *Staff Analysis of the Proposed Petition to Allow High Desert Power Project to use Alternative Water Supplies*, p. 4. August 28, 2014.

proof the Facility. HDPP will continue to report all use of water from all sources to the Commission on a monthly basis pursuant to SOIL&WATER-1(b).

1.2 Summary of Environmental Impacts

Section 1769(a)(1)(E) of the Commission's Siting Regulations requires that an analysis be conducted to address any potential impacts the proposed revisions may have on the environment, and measures proposed to mitigate potentially significant adverse impacts. Section 1769(a)(1)(F) requires a discussion of the impact of the proposed revisions on HDPP's ability to comply with applicable laws, ordinances, regulations, and standards ("LORS"). Section 3.0 of this document discusses the potential impacts of the Petition on the environment, as well as a discussion of the consistency of the requested change with LORS. Section 3.0 concludes that the modification proposed in the Petition will be in compliance with all applicable LORS and will not affect the Facility's ability to comply with all applicable LORS, and that there will be no significant adverse environmental impacts associated with this Petition.

1.3 Consistency of Petition with License

Section 1769(a)(1)(D) of the Commission's Siting Regulations requires a discussion of the Petition's consistency with applicable LORS and whether the modification being sought is based on new information that changes or undermines the assumptions, rationale, findings, or other basis of the Final Decision. If the Facility is no longer consistent with the license, an explanation of why the modification should be permitted must be provided. The changes proposed herein are consistent with HDPP's CEC license and relevant LORS. As discussed in more detail in Sections 2.0 and 3.0 below, the proposed modifications do not undermine any basis for the CEC's licensing decision.

2.0 IMPORTANT HISTORY AND DESCRIPTION OF PETITION

2.1 History of HDPP's Voluntary Transition from Use of Surface Water to Maximum Use of Recycled Water.

The information supporting the proposed modification presented in this Petition was not known during the original certification proceeding. As explained below, HDPP has been working diligently since 2008 to secure a drought-proof water supply and to increase Recycled Water use by the Facility. Further, implementation of the Loading Sequence that provides for the blending of multiple water sources when needed is consistent with California law and CEC's preferred water policy to maximize the use of Recycled Water while ensuring grid reliability through a flexible and comprehensive water management strategy.

2.1.1 The Commission's Original Certification Expressly Prohibited the Facility from Using Recycled Water.

In what would most certainly be an anomaly today, the Facility as certified by the Commission in the Final Decision was expressly ***prohibited*** from using Recycled Water and consequently was not designed to operate on 100% Recycled Water. Specifically, the Final Decision limited the Facility to a single water source:

> The Conditions of Certification below require that the High Desert Power Project <u>*use only imported State Water Project water for its cooling needs*</u>.[7]

At the time of the Commission's original approval, the California Department of Fish & Wildlife (then, the California Department of Fish & Game, "CDFG") opposed the use of Recycled Water by the Facility out of concern that reduced discharge of recycled water to the Mojave River would impact riparian vegetation in the Mojave River Narrows.[8]

Two 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, the California Supreme Court substantially affirmed the Judgment of the Riverside County Superior Court adjudicating the water rights in the Basin and appointing the Mojave Water Agency ("MWA") to act as the Watermaster to implement the adjudication, affirming the June 1, 1998 Judgment as to the stipulating parties. Since that time, MWA's leadership has resulted in significant increase in storage and sustainable water conditions in the Alto Subarea where the Facility is located as further described in Section 3.6 below. Moreover, as explained below, MWA manages the Basin as envisioned for all California groundwater basins by the 2014 Sustainable Groundwater Management Act ("SGMA").[9] The SGMA aims at providing the structure and the certainty already provided by the Judgment and MWA. Effective water basin management, similar to that of the Mojave Basin, is the direction the California Legislature envisions that all groundwater basins will move towards in the future under the SGMA.

Second, by Memorandum of Understanding (the "MOU") dated June 27, 2003 (more than 3 years after the Commission's certification of the Facility), the CDFG and Victor Valley Wastewater Reclamation Authority ("VVWRA") agreed that VVWRA would continue to discharge at least 9,000 AFY of Recycled Water to the Mojave River to protect instream resources. The MOU addressed the fish and wildlife resource concerns that caused the Commission to prohibit the Facility from using Recycled Water.

2.1.2 On its Own Initiative, HDPP Petitioned the Commission to Allow the Facility to Use Recycled Water.

Starting in 2007, court decisions under the federal Endangered Species Act have reduced SWP Water delivery from the State Water Project to protect the Delta smelt in the Sacramento-San Joaquin Delta. The reduction in pumping resulted in significantly reduced SWP Water allocations and unreliable SWP Water delivery throughout the state. As a result — and acting of its own volition — in 2008 HDPP petitioned the Commission to use Recycled Water at the

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[7] HDPP Final Decision, May 2, 2000, p. 230 (emphasis added).
[8] *Ibid*., p. 223.
[9] See Water Code § 10720.8(a)(2) exempting the Judgment and MWA from compliance with the SGMA.

Facility. In 2009 the Commission removed the prohibition allowing HDPP to use as much Recycled Water as feasible given the approved equipment capabilities and permit conditions.[10]

From its 2008 request to use Recycled Water to present, HDPP has consistently maintained — and the Facility's operational history demonstrates — that Recycled Water can be used only to the extent it is of sufficient quantity and quality to allow for the reliable operation of the Facility. The 2008 petition noted an important qualifier on the Facility's use of Recycled Water:

> 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 Zero Liquid Discharge ("ZLD") system* to process reclaimed water.[11]

The 2008 petition discussed that the quality of the Recycled Water will have higher specific conductivity and silica content than SWP Water, which will require blending with SWP Water and an increase in cooling tower blowdown, and that greater utilization of Recycled Water could occur only "if additional treatment of the reclaimed water is implemented prior to delivery to the Facility."[12]

As in 2008, HDPP desires to use as much Recycled Water as feasible. However, the Facility's existing water treatment system was not designed to remove the higher amounts of impurities found in Recycled Water and cannot reliably treat 100% Recycled Water. Moreover, upgrades to the water treatment system to use 100% Recycled Water are not feasible as described in the Feasibility Report. Consequently, water from more than one source must be blended with Recycled Water to allow for and to maximize Recycled Water use.

2.1.3 HDPP Has Been Proactive, Investing in Significant and Costly Capital Projects to Maximize the Facility's Use of Recycled Water.

When HDPP entered into its agreement for Recycled Water service with VWD in September 2010, it did so with the reasonable expectation that VWD would supply Recycled Water meeting the contractual water quantity and quality specifications and that no significant capital improvements beyond those required by the agreement would be needed by HDPP to use Recycled Water at the Facility. VWD has not always met the agreement specifications and HDPP has responded by accepting out-of-specification water. HDPP has invested significant

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[10] See SOIL&WATER-1(e).

[11] HDPP 2008 Petition for Modification, p. 1 (emphasis added).

[12] *Ibid*., p. 3: "The quantity of reclaimed water for initial usage in the cooling tower cannot be precisely determined at this time because it will be based on the specific conductivity (which is an indicator of Total Dissolved Solids) of the SWP water as well as the specific conductivity and silica content of the reclaimed water needed to achieve an acceptable blend. Without further treatment of the reclaimed water, HDPP anticipates that the specific conductivity of the reclaimed water will be approximately 25% to 40% higher than average SWP water; consequently, an increase in cooling tower blowdown will be required to meet the PM_{10} air emissions permit conditions. Cooling tower blowdown is ultimately limited by the capacity of the ZLD treatment system."

capital into additional engineering analysis and water treatment facilities to improve Recycled Water use given the varying quality delivered.

Since 2009, HDPP has invested approximately $6.7 million for: (i) multiple engineering and technical evaluations of the Facility's existing water treatment system investigating ways to maximize Recycled Water use for cooling and other industrial purposes at the Facility, and (ii) construction projects both inside and outside of the Facility fence line to obtain and utilize Recycled Water. Table 1 below summarizes the costs to date.

TABLE 1
Costs Incurred to
Maximize Use of Recycled Water

No.	Project Name	Description	Date	Cost
1	Perform Reclaimed Water Study	Study the cost for the Facility water treatment system upgrades to allow plant to run on 100% Recycled Water.	2008-2014	$ 284,659
2	Fund Construction of Recycled Water Delivery Facilities	VWD design, procure and install "outside the Facility fence" Recycled Water delivery piping and facilities.	2009-2011	$ 1,657,375
3	Construct Recycled Water Receiving Facilities	HDPP design, procure and install "inside the Facility fence" Recycled Water piping and facilities.	2009-2011	$ 589,038
4	Conduct Water Treatment Project	Perform various engineering studies, pilot studies, procure and temporarily install test water treatment equipment, to study ways to increase use of Recycled Water at the Facility.	2013	$ 2,469,049
5	Construct Third-Stage Cold Lime Softening System	Add an additional stage of softening to the cooling tower blowdown system to allow for more softening retention time.	2014-2015	$ 1,316,519
6	Construct UV System	Add UV system to cooling tower blowdown system to control organics that contribute to fouling of the micro-filters.	2014-2015	$ 133,184
7	Perform Engineering & Technical Evaluations	Retain engineering and technical consultants to evaluate the Facility water treatment system and recommend options for "drought proofing" the Facility.	2015	$ 244,401
			Total	$ 6,694,225

The capital projects and technical studies presented in Table 1 are complete. They have increased the Facility's ability to use more Recycled Water but they are not sufficient for the Facility to use 100% Recycled Water. With respect to upgrading the Facility's water treatment system such that it could use 100% Recycled Water, the Feasibility Report filed in November 2014 concludes:

> The capital costs to upgrade the water treatment system are extremely high and the costs of further treating additional quantities of Recycled Water so that [it] is of adequate quality for use at the Facility are significantly higher than the cost of the other sources of water to the Facility. Unlike utilities in California who have a retail customer base upon which it can recover the incremental capital and operating and maintenance costs associated with using Recycled Water, HDPP is a merchant generating facility and the amount of revenue it earns to pay for its costs is subject to market forces. Using 100% Recycled Water will not provide HDPP with increased energy or increased capacity revenue opportunities therefore it is not economically feasible for HDPP to incur these additional costs associated with the use of 100% Recycled Water. Accordingly, additional Recycled Water may not be furnished for a reasonable cost and the use of additional Recycled Water at the Facility is not mandated by California Water Code section 13550.[13]

Given these economic realities, efficient and reliable operation of the Facility may require the blending of two or more water supplies to maintain the CT Blowdown Rate and keep chloride concentration below the Threshold Chloride Concentration.

2.2 HDPP 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.

To understand how HDPP intends to drought-proof the water supply for the Facility, given the approved equipment capabilities and permit conditions, it is instructive to focus on the four supplies available to accomplish this objective.

Recycled Water. HDPP has a contract to purchase Recycled Water from the VWD and receives Recycled Water from two sources: (i) VWD's Industrial Wastewater Treatment Plant ("IWWTP") and (ii) VVWRA's Shay Road Plant. Recycled Water is HDPP's preferred supply. However, as described in the Feasibility Report, VWD does not reliably supply Recycled Water in sufficient quantity and quality, and upgrades to the Facility's existing water treatment system that would be required to allow for the use of 100% Recycled Water are not feasible.

SWP Water. HDPP purchases SWP Water under a long term contract with the City of Victorville, which is supplied by MWA, the regional State Water Project contractor. When HDPP was originally certified, SWP Water was envisioned as the primary source of water for the

[13] TN # 203306. *High Desert Power Project Recycled Water Feasibility Study Report.* Docketed Date November 3, 2014, pp 6, 21.

Facility given the prohibition on use of Recycled Water imposed by the Commission. Historically, delivery of SWP Water has been interrupted from time-to-time. In particular, during the current exceptional drought conditions, HDPP received in 2014 just 565 acre-feet ("AF") of the 8,000 AF maximum SWP Water allocation allowed under HDPP's purchase agreement with the City of Victorville, and in 2015 HDPP has been allocated only 2,171 AF.

Banked SWP Water. The Facility has an aquifer banking system ("ABS") that treats and injects SWP Water into the Basin (i.e., the aquifer bank) using a series of four wells located approximately five miles from the Facility. This supply, known as Banked SWP Water, can then be withdrawn for use subject to the limitations set forth in Conditions SOIL&WATER-5 and SOIL&WATER-6. The injected Banked SWP Water mixes with the native groundwater of the Basin. When withdrawn, the quality of Banked SWP Water is indistinguishable from that of the native groundwater, which makes Banked SWP a very high quality water to blend with Recycled Water.

The original Commission Decision imposed the condition that the Facility bank water via injection instead of percolation. Commission staff modeling estimated that the Facility would be able to use injection to bank multiple years of backup supply. It is important to note that *all* of the following conditions must be met in order for the Facility to treat and inject SWP Water: (a) SWP Water must be available from the State Water Project and allocated to HDPP for its use by MWA; (b) the allocated quantity must be in excess of the Facility's operating needs; (c) the SWP Water must meet certain concentration limits pertaining to total dissolved solids and trihalomethane content in order to be banked in the aquifer; and (d) the Facility must be operating and producing heat, or have sufficient residual heat after shut down, in order to provide the thermal energy needed to treat SWP Water for banking. These conditions substantially impair the Facility's ability to bank surplus SWP Water when available and are likely more restrictive than the Commission envisioned in 2000.

MRB Adjudicated Water. On September 10, 2014, the Commission approved a petition allowing HDPP to obtain an alternate water supply from the Basin consistent with the "Judgment After Trial" dated January, 1996, in *City of Barstow, et al. v. City of Adelanto, et al*. (Riverside County Superior Court Case No. 208568) as administered by the MWA as the Watermaster. The Commission's approval to use MRB Adjudicated Water is limited to no more than 2,000 AF in water year 2014/2015 and no more than 2,000 AF in water year 2015/2016. MRB Adjudicated Water is made available to HDPP through an agreement with the VWD (the "Agreement")[14]. The Agreement provides for VWD to supply HDPP with MRB Adjudicated Water under its own adjudicated right in a manner consistent with the CEC requirements. Per the Agreement, VWD may deliver MRB Adjudicated Water to the Facility using the existing ABS infrastructure that conveys Banked SWP Water to the Facility as well as through VWD's Recycled Water delivery system. The term of the Agreement currently extends until September 30, 2016, and may be extended consistent with Commission approval to use MRB Adjudicated Water beyond 2016. Impacts to the Basin from the Facility's use of MRB Adjudicated Water

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[14] *Untreated Water Delivery Service Agreement By and Between Victorville Water District and High Desert Power Trust*. Effective August 18, 2015.

will be mitigated through compliance with the terms and conditions of the Judgment and the Rules and Regulations of the Mojave Basin Area Watermaster. Moreover, as a condition to use this water source, the fee charged to the Project Owner by VWD under the Agreement allows for payment to MWA to replace MRB Adjudicated Water sold to the Facility on a 2:1 basis, resulting in a net benefit to the Basin through MWA's replacement water program.[15]

2.3 HDPP Will Use Objective Criteria to Blend Water Supplies to Maximize the Use of Recycled Water.

Through extensive study, HDPP has identified certain parameters of the Facility's water treatment system which, when not within certain operating ranges, affect how much Recycled Water the Facility can use. The quality of available Recycled Water also determines how much water from other backup water supplies must be blended with Recycled Water for efficient and reliable operations of the Facility and to meet existing permit conditions. As discussed in Section 2.3.1 below, the need to blend Recycled Water with other sources of water will be objectively determined and verified.

2.3.1 Monitoring CT Blowdown Rate Will Objectively Determine Blending Requirements and Maximize the Use of Recycled Water.

Maintaining cooling water quality that is compatible with the Facility's equipment tolerances and permit limits is a fundamental tenet which requires monitoring of the quality of the source waters and adjusting the quality of the circulating water in the cooling tower when needed. There are many dissolved constituents in the cooling water, and the Facility's operators must maintain certain constituents within acceptable ranges to ensure efficient and reliable operations of the water treatment system. The concentrations of these certain constituents are dependent upon the water treatment system performance and changes in source water quality, and may be brought back into balance by blending different source waters of differing quality depending on operational considerations.

The purpose of a cooling tower is to reject heat to the atmosphere. The Facility's cooling tower rejects heat produced during the power generating process that is not otherwise used in the Facility. This heat rejection is accomplished by evaporating a portion of the water that circulates through the cooling tower.

Similar to a tea kettle boiling on a stove that leaves deposits behind, impurities dissolved in the circulating cooling water increase in concentration as water evaporates from the cooling tower, degrading the water quality which is reflected in rising specific conductance (a.k.a., electrical conductivity) of the water. The concentrated dissolved impurities are removed by discharging water from the cooling tower — known as "blowdown" — to the Facility's water treatment system while additional "makeup" water is added to the cooling tower to replenish that which is lost to evaporation and blowdown.

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[15] Teleconference with Kirby Brill, MWA General Manager, on June 4, 2015.

The Facility's water treatment system is zero liquid discharge (i.e., ZLD) and is designed to extract and reuse the maximum amount of water out of every gallon of blowdown discharged from the cooling tower. The water treatment system is a complex process that includes ultraviolet treatment, filtration, softening, microfiltration, reverse osmosis filtration, and crystallization. Failure to remove a sufficient amount of impurities through the water treatment system and through makeup water addition can lead to PM_{10} emissions from the Facility's cooling tower exceeding HDPP's permitted limit, as well as exceeding the processing capabilities and the design tolerances of the Facility's equipment. Treated water is returned to the cooling tower for reuse.

As described above, specific conductance of the cooling water is a measure of *all* dissolved constituents which includes, but is not limited to: chloride, silica, calcium, phosphate, sulfate, and magnesium. The specific conductance of the cooling water is controlled by the volume of blowdown (i.e., the CT Blowdown Rate) and the addition of makeup water to the cooling tower. Specific conductance and CT Blowdown Rate are directly related. That is, increasing specific conductance reflects worsening water quality as the concentration of dissolved constituents increases. If the cooling water quality degrades beyond an acceptable level, then a higher CT Blowdown Rate and/or addition of makeup water of higher quality are required. However, the CT Blowdown Rate is limited by the throughput capability of the water treatment system which is based on the circulating water quality, and the suitability of a water source for use as makeup is based on its quality. CT Blowdown Rate and makeup water quality are therefore related to one another.

One method to monitor the cooling water quality and determine if it is acceptable is to use engineering principles to calculate the CT Blowdown Rate required to maintain cooling water quality, measured as specific conductance, from degrading to unacceptable levels. This mathematical approach (the "CT Blowdown Formula") determines the CT Blowdown Rate required to maintain circulating cooling water quality within acceptable limits and is based on empirical flow and specific conductance data continuously monitored at the Facility.

The required blowdown flow from the cooling tower ("BDF_R") is determined by keeping three operational components of the cooling tower in balance: (i) CT Blowdown Rate, (ii) makeup water addition rate, and (iii) evaporation. This balance is necessary to maintain acceptable quality of the circulating cooling water, measured as specific conductance, by preventing the concentration of dissolved constituents from reaching levels that adversely affect the water treatment system and other equipment. Simply put, if the actual blowdown flow ("BDF_A") leaving the cooling tower is less than the required blowdown flow, then higher quality circulating water in the cooling tower is required for the Facility to meet environmental permit limits and maintain acceptable conditions for the Facility equipment.

All of these principles are condensed into the CT Blowdown Formula which is expressed as follows:

If: $BDF_R > BDF_A$

Then: addition of higher quality makeup water is required to maintain the cooling tower water quality.

Where: BDF_R = Blowdown Flow Required; measured on a 24-hr rolling average basis

BDF_A= Blowdown Flow Actual; measured on a 24-hr rolling average basis

The complete description and derivation of the CT Blowdown Formula is found in Exhibit A to this Petition.

2.3.2 Monitoring the Chloride Concentration Will Objectively Determine Blending Requirements and Maximize the Use of Recycled Water.

Although the Facility continuously monitors specific conductance in the cooling water as a measurement of overall water quality, the concentrations of specific constituents are periodically measured and monitored to ensure the water treatment system will function optimally and the Facility's equipment will not be harmed. For example, chloride above a certain concentration contributes significantly to corrosion of the steam turbine condenser tubing.

For this reason, HDPP proposes to use chloride concentration as a second measurement to ensure the quality of the cooling water is at an acceptable level. When chloride concentration is greater than 980 mg/L, the "Threshold Chloride Concentration," the circulating cooling water is not of acceptable quality and blending makeup water using supplies of higher quality is required. Because the cooling tower's design criteria for chloride is 1,000 mg/L or less, the 980 mg/L Threshold Chloride Concentration provides a prudent safety measure to allow for operational adjustments before concentrations reach levels where corrosion or other damage could occur to the cooling system.

By monitoring and maintaining the CT Blowdown Rate above the rate established by the CT Blowdown Formula and by monitoring and maintaining chloride concentrations below the Threshold Chloride Concentration at acceptable levels by blending suitable makeup water supplies, HDPP operators will be able to maintain cooling water at acceptable qualities and maximize the use of Recycled Water. The water supply or water supplies selected for blending will be based on available quality and quantity of source waters accessible to the Facility, implemented pursuant to the Loading Sequence as described in detail in Section 2.4 below.

2.4 To Effectuate HDPP's Commitment to Use as Much Recycled Water as Feasible, the Facility's Makeup Water Will Be Selected from Available Supplies and Blended Consistent with SOIL&WATER–1 Using the Loading Sequence.

As a condition of approval of this Petition, HDPP will commit to maximize Recycled Water use in a way that is objective and verifiable by operating the Facility under a priority-of-use system (i.e., the Loading Sequence) to select waters on an as-needed basis, in order to minimize use of MRB Adjudicated Water as the fourth and final choice. The proposed Loading Sequence is consistent with the SOIL&WATER-1 conditions and is described as follows:

- *First*, HDPP will continue to maximize use of Recycled Water as the Facility's primary water supply, to the extent it is available and its quality is suitable to maintain cooling tower functions and reliable operation of the Facility, blended with SWP Water, if available and of suitable quality, in ratios that allow the required CT Blowdown Rate to be achieved and the chloride concentration to remain below the Threshold Chloride Concentration.

- *Second*, if monitoring indicates that higher quality backup water is needed to achieve the required CT Blowdown Rate or to reduce chloride concentration to below the Threshold Chloride Concentration, the Facility may next blend in Banked SWP Water, if available, in ratios that allow the required CT Blowdown Rate to be achieved and the chloride concentration to remain below the Threshold Chloride Concentration while maximizing Recycled Water use.

- *Third*, if monitoring indicates that higher quality backup water is needed to achieve the required CT Blowdown Rate or to reduce chloride concentration to below the Threshold Chloride Concentration, the Facility may next blend in MRB Adjudicated Water in ratios that allow the required CT Blowdown Rate to be achieved and the chloride concentration to remain below the Threshold Chloride Concentration while maximizing Recycled Water use. [16]

- *Finally*, while HDPP would endeavor to use the Loading Sequence hierarchy of supplies, the efficient and reliable operation of the Facility may require blending two or more supplies during startup, shutdown, upset conditions, disruptions in water supply, material changes in water supply quality, and other abnormal circumstances.

Once the required CT Blowdown Rate has been achieved and the chloride concentration has dropped below the Threshold Chloride Concentration, Recycled Water will continue to be used in ratios that maximize its use.

It is important to note that the water sources preferentially listed in the Loading Sequence above are also in rank order of relative cost to HDPP. That is, Recycled Water is the least cost and MRB Adjudicated Water is the highest cost. Consequently, as a merchant-based power plant, the Facility will minimize variable operating expenses and use the least-cost water supply, turning to MRB Adjudicated Water only as the final backup selection.

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[16] There may be circumstances when it is advantageous to the long-term reliability of the Facility to increase storage in the aquifer bank by simultaneously treating and injecting SWP Water through the ABS system while using MRB Adjudicated Water conveyed through VWD's Recycled Water delivery system. Such a circumstance may include the opportunity to increase Banked SWP Water storage at year's end before that particular year's allocation expires.

Continued access to MRB Adjudicated Water will be necessary due to the seasonal and annual variability of Recycled Water and SWP Water quality and quantity. Water use modeling (see Section 3.7 below) examined scenarios with SWP Water available and scenarios with major SWP Water outages. Modeling assuming that SWP Water is both available and of suitable quality, as measured by specific conductance less than 670 μS/cm[17], suggests that an expected range of MRB Adjudicated Water use over the next 10-year period could vary from zero to 1,010 AFY in any year if the City of Victorville's Victorville 2 power plant is built; or zero to 704 AFY if the Victorville 2 power plant is *not* built, which the Commission Staff suggested would be the case.[18]

The use of SWP Water alone in the Loading Sequence cannot be relied upon because the specific conductance of SWP Water delivered to the Facility often exceeds 670 μS/cm for extended durations and in any year the quantity of SWP Water available to the Facility is highly variable and is susceptible to complete curtailment in emergency conditions.[19] The most probable emergency conditions that could affect the Facility's SWP Water supply is an extended critical drought affecting the State Water Project system or a catastrophic event that critically disables the State Water Project, such as a large earthquake near the Delta that causes numerous levee failures or an earthquake or landslide damaging the California Aqueduct[20]. Under such emergency conditions, little to no SWP Water may be available for several years. If such an emergency occurs at a time when little to no Banked SWP Water reserves exist and the Facility is operating at design capacity the Facility would require 2,976 to 3,654 AFY of MRB Adjudicated Water if the Victorville 2 is built, and 2,400 to 3,344 AFY if Victorville 2 is *not* built.[21]

To account for the uncertainty in quantity and the variability in quality of SWP Water, HDPP proposes access to MRB Adjudicated Water up to but not exceeding 3,090 AFY, measured on a five-year rolling average basis. This maximum rolling average volume of 3,090 AFY will provide the Facility operators with the flexibility to maintain reliability in reasonably foreseeable climatic and dispatch conditions. This volume was derived using an assumed annual generation amount equivalent to the Facility running 16 hours per day at full load and 8 hours per day at a minimum load and *no* use of SWP Water factored into the Loading Sequence. Exhibit B to this Petition provides additional support and explanation regarding the calculation of this maximum required volume.

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[17] Derived value based on equipment tolerance/design and operational history that supports an acceptable CT Blowdown Rate.

[18] TN # 206321. *Staff Analysis of the High Desert Power Plant Recycled Water Feasibility Report.* Docketed Date October 9, 2015, pp. 6, 7.

[19] See Exhibit C, *Availability and Use of Alternative Water Supplies at the High Desert Power Project.* GSI Water Solutions, Inc., Santa Barbara, California. October 2015.

[20] At the time of submission of this Petition SWP Water was not available to the Facility due to the October 15, 2015 thunderstorm that caused flooding and mudslides that have inundated a portion of the California Aqueduct.

[21] TN # 206321. *Staff Analysis of the High Desert Power Plant Recycled Water Feasibility Report.* Docketed Date October 9, 2015, pp. 6, 7. In the Staff Analysis, Staff suggests that the Victorville 2 project will not be built.

Additionally, the water use modeling included assumptions on future availability of Recycled Water and SWP Water, but future outages of either supply are not predictable. Both supplies are subject to significant interruptions and, accordingly, the Facility requires access to greater quantities of MRB Adjudicated Water as a final backup selection for the purpose of surety of supply.[22] The proposed maximum of 3,090 AFY on a five-year rolling average would provide access to greater than 3,090 AF in a single year should catastrophic outages affect SWP Water availability. The fee charged to the Project Owner by VWD allows for payment to MWA to replace MRB Adjudicated Water sold to the Facility on a 2:1 basis under the Agreement,[23] resulting in a net benefit to the Basin as administered by the Watermaster through MWA's Replacement Water program.

2.5 Necessity of the Proposed Petition

Sections 1769(a)(1)(B) and (C) of the CEC Siting Regulations require a discussion of the necessity for the proposed modifications and whether the modifications are based on information known by the petitioner during the certification proceeding. The proposed modifications are necessary to prevent the Facility from being curtailed and perhaps completely shut down due to drought-related water shortages.

These modifications are necessary due to the significant changed circumstances affecting the water supply available to the Facility during its operational history, none of which were foreseen by the Commission when it originally certified the Facility in May 2000, including:

1. August 2000, three months after Certification of the Facility, the California Supreme Court substantially affirmed the Judgment adjudicating the groundwater rights of the Mojave Basin. The Supreme Court affirmation of the Judgment provided assurances that the Basin will be managed sustainably, assurances that were not confirmed at the time the Commission authorized the Facility to use only SWP Water. Through MWA's leadership, the Mojave Basin has been well-managed, serving as a model for the landmark SGMA of 2014.

2. June 2003, CDFG and VVWRA entered into a Memorandum of Understanding requiring VVWRA to discharge at least 9,000 AFY of Recycled Water to the Mojave River to protect instream resources. The MOU addressed the fish and wildlife resource concerns that caused the Commission to initially prohibit the Facility from using Recycled Water.

3. May 2007, Federal District Court invalidates Biological Opinions authorizing the Central Valley Project ("CVP") and SWP to take Delta smelt and Central Valley runs of chinook salmon, species listed under the

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[22] Such a significant interruption aside from the drought recently occurred in October 2015. MWA notified HDPP on October 22nd that extensive flooding near Hwy 58 caused a mud flow into the aqueduct and the extent of damage would not be assessed for weeks. MWA reported that there would be no/limited pumping for at least two weeks and probably longer, and that MWA would be curtailing deliveries to keep as much water in the pools for customers.

[23] Teleconference with Kirby Brill, MWA General Manager, on June 4, 2015.

Federal Endangered Species Act. An interim remedy imposes minimum Old and Middle River ("OMR") flows in the Delta to protect Delta smelt, the effect of which is to limit CVP and SWP exports.

4. For 2008, the California Department of Water Resources issues a 35% SWP allocation due to dry conditions and Delta smelt protections.

5. August 2008, the Facility petitions for authorization to use Recycled Water supplied by VWD and obtains Commission approval in 2009.

6. December 2008, U.S. Fish and Wildlife Service issues a new Biological Opinion ("BO") finding that the Long-Term Operational Criteria and Plan for coordination of the Central Valley Project and State Water Project is likely to jeopardize the existence of Delta smelt. The Biological Opinion includes measures that affect the timing and reduce the magnitude of CVP and SWP water diversions. Multi-year litigation over the BO commences.

7. February 2011, settlement reached among U.S. Fish and Wildlife Service and operators of the CVP and SWP imposing revised minimum OMR flows to protect Delta smelt.

8. July 2011, Facility receives first deliveries of Recycled Water. Recycled Water was not available April 2012 through June 2013 and September 2013 through January 2014, among other outages.

9. For 2009 through 2012, the California Department of Water Resources issues SWP allocations of 40%, 50%, 80% and 65% respectively.

10. Multi-year drought commencing in 2013 and continuing today, coupled with measures to protect Delta smelt, limits SWP allocations to 35% in 2013, 5% in 2014, and 20% in 2015.

The current exceptional drought, its impacts on the availability of SWP Water, along with other regulatory restrictions that have reduced SWP Water pumping and delivery, and the intermittent nature of Recycled Water service to date were not known at the time of the original certification. Because the quantity and quality of both SWP Water and Recycled Water available to HDPP vary significantly, this Petition is necessary to provide HDPP with the flexibility to utilize different water sources as available, whether individually or combined, as needed to ensure reliable and efficient operation of the Facility.

2.5.1 Recycled Water Can Be Used Only When Blended with Other Waters.

Since the Commission issued its 2009 Order granting HDPP the ability to use Recycled Water, the supply of Recycled Water available to HDPP has been intermittent on a day-to-day basis, has been unavailable for long periods of time, and has been out of specification, not meeting the quality requirements of the Recycled Water service agreement with VWD. In the 2009 Order, HDPP was required to conduct a feasibility study to evaluate the use of 100%

Recycled Water for evaporative cooling purposes and other industrial uses. As presented in the 2014 Feasibility Report, it was determined that it is not feasible for the Facility to operate using 100% Recycled Water for cooling and other industrial purposes because:

(i) The design basis for the Facility's instantaneous water requirement is up to 4,000 gallons per minute ("gpm"), 24 hours per day on all days of the year. A reliable water supply for the Facility must be able to meet both the annual and instantaneous requirements in order for the Facility to maintain a high availability for every hour of every day each year excluding planned maintenance.[24]

(ii) The Recycled Water supply is projected to fall short of the Facility's 4,000 AFY design basis requirement in future years.

(iii) The Recycled Water is not available 24 hours per day on all days of the year in quantities and qualities as required by the Facility to maintain high availability for generating power.[25]

(iv) The Facility's water treatment system cannot operate reliably on a 100% Recycled Water supply because its existing water treatment system was not designed to treat and remove the higher amount of impurities associated with using 100% Recycled Water as required to maintain cooling tower PM_{10} emissions within the Facility's permitted limits and to protect the Facility's cooling systems and equipment from harmful deposits associated with high amounts of impurities in cooling tower water.[26]

(v) Upgrades to the Recycled Water treatment and storage facilities area required to increase the reliability of the quantity and quality of the Recycled Water are not feasible for HDPP to undertake.

These conditions prevent HDPP from relying on Recycled Water as the sole source of water for the Facility. Furthermore, it is unknown how the drought will affect the availability of Recycled Water to HDPP. It is also unknown whether 2015 will mark the end of the current drought cycle or whether it will be another year in this current multi-year drought cycle. In either event, a reasonable expectation is that reduced water usage though conservation and efficiency measures will result in lower inflows to wastewater treatment plants, likely reducing the available supply of water to be recycled.

The Facility's existing water treatment system was designed to treat SWP Water which most often historically has been of higher quality than Recycled Water. The Facility was not

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[24] TN # 203306. *High Desert Power Project Recycled Water Feasibility Study Report*. Docketed Date November 3, 2014, p. 4.
[25] *Ibid.*, p. 20.
[26] *Ibid.*, p. 5.

designed to remove the greater amounts of impurities found in Recycled Water, nor is it feasible to upgrade the treatment system to reliably treat 100% Recycled Water as described in the Feasibility Report. Consequently, Recycled Water must always be blended with other waters when used.

2.5.2 SWP Water is Insufficient in Quantity and Quality to Drought-Proof the Facility.

Due to the pumping restrictions to protect the Delta smelt, coupled with the exceptional drought conditions in northern California, delivery of SWP Water to the Facility has proven to be unreliable. Historically, delivery of SWP Water has been interrupted from time-to-time. However, in 2014, the Facility received just 565 AF of the 8,000 AF maximum SWP Water allocation allowed under HDPP's purchase agreement with the City of Victorville, and in 2015 HDPP was allocated only 2,171 AF. If the drought continues into 2016 and beyond, it is expected the amount of SWP Water delivered to the Facility will continue to be severely diminished.

SWP Water quality varies seasonally, with the SWP Water having higher specific conductance (reflecting worse water quality) during certain runoff events and periodically during the irrigation season. HDPP is limited on its ability to inject SWP Water into its aquifer storage bank based on the total dissolved solids ("TDS") content in the SWP Water. HDPP is prohibited by permit from injecting SWP Water into the aquifer bank when the TDS content is greater than 400 mg/L, and cannot exceed an annual average of 322 mg/L TDS in the injected SWP Water.[27] Generally, for at least several months of each year, SWP Water quality will exceed allowable TDS concentration which prohibits banking, even if SWP Water is available in amounts greater than needed to operate the Facility. This inability to bank SWP Water due to cyclical or seasonal natural water composition changes reduces the amount of storage that HDPP can secure which, in turn, affects reliability of the Facility. The inability of the Facility to bank SWP Water when the Facility is not operating also limits the use of SWP Water as the sole source to drought-proof the Facility.

Additionally, during the times when SWP Water is of lower quality, its effectiveness as a diluent for Recycled Water is diminished which correspondingly reduces the percentage of Recycled Water that the Facility may use.

2.5.3 Access to MRB Adjudicated Water Ensures the Facility's Water Supply Reliability Under All Operating Conditions, Allowing Maximum Use of Recycled Water.

The 2014 Feasibility Report concluded that it is not feasible for the Facility to operate using 100% Recycled Water for cooling and other industrial purposes. Under all sustainable conditions, HDPP has learned through its operating experience that Recycled Water must be blended with SWP Water, Banked SWP Water and/or MRB Adjudicated Water in order to

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[27] *See Conditional Waiver of Waste Discharge Requirements issued to Victorville Water District and High Desert Power Project, LLC.* No. R6V-2012-0012 / WDID No. 6B360105004. Lahontan Regional Water Quality Control Board. March 14, 2012.

operate the Facility. Groundwater is the least variable source in terms of quantity and quality and, when used as a diluent with Recycled Water or SWP Water, provides the greatest assurance of maintaining acceptable cooling tower water quality allowing the Facility's water treatment system to operate most efficiently.

In the event that SWP Water is unavailable or its quality is unsuitable for use in the Facility, and Banked SWP water is unavailable, access to MRB Adjudicated Water is the final source of water that the Facility would draw upon to operate reliably and enable HDPP to maximize use of Recycled Water.

3.0 ENVIRONMENTAL ANALYSIS OF THE PETITION

3.1 Implementing the Loading Sequence is Not a CEQA Project and Can Be Implemented Consistent with Applicable LORS.

Implementing the Loading Sequence will not require new infrastructure or construction of any kind, and will not result in any physical change in the environment. The various water supplies to be obtained will use existing water supply infrastructure to serve the Facility. Implementation of the Loading Sequence is therefore not a "Project" as defined by CEQA because it is neither "an activity [with] the potential to cause direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment."[28]

3.2 Use of MRB Adjudicated Water is Consistent with California Water Law and Policy.

This Petition proposes use of water that is consistent with State energy and water law and policy. A foundational principle of California water law and policy is contained in Water Code section 13550, which states that the use of potable domestic water for nonpotable uses, including industrial uses, is a waste or an unreasonable use of the water if the State Water Board finds that recycled water is available which is "of adequate quality for these uses and is available for these uses" and "may be furnished for these uses at a reasonable cost to the user." When considering whether recycled water is of "adequate quality for these uses and is available for these uses," the State Water Board shall consider all relevant factors, including the level and types of specific constituents in the recycled water affecting these uses, on a user-by-user basis.[29]

Recycled water is of "reasonable cost" when the "cost of supplying the treated recycled water is comparable to, or less than, the cost of supplying potable domestic water," after having considered all relevant factors, including, but not limited to, the "present and projected costs of supplying, delivering, and treating potable domestic water for these uses and the present and projected costs of supplying and delivering recycled water for these uses."[30] The State Water Board will not mandate the use of recycled water if such use will adversely affect downstream water rights, degrade water quality, or be injurious to plantlife, fish, and wildlife.[31] In making

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[28] California Public Resources Code § 21065.
[29] Water Code § 13550, subd. (a)(1).
[30] *Ibid.*, § 13550, subd. (a)(2).
[31] *Ibid.*, § 13550, subd. (a)(3).

the determination of whether the use of recycled water shall be mandated, the State Water Board will consider the impact of the cost and quality of the recycled water on the specific individual user.[32]

The Feasibility Report demonstrates that the Facility's use of Recycled Water and other water sources is consistent with Water Code section 13550.[33] The Facility currently uses all Recycled Water that is made available by VWD and VVWRA and that is capable of being used at the Facility with existing infrastructure. The current supply of Recycled Water is not of adequate quality for use at the Facility without blending with higher quality water. The cost of treatment to use a higher percentage of Recycled Water is economically infeasible for the Facility and is therefore not of reasonable cost under section 13550 because the costs of treating and delivering additional quantities of Recycled Water to the Facility greatly exceed the cost of blending SWP Water, Banked SWP Water and MRB Adjudicated Water. The availability of the other sources of water make it possible for the Facility to use any Recycled Water.

The Loading Sequence implemented by monitoring the CT Blowdown Rate and chloride concentration will ensure that the mandate of section 13550 is met. The Loading Sequence will ensure that Recycled Water is the Facility's primary water supply and that SWP Water, Banked SWP Water and MRB Adjudicated Water are the Facility's backup water supplies that will be used to blend with and increase the utilization of Recycled Water. Monitoring the CT Blowdown Rate and chloride concentration will allow the Facility to objectively determine when sources of water other than Recycled Water are required to maintain cooling tower function and ensure the reliable operation of the Facility.

In addition to consistency with California Law, the blending of water sources using the Loading Sequence is consistent with the Commission's water policies. The most concise and often cited statement of Commission's Water policy is set forth in the 2003 Integrated Energy Policy Report ("IEPR")"

> Consistent with the [State Water] Board policy [Resolution 75-58] and the Warren-Alquist Act, the Energy Commission will approve the use of fresh water for cooling purposes by power plants which it licenses only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound." Additionally, as a way to reduce the use of fresh water and to avoid discharges in keeping with the Board's policy, the Energy Commission will require zero-liquid discharge technologies unless such technologies are shown to be "environmentally undesirable" or "economically unsound." The Energy Commission interprets "environmentally undesirable" to mean the same as having a "significant adverse environmental

[32] *Ibid.*, § 13550, subd. (b).
[33] See Feasibility Report, Exhibit E.

impact" and "economically unsound" to mean the same as "economically or otherwise infeasible."[34]

The 2003 IEPR further states, "'Feasible' is defined under the CEQA as meaning 'capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social and technological factors.' (Cal. Code Regs., tit. 14, § 15365.) The same definition exists in the Energy Commission's siting regulations. (See Cal. Code Regs., tit. 20, § 1702(e).)"[35]

The Feasibility Report demonstrates that it is "economically or otherwise infeasible" to construct additional capital facilities to allow the Facility to run on 100% Recycled Water — even assuming that the problems with water supply quantity could be resolved at all times. This is because the Facility's treatment system was not designed to treat and remove the higher amount of impurities associated with using 100% Recycled Water as required to maintain cooling tower PM_{10} emissions within the Facility's permitted limits and to protect the Facility's cooling systems and equipment from harmful deposits associated with high amounts of impurities in cooling tower water. Moreover, there are no "significant adverse environmental impacts" associated with the Loading Sequence implemented by monitoring the CT Blowdown Rate and chloride concentration. Finally, the Facility is a ZLD facility, consistent with the 2003 IEPR's mandate that requires "zero-liquid discharge technologies unless such technologies are shown to be 'environmentally undesirable' or 'economically unsound.'"

3.3 Extending the Existing Authorization to Use MRB Adjudicated Water Requires No New Infrastructure, Is Not a CEQA Project, and Can Be Implemented Consistent with Applicable LORS.

Use of MRB Adjudicated Water is not a "Project" as defined by CEQA because it is neither "an activity [with] the potential to cause direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment."[36] Moreover, the use of the various water supplies through the 2015/2016 water year for blending has been reviewed and approved by the Commission and found to be in compliance with applicable LORS.

3.4 Implementing the Loading Sequence Will Result in No Net Change In Mojave River Basin Supply.

Because the Basin is a closed system, the different sources of water used within the Basin are fungible and all contribute to the Basin supply. SWP Water surplus not needed to supply the demand of MWA's contractors including the Facility is percolated by MWA to recharge the Basin. Likewise, if the Facility is not operating and cannot inject SWP Water into the Basin, the SWP Water not injected by the Facility could be recharged or otherwise beneficially used by MWA through alternate means. Similarly, Recycled Water from the IWWTP not immediately used by the Facility is percolated into the Basin at a percolation pond.[37] Recycled Water surplus

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[34] 2003 IEPR, p. 41.
[35] *Ibid.*, p. 41, fn. 64.
[37] *New Waste Discharge Requirements and Revised Water Recycling Requirements for the City of Victorville Water District Industrial Wastewater Treatment Plant and Victor Valley Wastewater Reclamation Authority, City of*

to the recharge capacity of the percolation pond is applied to the Westwinds Golf Course for irrigation, and a considerable portion after evapotranspiration will percolate into the Basin.

3.5 The Judgment Mitigates *All* Use of MRB Adjudicated Water to Below the Level of Significance.

HDPP's use of MRB Adjudicated Water consistent with the Loading Sequence will not adversely affect groundwater resources because the Judgment, as implemented by MWA as Watermaster, mitigates adverse effect of *all* groundwater use to a level that is less than significant as described herein.

MWA serves as Watermaster of the Mojave River stream system and the Basin on the appointment of the Court.[38] MWA's responsibilities include, among other things, annual monitoring and reporting on Basin conditions, management of Basin safe yield through enforcement of pumping limits, and importation of surface water from the State Water Project to replace pumped groundwater.[39] The Judgment was substantially affirmed by the California Supreme Court in August 2000, shortly *after* HDPP was licensed by the Commission.[40] The Superior Court of Riverside County maintains continuing jurisdiction over the Judgment. The Judgment adjudicated the water rights to the Basin and affirmed a physical solution to appoint a Watermaster to balance withdrawals (pumping) and recharge to maintain the safe yield of the Basin.

The Judgment has significantly reduced historic groundwater pumping and has established a mechanism to ensure that future groundwater production is maintained within the safe yield. The Judgment mitigates the effects of groundwater withdrawal by the following primary methods:

- Assigning each adjudicated water right a "Base Annual Production," or "BAP," in AF per water year (October 1 through September 30);[41]

- Establishing a "Free Production Allowance" ("FPA"), which is the percentage of the BAP that can be pumped within the water year without payment of a pumping charge;[42]

- Allowing a right holder to delay, or carry over, a FPA to a subsequent water year ("Carry Over");[43]

Victorville. No. R6V-2014-0002 / WDID No. 6B360911001. Lahontan Regional Water Quality Control Board. January 9, 2014.

[38] Judgment, ¶¶ 4(nn); 23(c).

[39] *See generally* Judgment, ¶¶ 24-29.

[40] *City of Barstow v. Mojave Water Agency* (2000) 23 Cal.4th 1224.

[41] Judgment, ¶ 4(g).

[42] *Ibid.*, ¶ 4(k)).

[43] *Ibid.*, ¶ 4(i).

- Imposing an obligation to pay for "replacement water" for any water pumped in excess of the FPA ("Replacement Water Assessments"), which is used by MWA to acquire SWP Water and other supplies to recharge the Basin;[44]

- Directing MWA to maintain the Basin in safe yield by recommending annual adjustments to the FPA and by importing SWP Water and other supplies to replace pumped water in excess of the native safe yield;[45]

- Authorizing MWA to recommend adjustments to the Replacement Water Assessments for each subarea each year.[46]

MWA has recommended, and the court has approved, FPAs tailored to the specific water uses and hydrologic conditions of each subarea. In the Alto Subarea where the Facility is located, MWA has reviewed hydrological conditions and set the FPA at 60% for industrial water use and 80% for agricultural use in recognition of differences in return flows from different types of water uses.

The Replacement Water Assessment provision of the Judgment and MWA's State Water Project contract allows MWA to successfully maintain groundwater levels within the operational range established for the Alto Subarea and build water supply surplus in the Basin. MWA uses the Replacement Water Assessments to acquire surplus SWP Water available in above normal years and other water supplies for percolation into the Basin.[47]

The Judgment encourages efficient use of water by allowing for the transfer of groundwater production rights from one user to another. Water rights can be transferred on an annual basis or permanently within each subarea at any location within the subarea upon notice to MWA and compliance with applicable terms and conditions.[48] The transfer of groundwater production rights will also be subject to a BAP adjustment (reduction) by MWA to not cause an increased consumptive use of water.[49] The consumptive use adjustment for industrial use is determined by MWA on a case-by-case basis. The effect of the consumptive use adjustment is to permanently retire some portion of the BAP, thus reducing the total amount of groundwater production that is not subject to Replacement Water Assessments.

The Judgment allows any person or entity within the Basin, including HDPP, to intervene to become a Party to the Judgment by executing a stipulation with MWA.[50] Once a Party, HDPP can acquire existing BAP and FPA groundwater production rights adjudicated under the

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[44] *Ibid.*, ¶¶ 4(dd), 24(g) 4(ee), 25(b), 27, 28.
[45] *Ibid.*, ¶¶ 9(a), 24(g), 24(o), 27.
[46] *Ibid.*, ¶¶ 9(b), 27(b).
[47] Note that MWA recharges raw SWP Water by percolation, and does *not* believe that treatment and injection required by the Commission for the Facility is necessary.
[48] *Ibid.*, ¶ 24(n), 24(r), 34; Ex. F, ¶ 2.
[49] *Ibid.*, ¶ 24(q), Ex. F, ¶ 2.
[50] Judgment, ¶ 40.

Judgment or HDPP can pay applicable Replacement Water Assessments without acquiring existing groundwater production rights.

MWA may also adjust the FPA of an existing right to account for changes in consumptive use. As discussed, HDPP has contracted to purchase MRB Adjudicated Water from VWD under its water right and has not sought to become a party and acquire its own rights under the Judgment at this time. The MWA has evaluated the Facility's use of water under VWD's water right and has assigned Replacement Water Assessments on a 2:1 replacement ratio.[51]

3.6 There is No Groundwater Overdraft in the Alto Subarea Where the Facility Is Located.

The Facility is located in the Alto Subarea of the Basin. Each of the five subareas is managed separately due to their unique hydraulic characteristics and water demands. MRB Adjudicated Water used by the Facility would be pumped from, and put to beneficial use in, the Alto Subarea.

Since at least 1996, overdraft in the Alto Subarea has been eliminated because this portion of the Basin has been successfully operated within its desired Operating Range.[52] Per the Watermaster: "Conservation, importation of State Water Project water, MWA's 'R-cubed' program, and implementation of the Judgment have resulted in hydrologic balance in Alto. The water supply conditions in Alto Subarea are sustainable."[53]

As discussed above, the Judgment was substantially affirmed by the California Supreme Court in August 2000, shortly *after* the Facility was licensed by the Commission. The physical solution employed by MWA as Watermaster has resulted in increased storage in the Alto Subarea over time. In fact, since HDPP operations began in 2003, Alto Subarea groundwater storage has increased approximately 140,000 AF and groundwater levels have remained in the Operating Range (above levels considered to be of concern) since at least 1996.[54] FPA rampdown in the Alto Subarea is 60% of BAP where it has remained since 2005. The FPA reduction has resulted in the purchase of Replacement Water as part of the physical solution which, in part, maintains the long-term sustainability of the Alto Subarea.

3.7 VWD has Existing Legal Authorization to Serve MRB Adjudicated Water to the Facility.

VWD has existing legal authorization to pump MRB Adjudicated Water for the Facility. VWD will pump groundwater to meet future demands of the Facility under VWD's existing adjudicated water right and in compliance with the Judgment and Rules and Regulations of the Watermaster.

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[51] Teleconference with Kirby Brill, MWA General Manager, on June 4, 2015.
[52] *Twenty-First Annual Report of the Mojave Basin Area Watermaster – Water Year 2013-2014. May 1, 2015.* Figure 3-17.
[53] *Ibid*., p. 35 (emphasis added).
[54] *Ibid*., Figure 3-17.

3.8 The Facility's Use of MRB Adjudicated Water Will Have a *De Minimis* Effect on Water Supplies in the Basin.

The Facility began commercial operations in April 2003. From 2004 to 2014 the Facility's average annual energy production was 3.91 MMWh and ranged from a low of 1.87 MMWh in 2011 to a high of 4.89 MMWh in 2012. The Facility's generation profile with corresponding estimated water demand is provided below in Table 2.

TABLE 2
Generalized Water Demand Profile

MMWh[(a)]	AFY
0.64	500
1.28	1,000
1.92	1,500
2.56	2,000
3.21	2,500
3.85	3,000
4.49	3,500
5.13	4,000[(b)]

[(a)] Million Megawatt Hours
[(b)] Design basis requirement

The Facility has demonstrated the ability to use Recycled Water for certain durations by blending various percentages with SWP Water or groundwater or both, depending on operating conditions, water qualities, current equipment capabilities, and permit conditions.[55] Due to the uncertainty in quantity and quality of SWP Water to allow for either direct use or aquifer banking, the use of MRB Adjudicated Water called upon under the Loading Sequence could occur. If it did, such use would have a *de minimis* effect on the water supplies of the Basin under any foreseeable condition.

GSI Water Solutions, Inc. ("GSI")[56] evaluated the water supplies available to HDPP and the role each may play in drought-proofing the Facility. GSI conducted investigations to determine the amount, availability, and reliability of each alternative water supply source set forth in the Loading Sequence. Using reasonably foreseeable assumptions over the next 10-year period, in conjunction with data gathered during the feasibility study period as ordered by the

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[55] Percentages based on the changing quality of both Recycled Water and SWP Water since Recycled Water use began in July 2011. However, assumptions in the water use model set the lower limit of Recycled Water at 20% when *either* SWP Water or groundwater is used as diluent, which has generally but not always been possible because, in some instances, SWP Water cannot effectively be used as a diluent because its poor quality, as reflected in its specific conductance, interferes with the operability of the Facility's water treatment equipment.
[56] GSI Water Solutions, Inc. is a consulting engineering firm specializing in water resource planning. www.gsiwatersolutions.com/

Commission, GSI analyzed the annual amount of MRB Adjudicated Water that the Facility could be expected to use based on the Loading Sequence described in Section 2.3.2 above.

Two base water supply scenarios were evaluated by GSI: (1) one scenario was modeled with the Victorville 2 Hybrid power plant ("VV2") built, operating, and using its full 3,150 AF each year as approved by the Commission which provides a conservative analysis on the Facility's impact on water supply in the Basin,[57] and (2) the other scenario *without* VV2's hypothetical full demand incorporated into the calculations providing a more realistic evaluation, which the Commission Staff suggested would be the case.[58] Each base scenario was evaluated under Best case (wet climatic period), Average case (average climatic period), and Worst case (dry climatic period) conditions over the next 10 years with SWP Water available over a range of hydrologic conditions and without SWP Water available due to failure of Delta levees, California Aqueduct or other emergency. Table 3 provides a summary of the Facility's projected use of MRB Adjudicated Water based upon quantitative estimates of Best case, Average case, and Worst case conditions over the next 10 years with SWP Water available:[59]

TABLE 3
Summary of
Modeled Annual Average Use of
MRB Adjudicated Water with SWP Water Available
2015 - 2024 (AFY)

	Without VV2[60]			With VV2[61]		
	Water Supply Conditions					
Generation (MMWh)	Best	Average	Worst	Best	Average	Worst
0.64	0	0	0	0	0	0
1.28	0	0	0	0	0	0
1.92	0	0	31	0	0	31
2.56	0	0	128	0	0	175
3.21	0	0	225	0	0	544
3.85	0	0	330	0	46	775
4.49	0	0	488	0	86	842
5.13	0	0	704	0	136	1,010

57 To maximize conservatism of this scenario, the model assumes that VV2's full use of 3,150 AFY of available Recycled Water would be served first, otherwise there would be no modeled difference between the two scenarios.
58 TN # 206321. *Staff Analysis of the High Desert Power Plant Recycled Water Feasibility Report.* Docketed Date October 9, 2015, pp. 6, 7.
59 *Availability and Use of Alternative Water Supplies at the High Desert Power Project.* GSI Water Solutions, Inc., Santa Barbara, California. October 2015.
60 The model assumes that Banked SWP Water would be depleted of usable storage (i.e., 1,000 AF remaining) before using MRB Adjudicated Water under this scenario *without* VV2.
61 The model assumes that Banked SWP Water would be depleted of usable storage (i.e., 1,000 AF remaining) before using MRB Adjudicated Water under this scenario *with* VV2.

If the SWP Water supply is completely curtailed due to critical drought on the State Water Project system or a catastrophic event that critically disables the State Water Project and if such an emergency occurs at a time when little to no Banked SWP Water reserves exist and the Facility is operating at design capacity, the Facility would require 2,976 to 3,654 AFY of MRB Adjudicated Water if the Victorville 2 is built, and 2,400 to 3,344 AFY if Victorville 2 is not built. If Recycled Water and SWP Water are both not available during an emergency situation, the Facility would be forced to rely exclusively on MRB Adjudicated Water and under these conditions and while operating at design capacity the Facility would require 4,000 AFY of MRB Adjudicated Water.

Production safe yield of the Alto Subarea is 69,862 AFY.[62] Accordingly, under worst case water conditions *with* VV2 built and operating, the projected use of MRB Adjudicated Water (1,010 AFY) would have a *de minimis* effect on the Basin resulting in:

a) Less than 0.5% of the Alto Subarea safe yield groundwater during average climatic conditions when operating at high capacity and with SWP Water available,

b) Less than 2% of the Alto Subarea safe yield in extreme dry periods when operating at high capacity and with SWP Water available,

c) Less than 6% of the Alto Subarea safe yield during the highly unlikely combination of a complete State Water Project outage with zero availability of Recycled Water (i.e., emergency conditions), providing the full design basis demand of 4,000 AFY, and

d) Less than significant (negligible) hydraulic stress on the aquifer due to infrequent pumping.

3.9 The Facility's Use of MRB Adjudicated Water Has Less Than Significant Adverse Effect Due to 2:1 Replacement Water Requirement.

As discussed above, the Judgment and Watermaster adjustment of FPA and imposition of Replacement Water Assessments mitigates *all* groundwater use in the Basin to a level that has less than significant adverse effect, including VWD pumping under its existing water right on behalf of the Facility. Moreover, in all operating conditions the fee charged to the Project Owner by VWD under the Agreement requires payment to MWA to replace MRB Adjudicated Water sold to the Facility on a 2:1 basis,[63] resulting in a net benefit to the Basin through MWA's replacement water program.

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[62] *Twenty-First Annual Report of the Mojave Basin Area Watermaster – Water Year 2013-2014. May 1, 2015.* pg. 34.
[63] Teleconference with Kirby Brill, MWA General Manager, on June 4, 2015.

4.0 REVISIONS TO CONDITIONS OF CERTIFICATION

Approval of this Petition with modest language changes to SOIL&WATER-1 will result in HDPP's use of as much Recycled Water as feasible, while also providing HDPP with access to other water supplies, appropriately limited, that can be blended to drought-proof the Facility. HDPP has developed a monitoring program to provide an *objectively verifiable* method to ensure that Recycled Water use is maximized while the Project is drought-proofed through the blending of water supplies as necessary to maintain reliable function of the water treatment system.

In summary, the Facility's water usage when implementing the Loading Sequence:

(1) Has no adverse environmental or hydrologic effect on the Basin.

(2) Benefits the Basin by providing for net gain in storage.

(3) Ensures electric generation reliability in the region under all operating conditions.

(4) Is consistent with Commission energy and water use policy.

For the reasons stated herein, HDPP requests that the Commission revise SOIL&WATER-1 as follows:

Proposed additions are shown in **bold underline** and deletions in ~~strikethrough~~.

SOIL&WATER-1

Water used for project operation (except for domestic purposes) shall be State Water Project (SWP) water obtained by the project owner consistent with the provisions of the Mojave Water Agency's (MWA) Ordinance 9 and/or appropriately treated recycled waste water, and/or an alternative water supply obtained from the Mojave River Basin ("MRB") consistent with the "Judgment After Trial" dated January, 1996, in City of Barstow, et al. v. City of Adelanto, et al. (Riverside County Superior Court Case No. 208568) (collectively, "MRB Water Rights") as administered by the MWA Watermaster (the "Judgment").

a. Whenever recycled waste water of quality sufficient for project operations is available to be purchased from the City of Victorville, the project owner shall use direct delivery of maximum quantities of such water for project operations. Whenever the quantity or quality of recycled waste water is not sufficient to support project operations, the project may supplement recycled water supplies with SWP water, banked SWP water from the four HDPP wells as long as the amount of water used does not exceed the amount of water determined to be available to the project pursuant to SOIL&WATER-5, and/or MRB Water Rights. The Project Owner shall consume no more than **3,090** AF **per calendar year (January 1 to December 31), calculated on a five-year rolling average.** ~~in water year 2014/2015 (October 1 2014 September 30, 2015) and no more than 2,000 AF in water year 2015/2016 (October 1, 2015-September 30, 2016)~~ **Use** of MRB Water Rights and the acquisition, use ~~and~~ **or** transfer of MRB Water Rights shall be in compliance with the

Judgment and Rules and Regulations of the MWA Watermaster. At the project owner's discretion, dry cooling may be used instead, if an amendment to the Commission's decision allowing dry cooling is approved.

b. The project owner shall report all use of water from all sources to the Energy Commission CPM on a monthly basis in acre-feet.

~~c. The 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.~~

~~d. (Item Deleted)~~

~~e.~~ <u>c.</u> The project's water supply facilities shall be appropriately sized and utilized to meet project needs. The project shall make maximum use of recycled waste water for power plant cooling given current equipment capabilities and permit conditions.

~~f. The project owner shall continue with the feasibility study evaluating the use of 100 percent recycled water for evaporative cooling purposes and other industrial uses. The feasibility study shall be completed by the project owner and submitted to the CPM.~~

<u>Verification:</u>

* * *

<u>The Project Owner shall operate the project to maintain the required cooling tower blowdown rate (CT Blowdown Rate) based on the CT Blowdown Formula and to maintain chloride concentration at or below 980 mg/L (Threshold Chloride Concentration) in the circulating cooling tower water. When the required CT Blowdown Rate is less than the actual blowdown rate as determined by the CT Blowdown Formula, or when the chloride concentration cannot be maintained at or below the Threshold Chloride Concentration, the Project Owner shall implement a “Loading Sequence” (described in more detail below):</u>

<u>First, HDPP will continue to maximize use of Recycled Water as the Facility’s primary water supply, to the extent it is available and its quality is sufficient to maintain cooling tower functions and reliable operation of the Facility, blended with SWP Water, if available and of suitable quality, in ratios that allow the required CT Blowdown Rate to be achieved and the chloride concentration to remain below the Threshold Chloride Concentration.</u>

<u>Second, if monitoring indicates that higher quality backup water is needed to achieve the required CT Blowdown Rate or to reduce chloride</u>

concentration to below the Threshold Chloride Concentration, the Facility may next blend in Banked SWP Water, if available, in ratios that allow the required CT Blowdown Rate to be achieved and the chloride concentration to remain below the Threshold Chloride Concentration while maximizing Recycled Water use.

Third, if monitoring indicates that higher quality backup water is needed to achieve the required CT Blowdown Rate or to reduce chloride concentration to below the Threshold Chloride Concentration, the Facility may next blend in MRB Water Rights in ratios that allow the required CT Blowdown Rate to be achieved and the chloride concentration to remain below the Threshold Chloride Concentration while maximizing Recycled Water use.

Finally, while HDPP would endeavor to use the Loading Sequence hierarchy of supplies, the efficient and reliable operation of the Facility may require blending two or more supplies during startup, shutdown, upset conditions, disruptions in water supply, material changes in water supply quality, and other abnormal circumstances.

Once the required CT Blowdown Rate has been achieved and the chloride concentration has dropped below the Threshold Chloride Concentration, Recycled Water will continue to be used in ratios that maximize its use.

The Project Owner shall consume no more than 3,090 AF of MRB Water Rights per calendar year (January 1 to December 31), calculated on a five-year rolling average. The Project Owner shall report both on a calendar year quarterly basis and on an annual basis in the Annual Compliance Report the following:

- Recycled Water used (acre-feet),
- SWP Water used (acre-feet),
- Banked SWP Water used (acre-feet), and
- MRB Water Rights used (acre-feet).

In addition, if the use of MRB Water Rights reaches 1,500 AF in any one calendar year, the Project Owner shall both (i) provide the CPM with notice that 1,500 AF of MRB Water Rights has been consumed thus far in the calendar year, within ten calendar days of reaching the 1,500 AF level and (ii) provide on a monthly basis thereafter until the end of the calendar year a report on AF of MRB Water Rights consumed during each month following the notice.

5.0 POTENTIAL EFFECTS ON THE PUBLIC

Consistent with CEC Siting Regulations Section 1769(a)(1)(G), this section discusses the potential effects on the public of the modifications proposed in the Petition. The modifications proposed in the Petition will have no significant impacts on the environment, and will be in compliance with all applicable LORS and Conditions of Certification. Accordingly, there will be no adverse impacts on the public associated with this Petition.

6.0 LIST OF PROPERTY OWNERS

CEC Siting Regulations Section 1769(a)(1)(H), requires a list of the property owners potentially affected by the proposed modifications. All property within a mile of the Facility is part of the Southern California Logistics Airport ("SCLA") property, the former George Air Force Base.

7.0 POTENTIAL EFFECTS ON PROPERTY OWNERS

Consistent with CEC Siting Regulations Section 1769(a)(1)(I), this section addresses potential effects of the Petition on nearby property owners, the public, and parties in the application proceeding. There will not be any significant impacts to nearby property owners and the public. Nearby businesses will not be impacted.

EXHIBIT A

Derivation of Cooling Tower Blowdown Formula

DEFINITIONS

BDF_A	Blowdown Flow Actual, measured as an hourly average (gpm)
BDF_R	Blowdown Flow Required, (gpm)
BD_C	Blowdown Conductivity, measured as an hourly average (μS)
RW_F	Recycled Water Flow, measured as an hourly average (gpm)
RW_C	Recycled Water Conductivity, measured as an hourly average (μS)
CW_F	Clarified Water Flow, measured as an hourly average (gpm)
CW_C	Clarified Water Conductivity, measured as an hourly average (μS)
$EVAP_F$	Evaporation Rate (gpm)
$EVAP_C$	Evaporation Conductivity (μS)
CT_{L1}	Cooling Tower Basin Level, measured at the top of the hour (%)
CT_{L2}	Cooling Tower Basin Level, measured at the bottom of the hour (%)
DCT_L	Differential Cooling Tower Basin Level (%)
DCT_F	Differential Cooling Tower Basin Flow, calculated as an hourly average (gpm)
MU_F	Total flow of all cooling tower makeup water sources (gpm)
MU_C	Weighted average conductivity of all cooling tower makeup water sources (μS)
COC	Cycles of Concentration defined as BD_c / MU_c.

DERIVATION OF BLOWDOWN FLOW REQUIRED (BDF_R)

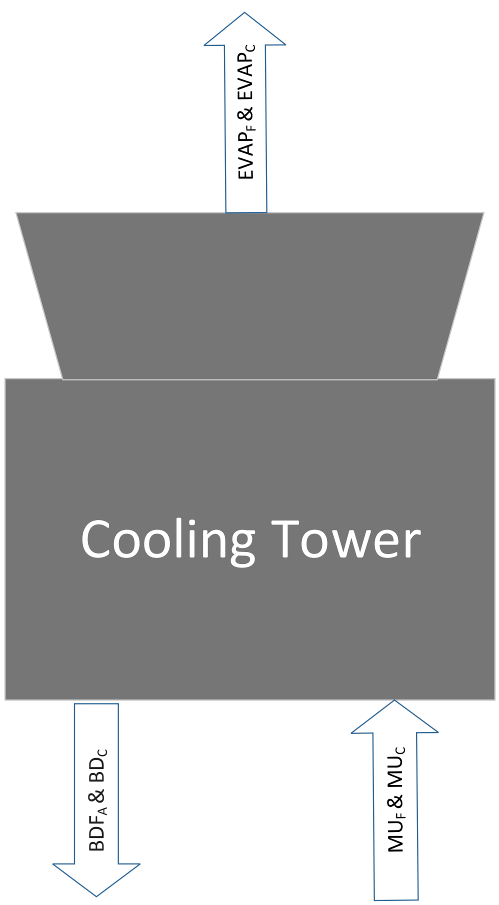
<u>HDPP Blowdown Flow Criteria:</u>

The purpose of any cooling tower is to reject heat from an industrial process to the surrounding environment; this is accomplished through evaporation of the cooling tower water. As water in the cooling tower evaporates into the atmosphere, dissolved impurities are left behind. Over time, as makeup water is used to replenish the evaporated water, the concentration of dissolved impurities in the cooling tower water increases, degrading the water quality of the cooling tower water. If the impurities in the cooling tower water reach high enough concentrations, the Facility's cooling tower water systems can be damaged and the Facility's PM_{10} emissions may exceed their permitted limit.

Industry standard cooling tower water management principals provide that in order to maintain acceptable cooling tower water chemistry, sufficient cooling tower water must be withdrawn from the cooling tower ("blowdown flow") to remove the required amount of dissolved impurities from the cooling tower water. The amount of cooling tower blowdown flow required is dependent upon the quality of water in the cooling tower, the amount of impurities found in the cooling tower makeup water (i.e., the "makeup water quality"), and the amount of evaporation taking place in the cooling tower.

Because the Facility is a zero-liquid-discharge ("ZLD") facility, the Facility's existing water treatment system removes the impurities from the cooling tower blowdown water and returns the treated water back to the cooling tower. Because the Facility was originally prohibited from using Recycled Water as makeup water for the cooling tower, the Facility's existing cooling tower blowdown water treatment system was not designed to remove the higher amount of impurities typically found in Recycled Water when compared to SWP Water. This design limitation reduces the volume of cooling tower blowdown flow that can be treated. As described above, when the actual cooling tower blowdown flow is less than the required blowdown flow, unacceptable levels of impurities in the cooling tower water result in potential damage to the Facility's water systems and the Facility is at risk for exceeding its permitted PM_{10} emission limits.

A criterion triggering the use of or increasing the use of higher quality cooling tower makeup water sources is if the cooling tower blowdown flow required to maintain acceptable cooling tower water quality (BDF_R) is greater than the actual blowdown flow (BDF_A) as determined on a rolling 24-hour average. This criterion has been proposed to allow HDPP to proactively respond to changes in the incoming makeup water quality and upsets within HDPP's water treatment system while maintaining acceptable cooling tower water chemistry. The concept used to derive the expression for BDF_R is comprised of a mass balance around the cooling tower as shown in the simplified example in the figure below.



Performing a mass balance on the cooling tower for water yields:

$$MU_F = EVAP_F + BDF_A . \tag{1}$$

The mass of dissolved solids into and out of the cooling tower is estimated using the conductivity of the respective flows. Performing a mass balance on the cooling tower for dissolved solids yields:

$$MU_F \times MU_C = EVAP_F \times EVAP_C + BDF_A \times BD_C \,. \tag{2}$$

Since evaporation is pure water and contains zero dissolved solids, the term $EVAP_C = 0$. Substituting and solving equation (2) for MU_F yields:

$$MU_F = BDF_A \times \frac{BD_C}{MU_C} = BDF_A \times COC \,. \tag{3}$$

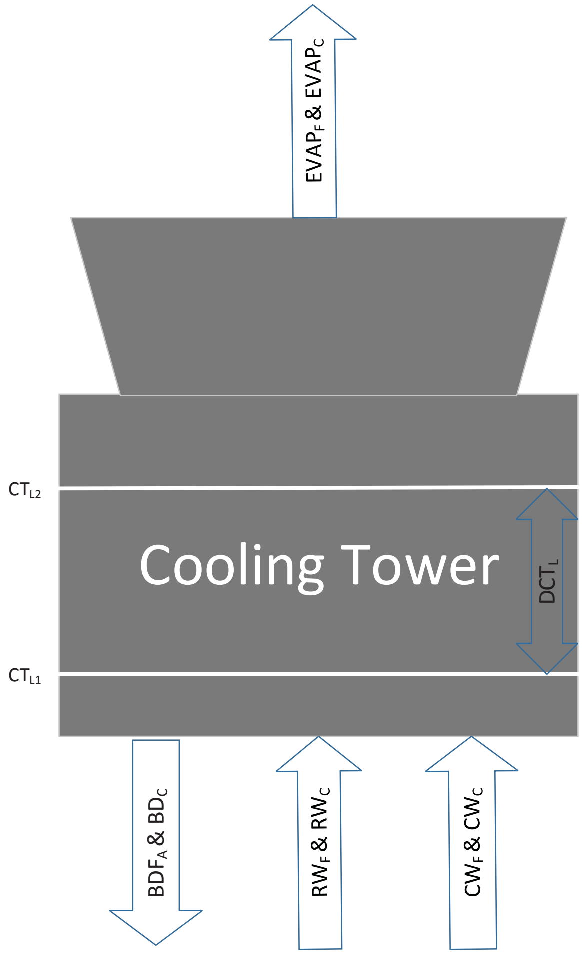
Substituting equation (1) into equation (3) results in equation (4) below expressing blowdown flow in terms of the cooling tower water evaporation rate and cooling tower water cycles of concentration:

$$BDF_A = \frac{EVAP_F}{COC - 1} \,. \tag{4}$$

Equation (5) below provides the cooling tower blowdown flow required to maintain proper cooling tower water quality at a known evaporation rate and at a known cooling tower water cycles of concentration – i.e., sufficient amount of impurities are being removed from the cooling tower water. Therefore, if BDF_A is greater than BDF_R, cooling tower water quality will be improving; alternatively if BDF_A is less than BDF_R, cooling tower water quality will be degrading.

$$BDF_R = \frac{EVAP_F}{COC - 1} \,. \tag{5}$$

The development of BDF_R for the Facility is the exact same as presented above. However, the mass balance around the Facility's cooling tower is much more complex due to storage, multiple cooling tower makeup water sources and varying makeup water source qualities. The mass balance diagram for the Facility is given below.



The introduction of storage into the mass balance analysis is important since the storage volume of the cooling tower basin is significant. Furthermore, accumulation or reduction of the volume of water stored in the cooling tower basin will impact the mass balance equations very differently. The resulting final expression derived for BDF_A will be different as a result. The following set of derivations are proved to highlight the differences in the mass balance equations resulting from storage as well as present the final form of BDF_R in each operating scenario. The operating scenarios are as follows:

1. Operating Scenario 1: Cooling tower basin level *increasing*

2. Operating Scenario 2: Cooling tower basin level *decreasing*

<u>Operating Scenario 1: Cooling tower basin level *increasing*</u>

Using the same methodology as presented above, a mass balance for water is applied. Here, the makeup water flow is comprised of several sources. Therefore, the makeup flow is given by:

$$MU_F = RW_F + CW_F . \tag{6}$$

Completing the mass balance for water around the cooling tower yields:

$$MU_F = EVAP_F + BDF_A + DCT_F. \tag{7}$$

Where DCT_F is given by:

$$DCT_F = \left[CT_{L2} - CT_{L1}\right] \times \frac{439322}{60}. \tag{8}$$

Note that the term [DCT_{L2}-DCT_{L1}] is the Differential Cooling Tower Basin Level (DCT_L), which is the total percent change of the cooling tower basin water level over an hour (%/hr). The term 439,322 is the total volume of the cooling tower basin in gallons, while the term 1/60 is used to convert flow from gallons per hour to gallons per minute.

Performing a mass balance for the dissolved solids yields:

$$MU_F \times MU_C = EVAP_F \times EVAP_C + BDF_A \times BD_C + DCT_F \times MU_C. \tag{9}$$

Where MU_C is given as the weighted conductivity of the makeup water sources. MU_C is estimated as:

$$MU_C = \frac{\left[RW_F \times RW_C + CW_F \times CW_C\right]}{\left[RW_F + CW_F\right]}. \tag{10}$$

Note the following with regards to equation (9):

1) $EVAP_C = 0$; evaporation is pure water and has near zero impurities.

2) The change in solids associated with a change in DCT_L may not be readily apparent. However, the change in solids can be rationalized when considering the simplified example previously presented. In the previous simplified example, in which the level of the cooling tower basin did not change, $MU_F = EVAP_F + BDF_A$. Since MU_F and BDF_A are directly measured, $EVAP_F$ can be easily calculated.

   Now, with the inclusion of storage as shown in equation (7), $EVAP_F$ can still be directly calculated from the measured flows of MU_F, BDF_A and DTC_F. However, if cooling tower basin levels are increasing, then $EVAP_F < MU_F - BDF_A$. Therefore, an increase in cooling tower basin level is a direct result of excess makeup water being supplied. Therefore, MU_C is applied to DCT_F.

   Alternatively, if cooling tower basin levels are decreasing, then $EVAP_F > MU_F - BDF_A$. Again, since MU_F and BDF_A are directly measured, the decrease in cooling tower basin level is due to evaporation. Therefore $EVAP_C$ is applied to DCT_F as shown in equation (14).

Substituting equation (7) into equation (9) and letting $EVAP_C = 0$ yields:

$$MU_C\left[EVAP_F + BDF_A + DCT_F\right] = BDF_A \times BD_C + DCT_F \times MU_C. \tag{11}$$

Solving for $EVAP_F$ yields:

$$EVAP_F = BDF_A \times \frac{BD_C}{MU_C} - BDF_A = BDF_A[COC - 1]. \tag{12}$$

Rearranging equation (12) for BD_F yields the blowdown flow required to maintain cooling tower chemistry, which is the same as equation (5) reproduced below:

$$BDF_R = \frac{EVAP_F}{COC - 1}. \tag{5}$$

Since $EVAP_F$ is not a directly measured parameter, equation (7) can be solved for $EVAP_F$ and substituted into equation (5) to yield:

$$BDF_R = \frac{MU_F - BDF_A - DCT_F}{COC - 1}. \tag{13}$$

<u>Operating Scenario 2: Cooling tower basin level *decreasing*</u>

Under Operating Scenario 2, equations (6), (7) and (10) are still valid under the stated operating conditions. These equations are reproduced below:

$$MU_F = RW_F + CW_F \tag{6}$$

$$MU_F = EVAP_F + BDF_A + DCT_F \tag{7}$$

$$MU_C = \frac{[RW_F \times RW_C + CW_F \times CW_C]}{[RW_F + CW_F]}. \tag{10}$$

The solids mass balance given in equation (9) is now given by:

$$MU_F \times MU_C = EVAP_F \times EVAP_C + BDF_A \times BD_C + DCT_F \times EVAP_C. \tag{14}$$

Substituting EVAPC = 0 and equation (7) into equation (14) yields the required blowdown flow:

$$BDF_R = \frac{EVAP_F + DCT_F}{COC - 1}. \tag{15}$$

Again, since $EVAP_F$ is not directly measured, solving equation (7) for $EVAP_F$ and substituting into equation (15) yields:

$$BDF_R = \frac{MU_F - BDF_A}{COC - 1}. \tag{16}$$

SUMMARY OF BDF_R EQUATIONS

CT Basin Level	Blowdown Flow Required
Increasing	$BDF_R = \frac{MU_F - BDF_A - DCT_F}{COC - 1}$
Decreasing	$BDF_R = \frac{MU_F - BDF_A}{COC - 1}$

EXHIBIT B

Derivation of Maximum MRB Adjudicated Water Demand

Plant Operating Basis	Facility Energy Generated per Year (MWh)	Facility Energy Generated per Day (MWh)	Total Water Requirement for Power Generation (AFY)	Reycled Water Use for Power Generation [(1)] (AFY)	Groundwater Use for Power Generation [(2)] (AFY)
3x1 Full Load 16 hrs/day + 2x1 Min Load 8 hrs/day	4,996,592	14,480	3,870	780	3,090

[(1)] HDPP's model found silica to be the constituent that limits the maximum amount of Recycled Water that can be used by the Facility when the incoming Recycled Water silica concentration is at 40 mg/L. Above this concentration, silica contributes significantly to scale formation throughout the cooling water system. The 40 mg/L concentration is the maximum allowable concentration specified in HDPP's Reclaimed Water Service Agreement with the Victorville Water District. The amount of silica and other constituents in the cooling tower water will be monitored and controlled to within acceptable limits by applying the CT Blowdown Formula and the Loading Sequence described in this Petition.

[(2)] This value represents the upper limit of MRB Adjudicated Water use in any year, assuming no SWP Water available in the Loading Sequence.

DERIVATION

1. Estimate Facility annual energy production
   a. Estimate monthly Facility capability based on historical ambient temperatures.
   b. Assume Facility runs at 3x1 configuration full capability 16 hours each calendar day and 2x1 minimum load configuration 8 hours each calendar day.
   c. Calculate monthly generation by multiplying Facility capability from Item 1b above by the applicable hours of each month.

2. Estimate cooling tower evaporation rates at 3x1 full load and 2x1 minimum load
   a. Evaluate hourly 2014-15 generation and determine monthly average evaporation rates when the Facility load is greater than 700 MW (a proxy for full load evaporation) and at 320 MW (a proxy for 2x1 configuration minimum load).

3. Calculate maximum Recycled Water blend ratio
   a. Define water quality of incoming groundwater and Recycled Water.
      i. Use values identified in Feasibility Report.
   b. Use evaporation rate from Item 2 above
   c. Assume cooling tower blowdown rate = 250 gpm (current Facility hydraulic limit)
   d. Define proposed cooling tower water constituent limits
      i. Start with Facility design limits

   ii. Increase silica limit from 150 mg/L to 180 mg/L based on Facility current practice to use specialty dispersant chemicals to mitigate silica deposits on Facility equipment
   iii. Based on operating experience, evaluate silica and chloride which are the constituents most likely to limit Facility's use of Recycled Water.

e. Calculate the cooling tower cycles of concentration.
f. For each month of the year, calculate the maximum percentage of Recycled Water that can be blended with groundwater while not exceeding the constituent limits established in Section 3d above.

4. Determine the annual volume of water required for power production

   a. From historical data, determine the 2014-15 historical monthly water use for power on an acre-ft/GWh ("AF/GWh") basis.
   b. Multiply the ratios from Section 4a above by the energy volumes from Section 1c above to determine the monthly volume of total water needed for power production.
   c. Multiply the total water volumes from Section 4b above by the percentages from Section 3f above to determine the volume of groundwater required for each month.

EXHIBIT C

REPORT: *AVAILABILITY AND USE OF ALTERNATIVE WATER SUPPLIES AT THE HIGH DESERT POWER PROJECT*

PREPARED BY GSI WATER SOLUTIONS, INC.

OCTOBER 2015

Report

Availability and Use of Alternative Water Supplies at the High Desert Power Project

Prepared for

High Desert Power Project, LLC

14302 FNB Parkway, Omaha, NE 68154

October 2015

Prepared by

GSI Water Solutions, Inc.

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Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

ABS	Aquifer Banking System
ADWF	Average Dry Weather Flows
AF	acre-feet
AFY	acre-feet per year
CEC	California Energy Commission
DFG	California Department of Fish and Game
DWR	California Department of Water Resources (DWR)
EC	Electrical Conductivity (specific conductance)
EDU	Equivalent Dwelling Unit
Facility	High Desert Power Project
gpd	gallons per day
gpm	gallons per minute
HDPP	High Desert Power Project, LLC
IWWTP	City of Victorville Water District's Industrial Wastewater Treatment Plant
mgd	million gallons per day
MOU	Memorandum of Understanding
MRB	Mojave River Basin
MW	megawatt
MWA	Mojave Water Agency
SCLA	Southern California Logistics Airport
SWP	State Water Project
TDS	total dissolved solids
VVWRA	Victor Valley Wastewater Reclamation Authority
VWD	Victorville Water District
Water Board	California Regional Water Quality Control Board, Lahontan Region
UV	ultraviolet light

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1. Introduction

High Desert Power Project, LLC (HDPP or Project Owner) operates the High Desert Power Project (the Facility), an 830 megawatt (MW) combined-cycle power plant located in the City of Victorville in San Bernardino County. The Facility was certified by the California Energy Commission (CEC or the Commission) on May 3, 2000, and commenced commercial operations in April 2003.

GSI Water Solutions, Inc. was retained by HDPP to prepare this report regarding the availability and use of alternative water supplies at the Facility in support of HDPP's November 1, 2015 Petition for Modification to "drought-proof" the Facility (the Petition) by "implementing reliable primary and backup HDPP water supplies that are consistent with State of California water policies." Specifically, the Petition includes a request for approval of the implementation of a systematic priority-of-use (referred to in this document as the "Loading Sequence") for primary and backup water supplies that is consistent with the conditions currently set forth in SOIL&WATER-1 and removal of the two-year restriction on Mojave River Basin Adjudicated Groundwater use. The proposed Loading Sequence is described as follows:

(1) Recycled Water, if available, blended with SWP Water, if available and of suitable quality, in ratios needed to maintain acceptable operating conditions.

(2) Recycled Water, if available, blended with SWP Water, if available and of suitable quality, and/or Banked SWP Water, if available, in ratios needed to maintain acceptable operating conditions.

(3) Recycled Water, if available, blended with SWP Water, if available and of suitable quality, and/or Banked SWP Water, if available, and/or MRB Adjudicated Water in ratios needed to maintain acceptable operating conditions.

The Facility's design basis annual water requirement is 4,000 acre-feet per year (AFY) (excluding water stored in the aquifer bank for future use) (R. Cullison, pers. comm., 2015). From 2004 through 2014, the average annual energy production from the Facility has been 3.91 million MWh per year. The annual average water consumption for energy production (excluding water required for aquifer banking) has been 2,741 AFY. (R. Cullison, pers. comm., 2015). On an instantaneous basis, the Facility's design basis water requirement for producing power (excluding water for aquifer banking) is up to 4,000 gallons per minute (gpm) 24 hours per day. Excluding periods of planned maintenance outages, the Facility is expected to maintain 98% availability or higher and, therefore, requires water supply that is 100% reliable every hour of every day.

A significant factor in the Facility's water supply planning is this understanding that the Facility requires adequate water on demand 24 hours per day to operate. Throughout this document, the "acre-feet per year" terminology is consistently applied to characterize the overall amounts of water associated with different supply options. However, the existence of an average annual supply is insufficient to the Facility if it cannot be delivered consistently and reliably every hour of every day when the Facility is available to operate. Thus, while the average number of acre-feet per year available to the Facility is important, it is equally important that water supply is available continuously throughout every day at the required instantaneous delivery rate (in gpm) to allow the Facility to operate. Consequently, the annualized quantification of water supplies in acre-feet per year terms is only useful at the coarsest of planning perspectives.

Although HDPP will prioritize the use of Recycled Water pursuant to the Loading Sequence and will strive to maximize Recycled Water use, known and common occurrences of Recycled Water outages and Recycled Water that does not meet the Facility's quality requirements force HDPP to ensure that SWP Water, Banked SWP Water, or MRB Adjudicated Water are maintained in an always-ready state, can be activated at any time, and can be utilized as needed until Recycled Water supplies are again available. Furthermore, operational experience to date shows that even when Recycled Water is available, dilution using one or more of the above-listed water supplies is required to achieve a blended water quality that can be used by the Facility's water treatment system.

This report focuses on two sets of "Water Supply Scenarios" that represent the expected range of non-emergency water supply conditions[1]. The scenarios evaluate the volume and reliability of the primary and backup water supplies listed in the Loading Sequence in priority order by applying a set of variables that affect the availability of each source. Details of the Water Supply Scenarios are set forth in Section 3.1. Water Supply Scenarios 1A-1C calculate the amounts of water needed from each source under proposed operations described in the Petition for Alternative Water Supplies to "drought-proof" the Facility (i.e., permanent use of MRB Adjudicated Water as a 4th priority, backup supply) with the assumption that the Victorville 2 Hybrid Power Project is not built. Water Supply Scenarios 2A-2C differ only in the assumption that the Victorville 2 Hybrid Power Project is built and uses 3,150 AFY of Recycled Water. Both Water Supply Scenarios calculate water use in priority order. Each Water Supply Scenario is calculated three times using a range of "Water Supply Conditions", to explore the effect of "best case," "average," and "worst case" factors controlling the required availability of the various water supplies in priority order under non-emergency conditions.

[1] Non-emergency water supply conditions means the normal range of deliveries for a given supply. Non-emergency conditions do not include outages that could occur as a result of infrastructure failure, natural disaster, record-breaking drought conditions, or other event that unexpectedly severely limits or completely cuts off a given alternative water supply.

2. Water Supply

In an effort to assess the potential for achieving the goal of “drought-proofing” the Facility by “implementing reliable primary and backup water supplies that are consistent with state water policies”, investigations were conducted to determine the amount, availability, and reliability of each water supply set forth in the Loading Sequence. The water supplies are listed below in priority order:

1. Recycled Water - Treated effluent currently produced by the Victorville Water District’s (VWD)[2] Industrial Wastewater Treatment Plant (IWWTP) located at the Southern California Logistics Airport (SCLA) and by the Victor Valley Water Reclamation Authority (VVWRA) at the Shay Road wastewater reclamation plant (the VVWRA Shay Road Plant).
2. SWP Water consistent with the provisions of the Mojave Water Agency’s (MWA) Ordinance 9, which may be used as directly delivered to the Facility.
3. Banked SWP Water - SWP Water that is treated by the Facility’s aquifer banking system (ABS) and then stored in an underground aquifer (i.e., the Aquifer Bank) via well injection for later use.
4. MRB Adjudicated Water, as approved on September 10, 2014 by the CEC in response to the drought-induced curtailment of SWP water may be used on a temporary basis, subject to certain limitations, through September 30, 2016. The Petition proposes usage of MRB Adjudicated Water as a backup supply on a permanent basis.

The availability of each water supply is described in the following sections in priority order. Discussions of specific quantitative factors and projections utilized in the Water Supply Scenarios are <u>underlined</u> where they appear in the following sections.

Table 1 summarizes historical water use at the Facility.

[2] The Victorville Water District is a County Water District and subsidiary district of the City of Victorville.

Table 1. Historical Water Use at the Facility.

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SWP Water Allocation Requested by HDPP (AF)	8,000	8,000	8,000	8,000	8,000	8,000	8,000	6,500	6,500	6,500	6,500
SWP Water Allocation Received (AF)	8,000	8,000	8,000	8,000	3,280	2,706	3,486	6,500	6,500	6,500	565
SWP Water Use for Power Production + Aquifer Banking (AF)	3,433	3,191	3,915	3,154	3,229	2,532	2,813	1,518	3,833	2,312	564
SWP Water Injected into Aquifer Bank (AF)	502	773	1,431	537	377	507	553	342	820	402	93
Banked SWP Water Extracted from Aquifer Bank for Power (AF)	4	11	25	214	526	723	98	33	288	1,308	1,381
Banked SWP Water Cumulative Net Injection (AF)	498	762	1,407	323	4,284	4,065	4,520	4,823	5,355	4,449	3,161
Banked SWP Water Available for Power[1] (AF)	N/A	N/A	N/A	N/A	3,135	2,919	3,364	3,600	4,122	3,360	1,942
MRB Adjudicated Water Use for Power Production[2] (AF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0
Recyled Water Use for Power (AF)	0	0	0	0	0	0	0	71	112	65	1,140
Total Water Use for Power Only (AF)	2,935	2,429	2,508	2,831	3,378	2,748	2,359	1,280	3,412	3,283	2,992
Total Water Use for Power + Aquifer Banking (AF)	3,437	3,203	3,939	3,368	3,755	3,255	2,911	1,622	4,233	3,685	3,085

1. Excludes first 1000 acre feet banked by project and losses incurred due to groundwater dissipation, which is calculated by the CEC
2. MRB Adjudicated Water was temporarily made available to HDPP beginning in September 2014 for a two year period.

2.1 Recycled Water

The following sections describe the history of Recycled Water use at the Facility and factors controlling projected future Recycled Water availability.

2.1.1 History of Recycled Water Availability and Use at the Facility

The Facility was originally permitted by the CEC to use SWP Water and Banked SWP Water only. The use of any Recycled Water was specifically prohibited. Through a petition process, HDPP successfully attained a CEC permit modification on November 18, 2009 to allow for use of Recycled Water at the Facility in addition to SWP Water and Banked SWP Water. Recycled Water use was also approved by the California Regional Water Quality Control Board, Lahontan Region (Water Board) in Order R6V-2009-0138 (Water Board, 2009).

Following these approvals, the Facility began receiving Recycled Water though the *Reclaimed Water Service Agreement* (the Agreement) with VWD dated September 7, 2010, which specified that VWD would deliver to the Facility Recycled Water that meets Title 22 reuse standards as well as other water quality specifications (e.g., total dissolved solids [TDS] and silica) as presented in the Agreement (i.e., “in-spec” Recycled Water). Under the terms of the Agreement, VWD was to initially provide up to 1,000 AFY (and at flow rates of up to 1,000 gpm) of Recycled Water to the Facility from two sources: (1) the IWWTP, and (2) the VVWRA Shay Road Plant. Figure 1 provides an overview of the location of the Facility, the wastewater treatment plants, and conveyance pipelines. VWD prioritizes delivery of Recycled Water from the IWWTP over VVWRA Shay Road Plant (S. Ashton, pers. comm., July 1, 2015); therefore, IWWTP Recycled Water is projected to be the first water used by the Facility in the Water Supply Scenarios presented in this report.

The IWWTP operated by VWD currently collects and treats wastewater from: (1) the Dr. Pepper/Snapple bottling facility, (2) the nearby Victorville Federal Correctional Complex (approximately one-third of its wastewater), (3) domestic flows from the City of Victorville, and (4) other municipal and industrial sources at SCLA. Historically, IWWTP has been available to deliver Recycled Water, although it has not typically met supply contract quality specifications, so use has been limited. VVWRA, who operates the VVWRA Shay Road Plant, is a Joint Powers Authority with a service area of 216 square miles, including the communities of Victorville, Hesperia, Apple Valley, and the San Bernardino County service areas of Spring Valley Lake and Oro Grande.

Delivery of Recycled Water to the Facility commenced in July 2011. On March 21, 2014, the Facility exercised its right under the Agreement and notified VWD to increase: (1) annual delivery of Recycled Water to 4,000 AFY, and (2) instantaneous delivery rate to 4,000 gpm. As discussed below, this requested increase in deliveries to 4,000 gpm and 4,000 AFY to the Facility only partially occurred. Table 2 summarizes historical deliveries of Recycled Water to the Facility.

As is evident in Table 2, Recycled Water use by the Facility has been limited. The primary reasons for the limited usage have been Recycled Water supply outages and Recycled Water supplies that did not meet the Facility’s water quality requirements. Several factors have resulted in interruptions in the delivery of Recycled Water to the Facility since July 2011. During two separate periods (see Table 2) Recycled Water was not delivered to the Facility because: (1) capital improvement plant modifications at the VVWRA Shay Road Plant curtailed the production of Recycled Water from mid-April 2012 through June 2013, and (2) problems with the ultraviolet light (UV) disinfection system at the VVWRA Shay Road Plant similarly prevented the production of Recycled Water during portions of 2013 and 2014 (HDPP, 2014). UV system downtime was approximately 31% overall during 2014 due to UV lamp issues (L. Olds, pers. comm., July 2015). The UV lamp issues were ultimately addressed by the manufacturer, resulting in a decrease in downtime to approximately 15% (pers. comm., Cullison 2015). Based upon recent information from VVWRA, operational performance is expected to improve moving forward; therefore, 15% downtime (85% uptime) is the projected worst case condition for both wastewater treatment plants in Water Supply Scenarios presented in this report under normal, non-emergency conditions.

The outages at the VVWRA Shay Road Plant resulting in the inability to produce and deliver “in-spec” Recycled Water are of key importance with respect to planning for Recycled Water use because these historical incidents indicate that future outages will occur. Additionally, since Recycled Water delivery began in July 2011, the IWWTP has failed to meet the specification requirements (primarily because of higher than allowable concentrations of TDS due to changes in the Dr. Pepper/Snapple process as described below) and has only been able to produce “out-of-spec” Recycled Water, which required more dilution with SWP Water or Banked SWP Water to achieve a blended supply that the Facility’s water treatment system can treat.

It is important to note that the Facility’s water treatment system cannot operate reliably on a 100% Recycled Water. This is because the treatment system was not designed to treat and remove the higher amount of impurities associated with using 100% Recycled Water as required to maintain cooling tower PM_{10} emissions within the Facility’s permitted limits and to protect the Facility’s cooling systems and equipment from harmful deposits associated with high amounts of impurities in cooling tower water. Thus, Recycled Water from the VVWRA Shay Road Plant and/or the IWWTP can be used at the Facility only when blended with other water supplies acting as a diluent to create a product that the Facility’s water treatment system can reliably treat. Groundwater, whether it be Banked SWP Water or MRB Adjudicated Water, is consistently the highest quality diluent supply available to the Facility enabling the maximum use of Recycled Water on a volumetric basis. SWP Water, when available, is also used as a diluent but is of worse quality than groundwater (particularly during droughts) and varies in quality throughout the year, resulting in the Facility being able to use less Recycled Water on a volumetric basis. The Facility has demonstrated the ability to use varying percentages of Recycled Water for certain durations by blending with SWP Water and groundwater, depending on operating conditions, water qualities, and given current equipment capabilities and permit conditions (R. Cullison, pers. comm., 2015).

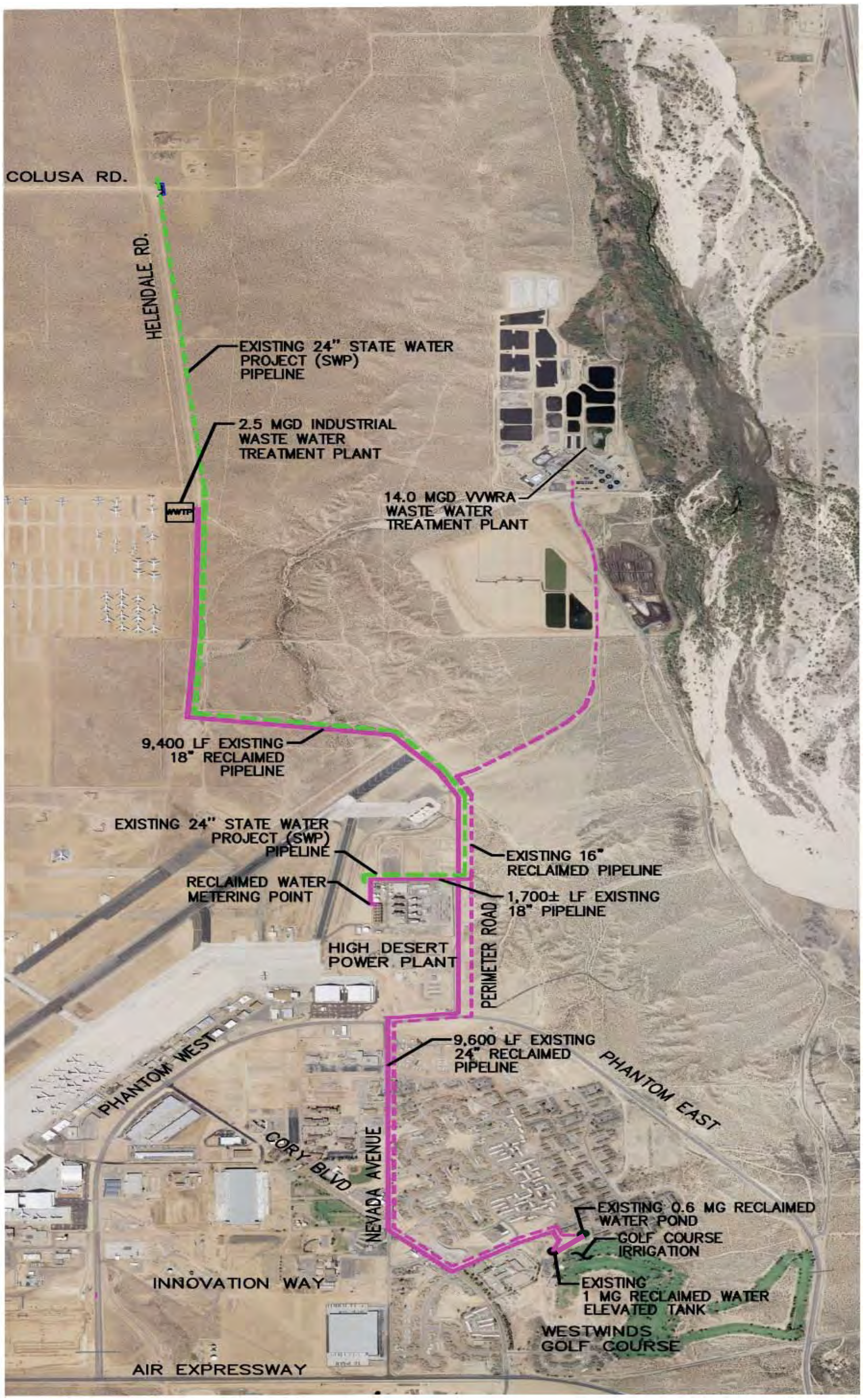

Figure 1. Map of the Facility Vicinity. This figure illustrates location of wastewater treatment plants and conveyance structures.

Table 2. Historical Monthly Recycled Water Use at the Facility.

Month/Year	Facility Water Consumption for Power Production - All Sources (AF)[1]	Recycled Water Consumption (AF)	Recycled Water Consumption for Power (%)
Jul-11	195.0	4.4	2.3%
Aug-11	228.9	24.1	10.5%
Sep-11	246.2	21.0	8.5%
Oct-11	157.6	12.9	8.2%
Nov-11	71.3	0	0.0%
Dec-11	152.9	6.0	3.9%
Jan-12	272.5	13.5	5.0%
Feb-12	243.3	15.1	6.2%
Mar-12	282.2	64.4	22.8%
Apr-12	275.0	18.7	6.8%
May-12	177.9	0	0.0%
Jun-12	285.9	0	0.0%
Jul-12	298.8	0	0.0%
Aug-12	347.7	0	0.0%
Sep-12	342.6	0	0.0%
Oct-12	302.3	0	0.0%
Nov-12	183.8	0	0.0%
Dec-12	350.3	0	0.0%
Jan-13	277.3	0	0.0%
Feb-13	255.8	0	0.0%
Mar-13	316.2	0	0.0%
Apr-13	317.4	0	0.0%
May-13	187.9	0	0.0%
Jun-13	353.2	0	0.0%
Jul-13	360.7	55.1	15.3%
Aug-13	244.0	9.6	3.9%
Sep-13	273.5	0	0.0%
Oct-13	237.0	0	0.0%
Nov-13	131.9	0	0.0%
Dec-13	332.7	0	0.0%
Jan-14	309.2	0	0.0%
Feb-14	178.3	16.4	9.2%
Mar-14	178.6	69.8	39.6%
Apr-14	206.0	142.0	68.9%
May-14	141.2	76.3	54.0%

Table 2. Historical Monthly Recycled Water Use at the Facility.

Month/Year	Facility Water Consumption for Power Production - All Sources (AF)[1]	Recycled Water Consumption (AF)	Recycled Water Consumption for Power (%)
Jun-14	297.4	161.9	54.4%
Jul-14	319.7	181.3	56.7%
Aug-14	326.0	192.2	58.9%
Sep-14	336.6	92.8	27.6%
Oct-14	358.5	126.7	35.3%
Nov-14	121.5	39.2	32.3%
Dec-14	204.3	40.9	20.0%
Jan-15	119.2	46.5	39.0%
Feb-15	214.9	35	16.3%
Mar-15	123.3	21.3	17.3%
Apr-15	175.6	34.3	19.5%
May-15	99.6	0	0.0%
Jun-15	301.6	77	25.5%

Source (J. Boyer, pers. comm., June 24, 2014, and July and August 2015)
(1): Volumes exclude water for banking.

Notwithstanding these Recycled Water quality and quantity issues, in February 2014 HDPP agreed to and began accepting delivery of the poorer-quality Recycled Water from the IWWTP. This out-of-spec Recycled Water supply was blended with Banked SWP Water during the 2014 SWP Water curtailment period (HDPP, 2014). This blending represents an additional expense to the Facility but produced a product water that is acceptable for use at the Facility.

As noted above, on March 21, 2014, the Facility exercised its right under the Agreement and notified VWD to increase: (1) annual delivery of Recycled Water to 4,000 AFY, and (2) instantaneous delivery rate to 4,000 gpm. This increase in Recycled Water delivery has only partially occurred because of various outages and maintenance activity at the VVWRA Shay Road Plant and overall VWD delivery issues described herein.

Facility operations are dependent on the instantaneous availability of a usable water source and the continued ability to have immediate access to alternative supply sources (SWP Water, Banked SWP Water, and MRB Adjudicated Water) to ensure operability of the Facility. Because the amount of VWD's existing Recycled Water storage only allows for a few hours of the Facility's operating water demand, when an outage at the VVWRA Shay Road Plant or at the IWWTP occurs, the Facility is forced to switch from Recycled Water to SWP Water, Banked SWP Water, or MRB Adjudicated Water within a few hours to sustain power-generation operations. Because the Facility has no on-site storage or pre-treatment capability for incoming Recycled Water before it is delivered into the Facility's cooling tower, when Recycled Water is delivered "out-of-spec", the Facility is forced to immediately switch to SWP Water, Banked SWP Water or MRB Adjudicated Water to sustain power-generation operations.

The Facility requires up to 4,000 gpm of supply water 24 hours per day whenever the Facility is available to operate. The existence of an average annual water supply in acre-feet per year is insufficient for the Facility if the water cannot be delivered reliably and at the instantaneous rate required for Facility operation. During the feasibility study period, it was demonstrated that the VWD's delivery system cannot deliver up to 4,000 gpm on a continuous, reliable basis when Recycled Water is delivered as it currently is through VWD's existing distribution system. The deficiencies in reliable delivery, in addition to the known occurrences of Recycled Water production outages, force the Facility to ensure that other water supplies in its portfolio of options are maintained in an always-ready state and can be activated at any time.

The Petition recommends that moving forward, actual blending will be based on chloride concentration in the circulating cooling water and HDPP's proposed "CT Blowdown Formula", both to be used to determine the need for certain source waters (blending) to maintain reliable operations. For the purposes of the Water Supply Scenarios presented in this report, it is projected that the maximum percentage of Recycled Water that can be utilized by the Facility on an instantaneous basis when blending with SWP Water will range from 20% (worst case) to 35% (best case); when blending with Banked SWP Water or MRB Adjudicated Water, the scenarios project that the maximum percentage of Recycled Water that can be utilized will range from 20% (worst case) to 40% (best case)[3]. Lastly, the Water Supply Scenarios also project that the order of blending water with Recycled Water will be SWP Water first, Banked SWP Water second, and MRB Adjudicated Water last. Each water supply will be fully utilized to the extent feasible before transitioning to the next priority source (e.g., all Banked SWP Water will be used before any MRB Adjudicated Water is pumped). The assumption that one supply would be fully utilized before moving to the next supply may not reflect all possible operating scenarios. There are, for example, times of the year under certain hydrological conditions when SWP Water is of high quality (seasonality) and may thus be used as a diluent for poorer quality Recycled Water. Conversely, there may be seasons during the year when SWP Water quality is of poor quality. During these times of poor quality, it may be necessary to move to a second diluent source before all SWP Water available is used.

2.1.2 Potential Future Recycled Water Availability

Forecasted amounts of Recycled Water available for the Facility have changed in recent years as a result of:

a) changes involving the major wastewater treatment plants,

b) changes in actual and projected population growth,

c) the anticipated implementation of two subregional wastewater reclamation plants that will reduce total flow to the VVWRA Shay Road Plant,

d) diversion of domestic flows that historically were conveyed to VVWRA and are now conveyed to IWWTP, and

[3] Recycled Water use greater than these percentages did occur when temporary water treatment equipment was mobilized to the Facility during the feasibility study testing period that was ordered by the Commission, which concluded November 1, 2014. However, use of Recycled Water in excess of these percentages has not been demonstrated to be sustainable given current equipment capabilities and permit conditions as required in the Facility's SOIL&WATER-1(e) condition.

e) CEC approval of the Victorville 2 Hybrid Power Project which, if built, will also use a large amount of Recycled Water.

In an effort to determine the amount of Recycled Water available in the next 10 years, an evaluation was conducted based on: (1) existing planning documents associated with both the VVWRA Shay Road Plant and the IWWTP, and (2) data collected at these plants obtained through coordination with management staff. Because most of the available planning documents prepared by various local agencies (e.g., Urban Water Management Plans, General Plans, and water or wastewater master plans) that would support the determination of future availability of Recycled Water are 5 or more years old, and because population growth and other factors have changed considerably in recent years in response to nationwide economics and other factors, present-day usage and updated forecasted data were collected from VVWRA. More recent data collected were used to develop updated forecasts of Recycled Water availability for use at the Facility and then compared to the forecast that was available when the Facility was approved to use Recycled Water in 2009.

It is important to note that the actual inflows to the wastewater treatment plants are dependent on many factors, most of which are entirely out of the control of VVWRA or VWD. In fact, it is possible that there could be no increase for many years, or there could be decreases, particularly given the potential for long-term reductions in per capita indoor water usage though implementation of conservation and efficiency measures associated with the current drought. As was recently seen in this area, a nation-wide economic shift (such as from the real estate downturn in 2007 or the financial market crash in 2008) could directly affect future growth in the area. It is not impossible that local, regional or national factors could affect this area again and stop or significantly slow growth for an unknown number of years. In this context, projected increases of future wastewater flow as provided in planning documents prepared by the various local agencies are dependent upon many factors and assumptions. Those documents are, rightly, prepared from the agency perspective of needing to be prepared to accommodate the changing demands of their constituents in future years. From the Facility's perspective, however, if less Recycled Water is available because of slower growth, there will be operational concerns unless its alternative water supplies are contractually and physically maintained and accessible.

The following sections describe future wastewater flows to the treatment plants. As described in Section 2.1.1, the amount of Recycled Water produced by the wastewater treatment plants that can be utilized by the Facility is less than the wastewater treatment volumes described in the following sections because of treatment plant outages and dilution required to produce blended water quality that the Facility can reliably use. As described in Section 2.1.1, 15% downtime (85% uptime) is the projected worst case condition for both wastewater treatment plants in Water Supply Scenarios presented in this report under non-emergency conditions. Best case and average case uptime projected in the Water Supply Scenarios is 95% and 90%, respectively. Uptime percentage is referred to as a "Recycled Water Availability Factor" in the Water Supply Scenarios.

As described in Section 2.1.1, the Water Supply Scenarios presented in this report project the maximum fraction of Recycled Water that can be utilized by the Facility on a continuous and long term basis, and dependent on operating conditions and water qualities, ranges from 35% to 40% depending on diluent. The Water Supply Scenarios apply factors to the available flows identified in the following sections to determine the maximum amount of Recycled Water that the Facility could potentially utilize in a given year, subject to the availability of SWP Water, Banked SWP Water, or MRB Adjudicated Water for dilution.

2.1.2.1 Future Wastewater Flows to IWWTP

Mr. Steve Ashton, VWD's Water Supply Manager, provided information on past and projected future wastewater flows to the IWWTP (S. Ashton, pers. comm., June 2, 2014, and July 1, 2015). The IWWTP has an ultimate treatment capacity of 2.5 mgd and has historically treated wastewater generated from various commercial and domestic sources at SCLA, primarily the Dr Pepper/Snapple bottling plant and the Victorville Federal Correctional Complex, totaling approximately 0.5 million gallons per day (mgd). In February 2015, approximately 1.2 mgd of wastewater was permanently diverted from VVWRA's "Westside Feed" to the IWWTP, which represents approximately 10 percent of the total flow from the VVWRA service area (S. Ashton, pers. comm., July 1, 2015). VVWRA "Westside Feed" flows will not be impacted by future operation of the VVWRA subregional treatment plants. As of May 2015, the IWWTP is producing 1.65 mgd (1,848 AFY) of Recycled Water that is potentially available for use at the Facility after accounting for the previously described constraints.

The IWWTP was constructed to initially serve the Dr. Pepper/Snapple bottling plant and the Recycled Water produced by the IWWTP was to be readily available for reuse at the Facility. However, after the IWWTP went online, HDPP was told by VWD that Dr. Pepper/Snapple had changed its bottling processes from the original design and will produce wastewater of higher TDS concentration and less volume than originally planned. This unexpected change resulted in the production of Title 22 Recycled Water at the IWWTP of: (1) much lower flow than originally forecasted, and (2) out-of-spec quality (primarily higher TDS) that cannot be used at the Facility without considerable dilution by blending with additional other water of substantially better quality. The recent permanent diversion from VVWRA's "Westside Feed" has reduced the salinity of the Recycled Water produced by the IWWTP. Further water quality improvements are expected by approximately October 2015 as a result of VWD's actions to comply with the permit for IWWTPs Percolation Pond 14, which necessitates pretreatment at Dr. Pepper/Snapple that will result in significant salinity reductions in its waste stream (S. Ashton, pers. comm., July 1, 2015).

IWWTP has produced approximately 0.5 mgd of Recycled Water from SCLA influent sources for the past several years and VWD expects that this flow rate will continue without increases for many years. There are potential new commercial tenants that may or may not move to SCLA in the coming years, and prediction of timing or amounts of future increases to wastewater flows is not possible at this time. The recent permanent diversion of influent from VVWRA's "Westside Feed" may increase over time, to the extent that there is growth in that area. Growth projections for VVWRA's service area are described in the next section and are applied to the IWWTP "Westside Feed" diversion amounts moving forward. Table 3 provides projections of IWWTP treatment plant influent from 2015 thru 2024, which are utilized in the Water Supply Scenarios. It is projected that there are negligible losses in the treatment process such that influent flow is a good measure of the potential quantity of Recycled Water that may be available for use at the Facility after considering the previously described constraints.

Table 3. Projected Wastewater Influent Flows to IWWTP

Year	IWWTP Influent (AF)[1]		
	Low Growth	Moderate Growth	High Growth
2014	N/A	1,848	N/A
2015	1,854	1,859	1,865
2016	1,865	1,881	1,899
2017	1,876	1,903	1,933
2018	1,887	1,925	1,967
2019	1,898	1,947	2,001
2020	1,909	1,969	2,035
2021	1,920	1,991	2,069
2022	1,931	2,013	2,103
2023	1,942	2,035	2,137
2024	1,953	2,057	2,171

Notes:

1. Moderate growth per regional growth projections (pers. Comm. Olds, 2015): 2015 increase by 500 equivalent dwelling units (EDUs); 1,000 EDUs thereafter. 200 gallons per day per EDU. High and low growth assumed to be +/- 50% of regional growth projection. 10% of growth assigned to IWWTP.

2.1.2.2 Future Wastewater Flows to VVWRA Shay Road Plant

Data provided by, and discussions with Mr. Logan Olds, VVWRA's General Manager, were used to assess future wastewater flows to the VVWRA Shay Road Plant (L. Olds, pers. comm., June 10 and 17, 2014, and July 2015). The VVWRA Shay Road Plant currently treats approximately 12 mgd of commercial and domestic wastewater and, following a series of upgrades completed in 2008, has an ultimate treatment capacity of 18 mgd. Historical influent to the plant during the period 2003 through 2014 ranged from 9.4 to 12.6 mgd (10,530 to 14,115 acre-feet per year AFY), as shown in Table 4.

Table 4. Historical VVWRA Shay Road Plant Flows.

Year	VVWRA Flow (mgd)	VVWRA Flow (AF)
2003	9.35	10,473
2004	10.60	11,874
2005	12.03	13,475
2006	12.32	13,800
2007	12.43	13,923
2008	12.30	13,778
2009	12.07	13,520
2010	12.58	14,091
2011	12.26	13,733
2012	12.20	13,666
2013	12.12	13,576
2014	12.10	13,554

VVWRA monitors and reports the quantity of received wastewater flows, and hence its treatment volumes, using the industry-standard term Average Dry Weather Flows (ADWF). In regards to seasonal fluctuations in wastewater flow rates, the supplies of Recycled Water are expected to be relatively constant over the course of any given year due to the predominantly domestic nature of the VVWRA Shay Road Plant's customer's base. Historically there have not been significant seasonal fluctuations in flow volumes at the VVWRA Shay Road Plant. The same is projected to apply to IWWTP, particularly because the majority of the influent to that plant now comes from the VWD portion of the VVWRA service area.

Table 5 provides projections of VVWRA Shay Road Plant treatment plant influent from 2015 thru 2024, which are utilized in the Water Supply Scenarios. It is projected that there are negligible losses in the treatment process such that influent flow is a good measure of the potentially quantity of Recycled Water that may be available for use at the Facility after considering the previously described constraints.

The projected amount of influent flow to the VVWRA Shay Road Plant is based upon recent VVWRA projections of anticipated residential and commercial growth in their service area and projected diversions to two subregional treatment plants beginning in 2017. As mentioned above, growth projections are based upon a series of assumptions based upon short-term historical trends, and the actual change in wastewater flows to the VVWRA Shay Road Plant could be different, as discussed below. Growth assumptions are detailed in the Table 5 footnotes. Two subregional wastewater reclamation facilities have been planned and funded, and they are anticipated to start construction in 2015 and be operational by 2017 (L. Olds, pers. comm., June 10 and 17, 2014). These facilities will each capture 1 mgd (1,120 AFY) of the flows from the Hesperia and Apple Valley areas, respectively. The combined reduction of 2 mgd (2,240 AFY) will correspondingly reduce the amount of available Recycled Water available from the VVWRA Shay Road Plant for use at the Facility. Water quality changes are not anticipated in association with these reductions in flow to the VVWRA Shay Road Plant.

Table 5. Projected Wastewater Influent Flows to VVWRA Shay Road Plant.

Year	VVWRA Influent (AF)[1,2]		
	Low Growth	Moderate Growth	High Growth
2014	N/A	13,554	N/A
2015	12,260	12,311	12,361
2016	12,361	12,513	12,663
2017	10,222	10,475	10,725
2018	10,323	10,677	11,027
2019	10,424	10,879	11,329
2020	10,525	11,081	11,631
2021	10,626	11,283	11,933
2022	10,727	11,485	12,235
2023	10,828	11,687	12,537
2024	10,929	11,889	12,839

Notes:

1. Moderate growth per regional growth projections (pers. Comm. Olds, 2015): 2015 increase by 500 equivalent dwelling units (EDUs); 1,000 EDUs thereafter. 200 gallons per day per EDU. High and low growth assumed to be +/- 50% of regional growth projection. 90% assigned to VVWRA
2. Includes influent loss for diversion to subregional plants beginning in 2017 (pers. Comm. Olds, 2014) and 1.2 mgd diversion to IWWPT starting in 2015.

There are small losses in the VVWRA treatment process, which includes a minor amount of onsite recycled water use (L. Olds, pers. comm., July 2015). These losses are considered negligible and influent flow is considered a good measure of the potential quantity of Recycled Water that may be available for use at the Facility after other Recycled Water demands are accounted for and after considering the previously described constraints.

Other than the Facility, there are three existing and future demands for Recycled Water:

1. Environmental Flow Releases to Mojave River (existing)
2. Westwinds Golf Course (existing)
3. Victorville 2 Hybrid Power Project (future)

Each Recycled Water demand is described below.

Environmental Flow Releases to Mojave River. In accordance with the 2003 Memorandum of Understanding (MOU) between the California Department of Fish and Game (DFG; now known as the California Department of Fish and Wildlife) and VVWRA, VVWRA is required to discharge 9,000 AFY of Recycled Water from the VVWRA Shay Road Plant to the Mojave River Transition Zone. Secondary- or tertiary-treated water may be used to meet the requirement either as discharges to VVWRA's percolation ponds or discharges directly to the Mojave River.

The required discharge amount will vary each year in association with the following criteria:

1. VVWRA's discharge need not be more than is necessary to produce, in combination with base flow of the Mojave River as measured at the Lower Narrows gage, a total of 15,000 AFY (see Table 6 below for summary of historical post-Judgment base flow and values utilized in the Water Supply Scenarios).
2. If the combined flows at the Lower Narrow gage exceed 15,000 AFY for the prior water year, VVWRA may decrease its discharge by an amount equal to the prior water year's combined flow exceedance over 15,000 AFY.
3. VVWRA is also required to discharge to the Mojave River not less than 20 percent of the *increase in* Recycled Water flows conveyed to the VVWRA Shay Road Plant compared to 2003, the date of the DFG MOU.
4. VVWRA may subtract Recycled Water delivered to irrigate Westwinds Golf Course from the 9,000 AFY of "available Recycled Water" that is required to be diverted to the Mojave River Transition Zone.

It is reasonable to assume that the MOU will continue to operate and that the supplies required to meet VVWRA's obligations under the MOU will continue to be used for those purposes.

The volume of Recycled Water required to achieve a combined flow of at least 15,000 AF at the Lower Narrow gage varies each year according to the current year's base flow and prior year's combined flows.

Table 6. Mojave River Base Flow at Lower Narrows Gage.

Historical Data			Wettest 10-Year Period		Average 10-Year Period		Driest 10-Year Period	
Year	Flow (AF)	10-Yr Average	Year	Flow (AF)	Year	Flow (AF)	Year	Flow (AF)
1994	9,253	-	1994	9,253	-	-	-	-
1995	7,385	-	1995	7,385	-	-	-	-
1996	6,558	-	1996	6,558	-	-	-	-
1997	6,613	-	1997	6,613	-	-	-	-
1998	11,282	-	1998	11,282	1998	11,282	-	-
1999	8,122	-	1999	8,122	1999	8,122	-	-
2000	5,806	-	2000	5,806	2000	5,806	2000	5,806
2001	4,738	-	2001	4,738	2001	4,738	2001	4,738
2002	4,557	-	2002	4,557	2002	4,557	2002	4,557
2003	3,478	**6,779**	2003	3,478	2003	3,478	2003	3,478
2004	4,135	6,267	-	-	2004	4,135	2004	4,135
2005	8,839	6,413	-	-	2005	8,839	2005	8,839
2006	6,627	6,420	-	-	2006	6,627	2006	6,627
2007	4,396	**6,198**	-	-	2007	4,396	2007	4,396
2008	4,680	5,538	-	-	-	-	2008	4,680
2009	3,713	**5,097**	-	-	-	-	2009	3,713
2010	6,752	5,191	-	-	-	-	-	-
2011	10,887	5,806	-	-	-	-	-	-
2012	8,594	6,210	-	-	-	-	-	-
2013	7,190	6,581	-	-	-	-	-	-
2014	5,856	6,753	-	-	-	-	-	-
	Maximum	6,779						
	Average	6,104						
	Minimum	5,097						

Source: Mojave Basin Area Watermaster Annual Reports.
http://www.mojavewater.org/downloads.html

Westwinds Golf Course. The Westwinds Golf Course has been irrigated since 2003 with Recycled Water from the VVWRA Shay Road Plant, as approved by Water Board Order R6V-2003-028 (Water Board, 2003). Deliveries of Recycled Water to the golf course for its use have ranged from an annual average of 80,000 gallons per day (gpd) (90 AFY) (in 2013) to 340,000 gpd (381 AFY) (in 2009). Based upon projected golf course irrigation demands and continuing operations, VVWRA suggests a planning-level estimate of future average annual use of 120,000 gpd (134 AFY) (L. Olds, pers. comm., June 10 and 17, 2014). However, VWD recently stated that Recycled Water will only be used at the golf course if it is available and cannot be used by the Facility (S. Aston, pers. comm., July 1, 2015). If Recycled Water is used at the golf course it does not affect availability of Recycled Water in the following year because the usage is debited from the required environmental flow releases to Mojave River. Based on the foregoing, it is not necessary to consider further Recycled Water use at the golf course in the Water Supply Scenarios.

Victorville 2 Hybrid Power Project. The Victorville 2 Hybrid Power Project is a proposed power generation facility that would include both gas-fired combustion turbine generators and solar electrical generation technology. Victorville 2 is to be located immediately north of SCLA. The City of Victorville, owner of the proposed Victorville 2 facility, has received CEC approval for the project with a start-of-construction deadline of July 16, 2018. The CEC approval contemplated that the project would use 3,150 AFY of Recycled Water (at an average flow rate of 2,603 gpm).

Given the potential future development of Victorville 2 and its associated demands on available Recycled Water, consideration of availability of Recycled Water for Facility uses is considered in the Water Supply Scenarios 2A-2C.

2.2 State Water Project Water

SWP Water is purchased by HDPP from VWD, the local retail water agency, who obtains it from MWA, the regional SWP contractor.

In 2001 the City of Victorville executed a Water Service Agreement that enables SWP Water delivery to the Facility (City of Victorville, 2001). Pursuant to the agreement, the City of Victorville agrees to deliver up to 8,000 AFY of SWP Water requested by HDPP, provided the City is able to obtain such water from MWA. Historically, HDPP has requested 6,500 – 8,000 AF of SWP Water each year from the City of Victorville. The City of Victorville then makes a request to MWA.

MWA has a SWP entitlement (a.k.a. “Table A entitlement”) administered by California Department of Water Resources (DWR). As of May 2015, MWA’s Table A maximum annual entitlement is 85,800 AFY. Each year DWR evaluates SWP conditions and allocates available SWP water supplies to the State Water Contractors. The allocation is issued as a percentage of the contractors’ Table A entitlements.

Each year, MWA reviews its Table A allocation and water demands and then allocates available SWP Water among the retail water agencies and groundwater recharge projects within its service area. The Board of Directors’ general policy in times of limited Table A allocation is to allocate available Table A entitlement proportionally to requesting customers as a percentage of their 5-year average historical demands, up to a maximum of the lesser of their delivery request or their 5-year average use (MWA, 2015). In practice, HDPP’s annual allocation of SWP Water has typically exceeded the amount that would be expected from strict application of this general policy. Table 7 summarizes historical SWP Water availability, HDPP requests, and Facility usage.

Future Table A allocations will be a function of hydrology on the SWP system and Delta flow requirements necessary for protection of endangered and threatened fish species and protection of fish and wildlife beneficial uses in the Bay Delta estuary. SWP water supplies may be highly variable based on hydrology alone; a wet water year may be followed by a dry or critically dry year (DWR, 2015a). Additionally, because of the various regulatory requirements placed on the SWP's Bay-Delta operations, the ability to accurately determine the SWP's water delivery capability in a given year is a significant challenge (DWR, 2015a). The regulatory requirements have resulted in a decrease in SWP exports from the Bay-Delta since 2005, although the bulk of the change occurred around 2009 as federal Biological Opinions[4] went into effect (DWR, 2015a).

Because SWP operations are continuously evolving in response to regulatory requirements and new understanding gained through monitoring and operational modifications, the use of historical Table A allocations in the Water Supply Scenarios would not be representative of future conditions. In April 2015, DWR issued the Draft State Water Project Delivery Capability Report 2015 (DWR, 2015a). Among other things, the report presents the existing overall delivery capability of the SWP system and the allocation of that capacity to each contractor under a range of hydrologic conditions based on best available information. Table B.23 of the DWR report provides specific forecasts of MWA Table A allocations using historical hydrology and considering current regulatory requirements and operations. These projections are tabulated in Appendix A.

Table 7. Historical State Water Project Availability and Use at the Facility.

Year	DWR SWP Allocation to MWA (% of Table A)[1]	SWP Requested by Facility (AF)[2]	SWP Allocation from MWA (AF)[3]	Total SWP Use at Facility (AF)[2]	SWP Water Consumption (AF)[2]	SWP Injected into ABS (AF)[2]
2004	65%	8,000	8,000	3,434	2,932	502
2005	90%	8,000	8,000	3,191	2,418	773
2006	100%	8,000	8,000	3,915	2,484	1,431
2007	60%	8,000	8,000	3,154	2,617	537
2008[4]	35%	8,000	3,280	3,229	2,852	377
2009	40%	8,000	2,706	2,532	2,025	507
2010	50%	8,000	3,486	2,814	2,261	553
2011	80%	6,500	6,500	1,518	1,176	342
2012	65%	6,500	6,500	3,833	3,013	820
2013	35%	6,500	6,500	2,313	1,911	402
2014	5%	6,500	565	564	471	93
2015	20%	6,500	2,171	In Progress	In Progress	In Progress

1. Source: (DWR, 2015b)
2. Source: (J. Boyer, pers. comm., July and August 2015).
3. Source: (R. Cullison, pers. comm., 2015)
4. First year of increased flow restrictions on SWP Delta conveyance pursuant to the 2008 (and later 2009) Biological Opinions.

[4] A biological opinion (BO) is a document that states the opinion of the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) as to whether or not an action by another federal agency is likely to jeopardize the continued existence of species listed under the federal Endangered Species Act (ESA) as threatened or endangered. Several BOs have been issued since the 1990s on the effects of coordinated SWP / Central Valley Project operations on several listed species in the Delta.

As discussed above, MWA allocates its available Table A allocation amongst the retail water agencies and groundwater recharge projects within its service area. A projected relationship was developed between SWP Table A allocation and the SWP allocation provided to HDPP by MWA by considering historical allocations provided to HDPP, historical SWP Water use at the Facility, and historical SWP Table A allocations. The projected relationship is shown in Table 8.

Table 8. MWA SWP Table A Allocations and Projected HDPP Allocations.

MWA Table A %	Projected HDPP Allocation (AF)
<10%	500
10-19%	1,250
20-29%	2,000
30-39%	2,500
40-49%	3,000
50-59%	3,500
>=60%	6,500

The relationship between SWP Table A allocation and the SWP allocation provided to HDPP by MWA (Table 8) is combined with DWR's MWA Table A allocation forecasts in Appendix A to arrive at projected SWP Water allocations for the Facility under wet, average, and dry non-emergency conditions. The results are shown in Table 9. The allocations listed in Table 9 represent the maximum amount of SWP Water HDPP could potentially use in a given year.

Table 9. HDPP SWP Water Allocations Used in Water Supply Model.

Wettest 10-Year Period			Average 10-Year Period			Driest 10-Year Period		
Hydrology Year	Predicted Table A %	Projected HDPP Allocation (AF)	Hydrology Year	Predicted Table A %	Projected HDPP Allocation (AF)	Hydrology Year	Predicted Table A %	Projected HDPP Allocation (AF)
1978	81%	6,500	1942	70%	6,500	1924	24%	2,000
1979	74%	6,500	1943	89%	6,500	1925	41%	3,000
1980	100%	6,500	1944	42%	3,000	1926	52%	3,500
1981	56%	3,500	1945	74%	6,500	1927	70%	6,500
1982	100%	6,500	1946	68%	6,500	1928	77%	6,500
1983	100%	6,500	1947	55%	3,500	1929	23%	2,000
1984	79%	6,500	1948	52%	3,500	1930	37%	2,500
1985	75%	6,500	1949	38%	2,500	1931	33%	2,500
1986	89%	6,500	1950	61%	6,500	1932	32%	2,500
1987	21%	2,000	1951	78%	6,500	1933	42%	3,000

See Appendix A for Table A % projections.

Although SWP Water may be allocated to HDPP in a given year, there are periods of time each year that SWP cannot be used due to delivery curtailments or because the water quality is not suitable for HDPP use. Daily SWP availability and suitability was evaluated and considered in the Water Supply Scenarios.

To assess SWP Water availability, the ideal dataset would be daily flow in the SWP aqueduct serving MWA; however, such data were not available for this analysis. As an alternative, SWP Water availability was assessed using continuous water quality monitoring records at Check 41 on the SWP East Branch (the DWR continuous water quality monitoring station located closest to HDPP), (Table 10). It was projected that any day in which the continuous electrical conductivity (EC) sensor at Check 41 did not report data indicates a day with no aqueduct flow. Daily EC sensor data were downloaded from DWR's website and used to determine the number of days each year with no data reported (second column in Table 10) (DWR, 2015c). The number of days per year with no data was converted to a percentage of time that SWP Water is projected to be flowing in the SWP East Branch and, thus, potentially available for use by HDPP (fifth column in Table 10). This analysis used 2009 and later data to reflect the SWP operations after the federal Biological Opinions affecting SWP exports from the Bay-Delta went into effect. The approach for assessing SWP Water availability is conservative with respect to estimating potential HDPP MRB Adjudicated Water use because HDPP's operators note that SWP Water was not available during February through August 2014, which equates to 42% availability for 2014, as compared to 90% availability suggested by the EC sensor data (R. Cullison, pers. comm., 2015). It is possible that SWP Water was flowing in the aqueduct, but was needed to fill reservoirs and/or MWA needed it for higher priority uses during that time.

Table 10. SWP Water Availability and Suitability for HDPP Use.

Year	Days With Continuous EC Probe Data	Days with Continous EC Probe <670 uS/cm	Percent of Time SWP Suitable	Percent of Time SWP Available[1]	Percent of Time SWP is Suitable and Available[2]
2009	347	341	98%	95%	93%
2010	336	336	100%	92%	92%
2011	324	324	100%	89%	89%
2012	355	355	100%	97%	97%
2013	348	348	100%	95%	95%
2014	329	327	99%	90%	90%
				Average:	93%

Notes:

(1) Based on number of days per year with continuous EC sensor data at Check 41 as an assumed indicator of flow.

(2) %Time Suitable and Available = %Time Suitable X %Time Available

To assess SWP Water suitability, the EC sensor data were used to assess the percentage of time that SWP Water EC was less than 670 micro Siemens per centimeter (uS/cm), a threshold value derived from equipment tolerance/design considerations and operational history (R. Cullison, pers. comm., 2015). Again, this analysis used 2009 and later data to reflect the SWP operations after the federal Biological Opinions affecting SWP exports from the Bay-Delta went into effect. Table 10 shows the number of days each year in which EC was less than the 670 uS/cm threshold (third column). The number of days per year in which EC was less than 670 uS/cm was converted to a percentage of time that SWP Water is projected to be suitable for use by HDPP (fourth column in Table 10).

The percentage of time that SWP Water may be available and suitable for use by HDPP was calculated as the product of the availability and suitability percentages and is shown in the sixth column of Table 10. The percentage of time SWP Water may be available and suitable ranges from 89% to 97% of the time. The average is 93%. For the purposes of the Water Supply Scenarios presented in this report, it is projected that SWP Water is available and suitable for use by HDPP from 89% (worst case) to 97% (best case) of the time under non-emergency conditions. Average case SWP Water availability is projected to be 93% of the time.

2.3 Banked State Water Project Water

The Facility was originally certified by the CEC to treat SWP Water with the Facility's aquifer banking system (ABS) and store SWP Water in an underground aquifer (Aquifer Bank) via well injection (Banked SWP Water) for later use when SWP Water is not available to the Facility. VWD began banking SWP Water for HDPP when the Facility began commercial operation in 2003. Banked SWP Water is received, treated, injected, and re-delivered to the Facility under an agreement between HDPP and the VWD. The ABS treatment process consists of gravity filters to remove course suspended solids and ultrafiltration to remove smaller suspended solids. Under the agreement, VWD owns and operates a group of four wells that are used to inject and extract Banked SWP Water from the Aquifer Bank for use by the Facility. The wells are located approximately 4 to 5 miles south of the Facility. HDPP reimburses VWD for the cost to maintain and operate the wells. The VWD's well and pipeline delivery system is designed to deliver 2,850 gpm or approximately 4,600 AFY if operated continuously (R. Cullison, pers. comm., 2015).

The volume of Banked SWP Water available to the Facility is limited to the volume of water HDPP has injected into the aquifer less 1,000 AF and less the amount of dissipated groundwater, which is periodically calculated by CEC staff. Table 11 summarizes historical ABS operations.

As shown in Table 11, 7,881 AF of SWP Water has been injected into the ABS and 4,719 AF has been extracted through the end of 2014. The net volume injected to date is, therefore, 3,162 AF. The available volume of Banked SWP Water is less than the net volume injected due to dissipation losses and the CEC requirement to subtract 1,000 AF from the amount water injected. The available volume of Banked SWP Water at the end of 2014 was approximately 1,780 AF[5]. This is the starting balance used in the Water Supply Scenarios.

Table 11. Summary of Historical Aquifer Banking System Operations[1].

Year	Injection (AF)	Extraction (AF)	Net Volume Injected (AF)	Storage (AF)[2,3]
2002	0	42	(42)	(42)
2003	1,544	66	1,478	1,436
2004	502	4	498	1,934
2005	773	11	762	2,696
2006	1,431	25	1,406	4,102
2007	537	214	323	4,425
2008	377	526	(149)	4,276
2009	507	723	(216)	4,060

[5] The volume of available Banked SWP Water cannot be determined precisely until updated CEC dissipation calculations become available.

Table 11. Summary of Historical Aquifer Banking System Operations[1].

Year	Injection (AF)	Extraction (AF)	Net Volume Injected (AF)	Storage (AF)[2,3]
2010	553	98	455	4,515
2011	342	33	309	4,824
2012	820	288	532	5,356
2013	402	1,308	(906)	4,450
2014	93	1,381	(1,288)	3,162
TOTAL	7,881	4,719	3,162[2]	N/A

1. Source: 2014 Annual Monitoring Report (HDPP, LLC, 2015)
2. The Net Volume Injected total and Storage column does not include losses due to dissipation. Cumulative dissipation losses were 342 AF through the end of second quarter 2013. Source: (Abulaban, 2013).
3. Available storage is 1,000 AF less than storage and dissipation losses due to the requirement to subtract 1,000 AF from the amount of water available to the project, throughout the life of the project, as specified in Soil and Water-5.

It is important to note that in order to treat and bank SWP Water, the following conditions must first be met:

a) SWP Water must be available and allocated to HDPP for its use by MWA,

b) The allocated quantity must be in excess of the Facility's operating needs,

c) SWP Water must meet concentration thresholds (for total dissolved solids and trihalomethanes) in order to be injected, and

d) The Facility must be operating, or have sufficient residual heat during shut-down, in order to provide the thermal energy needed to treat SWP Water for banking.

Given the above-described conditions and SWP Water availability and quality, the average annual quantity of water that has been banked historically is 576 AFY[6] (R. Cullison, pers. comm., 2015).

2.4 Mojave River Basin Adjudicated Water

On September 10, 2014, in response to a drought induced curtailment of SWP Water, the CEC approved a modification to the Facility's CEC conditions of certification allowing HDPP to obtain MRB Adjudicated Water for use as an alternative water supply. The approval allows HDPP to obtain water rights consistent with the "Judgment After Trial" dated January, 1996, in City of Barstow, et al. v. City of Adelanto, et al. (Riverside County Superior Court Case No. 208568) as administered by the MWA as the Watermaster (the "Judgment"). The Judgment allows any party, including HDPP, to become a Party to the Judgment and (1) acquire and use existing water rights adjudicated under the Judgment, or (2) pay applicable Replacement Water Assessments that pay for imported water for recharge to replace pumped groundwater. The CEC limited HDPP's consumption of MRB Adjudicated Water to no more than 2,000 AF in water year 2014/2015 and no more than 2,000 AF in water year 2015/2016. Use of MRB

[6] The 576 AFY average annual banked volume is the average during operating years 2004-2014. Operating year 2003 was excluded because the Facility began commercial operation in April 2003 and did not operate for the entire year.

Adjudicated Water is currently approved by CEC through September 30, 2016. The Petition proposes use of MRB Adjudicated Water as a 4^{th} priority backup supply on a permanent basis.

The Facility receives MRB Adjudicated Water through an agreement with VWD.

2.4.1 Sustainable Management of Mojave River Basin Groundwater

HDPP's proposed use of MRB Adjudicated Water that is consistent with the Loading Sequence will not adversely affect groundwater resources because the Watermaster is required to manage the Mojave River Basin (Basin) in accordance with the adjudication which thereby mitigates adverse effect of all groundwater use to a level that is less than significant for the reasons described below.

The Replacement Water Assessment provision of the Judgment and MWA's SWP contract has allowed Watermaster to successfully maintain groundwater levels within the operational range established for the Alto Subarea. The Watermaster uses the Replacement Water Assessments to acquire surplus SWP Water available in above normal years for percolation into the basin. The Watermaster has banked water in the Basin, which has provided a buffer for drought water years. At the end of water year 2013/14, over 100,000 AF of water remained in the Alto Subarea storage account (equivalent to approximately 2-years of consumptive use).

Since at least 1996, overdraft in the Alto Subarea has been eliminated because this portion of the Basin has been successfully operated within its desired Operating Range. Per the Watermaster (2014 report): "Conservation, importation of State Water Project water, MWA's 'R-cubed' program, and implementation of the Judgment have resulted in hydrologic balance in Alto. The water supply conditions in Alto Subarea are sustainable." Furthermore, the physical solution employed by MWA as Watermaster has resulted in increased storage in the Alto Subarea over time. In fact, since HDPP operations began in 2003, Alto Subarea groundwater storage has increased approximately 140,000 AF and groundwater levels have remained in the Operating Range (above levels considered to be of concern) since at least 1996. Free Production Allowance (FPA) rampdown in the Alto Subarea is 60% of the Base Annual Production right (BAP), where it has remained since 2005. The FPA reduction has resulted in the purchase of Replacement Water as part of the physical solution which, in part, maintains the long-term sustainability of the Alto Subarea.

HDPP's use of MRB Adjudicated Water will have minimal impact on the Basin. Production safe yield of the Alto Subarea is 69,862 acre-feet per year. Using two key water supply scenarios discussed in this report (one with the Victorville 2 Hybrid power plant (VV2) built and operating and the other without it), projected use of MRB Adjudicated Water as modeled over the next 10 years will have a small effect on the Basin. Under typical, foreseeable operating scenarios, HDPP's impact on MRB Adjudicated Water would be minimal, resulting in use of:

1. Less than 0.2% of the Alto Subarea safe yield groundwater during average climatic conditions when the Facility is operating at high capacity.
2. Less than 2% when operating at or below historical average capacity, regardless of climate.
3. Less than 2% in extreme dry periods when operating at high capacity.
4. Less than 6% during a complete State Water Project outage combined with zero availability of Recycled Water (i.e., emergency conditions), providing the full design basis demand of 4,000 AFY.

HDPP's use of MRB Adjudicated Water is the last and final source water to be used in the Loading Sequence, causing negligible stress on the aquifer due to infrequent pumping. Moreover, and probably most importantly, in all operating conditions MRB Adjudicated Water would be funded for replenishment after use on a 2:1 basis, resulting in a net gain to the Basin.

3. Water Supply Scenarios

The following sections describe the Water Supply Scenarios and results.

3.1 Water Supply Scenario Descriptions

The information described in Section 2 was used to develop two sets of Water Supply Scenarios that assess water availability under non-emergency conditions during a 10-year future period (2015-2024) under proposed operations described in the Petition for Alternative Water Supplies to "drought-proof" the Facility (i.e., permanent access to MRB Adjudicated Water as a 4th priority, backup supply) (Table 12). Scenarios 1A-1C project that the Victorville 2 Hybrid Power Project is not built. Scenarios 2A-2C project the Victorville 2 Hybrid Power Project is built and uses 3,150 AFY of Recycled Water.

Each set of Water Supply Scenarios includes three "sub-scenarios" designed to evaluate water availability under a range of non-emergency "Water Supply Conditions" (e.g., climate or population growth) (Table 12). The Scenarios do not explicitly address emergency conditions (e.g., a prolonged SWP outage caused by an extended drought on the SWP system or an earthquake near the Bay Delta that precludes delivery of all SWP supplies). However, MRB Adjudicated Water usage under emergency conditions can be inferred from the scenario results and are discussed in the results section. Best Case, non-emergency conditions (the "A" scenarios) include wet climate and high population growth assumptions and, therefore, reflect the highest expected Recycled Water, SWP Water, and Banked SWP usage. Worst Case non-emergency conditions ("C" scenarios) utilize dry climate and low growth assumptions and, therefore, reflect the lowest expected Recycled Water, SWP Water, and Banked SWP availability under non-emergency conditions. Average Case non-emergency conditions ("B" scenarios) utilize average climate and moderate growth assumptions and, therefore, are intended to reflect average non-emergency conditions.

Although the Scenarios begin in 2015, the intent is to model a hypothetical 10-year period under the above-described "Best," Average," and "Worst" case non-emergency "Water Supply Conditions beginning in 2015 including either Victorville 2 Hybrid Power Project Recycled Water Demands (Scenarios 1A-1C) or not (Scenarios 2A-2C). Therefore, the 2015 scenario results are <u>not</u> intended to be compared to actual 2015 conditions.

The Water Supply Scenario calculations assume the Facility's design water demand of 4,000 AFY, which corresponds to the Facility generating approximately 5.1 million MWh per year (R. Cullison, pers. comm., 2015). The actual water demand will vary depending on energy market conditions, ambient conditions and other operational factors. If the plant does not use its design water demand, there would be less water used *in reverse priority order*. For perspective, from 2004-2014, the Facility's average annual energy production has been 3.91 million MWh per year and the annual average water usage for power generation has been 2,741 AFY (R. Cullison, pers. comm., 2015).

As described above, the Water Supply Scenario calculations assume design basis Facility water demand, which results in conservative estimates of MRB Adjudicated Water use under non-emergency conditions. In a further attempt to ensure the results are conservative with respect to MRB Adjudicated Water use, SWP Water banking is limited to the maximum, average, and minimum annual quantity of water that has been injected historically for the best, average, and worst case scenarios, respectively (Table 1).

The inputs for each Scenario are listed in Table 12. The inputs and assumptions utilized in the Water Supply Scenarios were previously discussed in Section 2. The scenario calculations are included in Appendices B-G. Additional calculations were performed to calculate the amount of MRB Adjudicated Water that would be needed for different generation amounts for each scenario. The calculations were performed by varying the Facility water demand in the spreadsheets shown in Appendices B-G.

Table 12. Water Supply Scenarios.

	Normal Range of Expected Operations			Normal Range of Expected Operations Plus Victorville 2 Recycled Water Demand		
Scenario No.	**1a**	**1b**	**1c**	**2a**	**2b**	**2c**
Non Emergency Water Supply Condition	**Best Case**	**Average Case**	**Worst Case**	**Best Case**	**Average Case**	**Worst Case**
Facility Water Demand						
Facility Design Water Demand (AFY)	4,000					
Recycled Water - IWWTP						
Initial Flow (AFY)[1]	1,865	1,859	1,854	1,865	1,859	1,854
Flow Increase Due to Population Growth[2]	High	Moderate	Low	High	Moderate	Low
Recycled Water Availability Factor[3]	95%	90%	85%	95%	90%	85%
Percentage of Recycled Water When Blending with SWP Water That Meets Cooling Tower Blowdown Monitoring Parameters[4]	35%	25%	20%	35%	25%	20%
Percentage of Recycled Water When Blending Banked SWP Water or Groundwater That Meets Cooling Tower Blowdown Monitoring Parameters[4]	40%	30%	20%	40%	30%	20%
Recycled Water - VVWRA						
Initial Flow (AFY)[5]	12,361	12,311	12,260	12,361	12,311	12,260
Flow Increase Due to Population Growth[2]	High	Moderate	Low	High	Moderate	Low
Losses to Subregional Plants (AFY)[6]	2,240					
V2 Hybrid Power Plant Demand (AFY)[7]	0	0	0	3,150	3,150	3,150
Recycled Water Availability Factor[3]	95%	90%	85%	95%	90%	85%
Percentage of Recycled Water When Blending with SWP Water That Meets Cooling Tower Blowdown Monitoring Parameters[4]	35%	25%	20%	35%	25%	20%
Percentage of Recycled Water When Blending Banked SWP Water or Groundwater That Meets Cooling Tower Blowdown Monitoring Parameters[4]	40%	30%	20%	40%	30%	20%
Mojave River Base Flow at Lower Narrows[8]	Wet	Average	Dry	Wet	Average	Dry
State Water Project						
SWP Availability[9]	Wet	Average	Dry	Wet	Average	Dry
Percentage of Time SWP Water Is Available and Suitable for Cooling[10]	97%	93%	89%	97%	93%	89%
Banked State Water Project Water						
Banked State Water Project Water Use	3rd priority water source, used only as needed and available					
SWP Banking Volume Cap (AFY)[11]	1,431	576	93	1,431	576	93
Mojave River Basin Groundwater						
MRB Adjudicated Groundwater Use	4th priority water source, used only as needed					

Notes:
1. See Table 3 and text for further explanation.
2. Growth assumptions per VVWRA (pers. Comm. Olds, 2015). See text for further explanation.
3. Defined as the average percentage of time the treatment plant is capable of producing and delivering recycled water. See text for further explanation.
4. Source: Pers. comm., Cullison, 2015; see text for further explanation.
5. See Table 5 and text for further explanation.
6. Two 1 mgd subregional wastewater reclamation facilities are under construction near Hesperia and Apple Valley and are expected to be operational in 2017 (pers. Comm., Olds 2015).
7. Victorville 2 CEC approval contemplated that the project would use 3,150 AFY of Recycled Water. Scenarios 1A-1C assume Victorville 2 project is not built.
8. See Table 6 and text for further explanation.
9. See Table 9 and text for further explanation.
10. See text for further explanation.
11. SWP Banking is limited to the average annual banked volume achieved historically. See text for further explanation.
12. The 576 AFY average annual banked volume is the average during operating years 2004-2014. Operating year 2003 was excluded because the Facility began commercial operation in April 2003 and did not operate for the entire year.

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3.2 Scenario Results

The results of the Water Supply Scenarios are presented in Tables 13 and 14 and Figure 2, and described in the following sections.

3.2.1 Scenarios 1A-1C Results Summary

Water Supply Scenarios 1A-1C assess water availability under proposed operations described in the Petition for Alternative Water Supplies to "drought-proof" the Facility (i.e., permanent use of MRB Adjudicated Water as a 4th priority, backup supply) with the assumption that the Victorville 2 Hybrid Power Project is not built. The results of Scenarios 1A-1C are summarized below.

Scenario 1A (Best Case Non-Emergency Water Supply Conditions – No Victorville 2 Plant): Under wet conditions and high population growth assumptions, all Facility water demands would be met using a combination of Recycled Water, SWP Water, and Banked SWP Water (Table 13 and Figure 2). MRB Adjudicated Water would not be needed to meet Facility water demands (Tables 13 and 14). Average Recycled Water, SWP Water, and Banked SWP Water use during the 10-year scenario period would be 1,419, 2,350, and 230 AF, respectively. Additionally, 7,176 AF of available Banked SWP Water is estimated to remain at the end of the 10-year scenario period, constituting a sizable amount water in storage for future HDPP use (plus an additional 1,000 AF that remains available in the bank, per the Facility's Conditions of Certification.)[7].

Scenario 1B (Average Case Non-Emergency Water Supply Conditions – No Victorville 2 Plant): Under average climate conditions and moderate population growth assumptions, all Facility water demands would be met using a combination of Recycled Water, SWP Water, and Banked SWP Water (Table 13 and Figure 2). Average Recycled Water, SWP Water, and Banked SWP Water use during the 10-year scenario period would be 1,034, 2,492, and 474 AF, respectively. Additionally, 2,142 AF of available Banked SWP Water is estimated to remain at the end of the 10-year scenario period.

Scenario 1C (Worst Case Non-Emergency Water Supply Conditions – No Victorville 2 Plant): Under dry climate conditions and low population growth assumptions, all Facility water demands would be met using a combination of Recycled Water, SWP Water, Banked SWP Water, and MRB Adjudicated Water (Table 13 and Figure 2). Average Recycled Water, SWP Water, Banked SWP Water, and MRB Adjudicated Water use during the 10-year scenario period would be 800, 2,234, 262, and 704 AF, respectively. Additionally, 298 AF of available Banked SWP Water is estimated to remain at the end of the 10-year scenario period. MRB Adjudicated Water would be needed under Scenario 1C conditions whenever the Facility operates in excess of approximately 50% of its historical average annual energy production of 3.91 MMWh (Table 13).

3.2.2 Scenarios 2A-2C Results Summary

Water Supply Scenarios 2A-2C assess water availability under proposed operations described in the Petition for Alternative Water Supplies to "drought-proof" the Facility (i.e., permanent use of MRB Adjudicated Water as a 4th priority, backup supply) with the assumption that the Victorville 2 Hybrid

[7] For each Scenario reported, the SWP Banked water is referred to as "available" because an additional 1,000 AF of Banked SWP Water remains in the bank and is not used, per the Facility's Conditions of Certification.

Power Project is built and uses 3,150 AFY of Recycled Water. The results of Scenarios 2A-2C are summarized below.

Scenario 2A (Best Case Non-Emergency Water Supply Conditions –Victorville 2 Plant Online): Under wet conditions and high population growth assumptions, all Facility water demands are met using a combination of Recycled Water, SWP Water, and Banked SWP Water (Table 13 and Figure 2). Average Recycled Water, SWP Water, and Banked SWP Water use during the 10-year scenario period would be 1,269, 2,134, and 597, AF, respectively. Additionally, 5,633 AF of available Banked SWP Water is estimated to remain at the end of the 10-year scenario period.

Scenario 2B (Average Case Non-Emergency Water Supply Conditions –Victorville 2 Plant Online): Under average climate conditions and moderate population growth assumptions, all Facility water demands are met using a combination of Recycled Water, SWP Water, Banked SWP Water, and MRB Adjudicated Water (Table 13 and Figure 2). Average Recycled Water, SWP Water, Banked SWP Water, and MRB Adjudicated Water use during the 10-year scenario period are 903, 2,295, 667, and 135 AF respectively. Additionally, 1,007 AF of available Banked SWP Water is estimated to remain at the end of the 10-year scenario period. MRB Adjudicated Water would be needed under Scenario 2B conditions whenever the Facility operates in excess of approximately 3.85 MMWH (98% of the Facility's historical average annual energy production of 3.91 MMWh (Table 13).

Scenario 2C (Worst Case Non-Emergency Water Supply Conditions –Victorville 2 Plant Online): Under dry climate conditions and low population growth assumptions, all Facility water demands are met using a combination of Recycled Water, SWP Water, Banked SWP Water, and MRB Adjudicated Water (Table 13 and Figure 2). Average Recycled Water, SWP Water, Banked SWP Water, and MRB Adjudicated Water use during the 10-year scenario period are 580, 2,149, 262, and 1,010 AF respectively. Additionally, 272 AF of available Banked SWP Water is estimated to remain at the end of the 10-year scenario period. MRB Adjudicated Water would be needed under Scenario 2C conditions whenever the Facility operates in excess of 50% of its historical average annual energy production of 3.91 MMWh (Table 13).

3.2.3 Emergency Conditions

The most probable emergency conditions that could affect the Facility's water supply is an extended critical drought on the SWP system or a catastrophic event that critically disables the SWP, such as a large earthquake near the Bay Delta that causes numerous levee failures. Under such emergency conditions, little to no SWP Water may be available for several years. If such an emergency occurs at a time when little to no Banked SWP reserves exist and the Facility is operating at design capacity, the Plant would require 2,400 to 3,344 AFY of MRB Adjudicated Water if there is no Victorville 2 Hybrid Power Project Recycled Water demand (Scenarios 1A-1C) and 2,976 to 3,654 AFY if the Victorville 2 Hybrid Power Project exists and is using 3,150 AFY of Recycled Water (Scenarios 2A - 2C). The MRB Adjudicated Water usage under emergency conditions was calculated using the same approach shown in Appendices B-G, except that SWP Water and initial Banked SWP Water were set to zero.

If there was a supply of Banked SWP Water present at the start of the emergency conditions, this supply would be used first, and then the annual amounts of MRB Adjudicated Water would need to be tapped to continue HDPP operations. If Recycled Water is also not available during the emergency, the Facility would be forced to rely exclusively on MRB Adjudicated Water and under these conditions and while operating at design capacity the Facility would require 4,000 AFY of MRB Adjudicated Water.

Even though these are scenarios under potential emergency conditions, the contractual arrangement with Mojave Water Agency is for 2:1 replacement of MRB Adjudicated Water which would be conducted by MWA as soon as SWP deliveries are re-established and resulting in a net increase of groundwater in storage.

Table 13. Results of Water Supply Scenarios.

Year	Scenario 1A Normal Range of Expected Operations Best Case Non-Emergency Water Supply Conditions						Scenario 1B Normal Range of Expected Operations Average Case Non-Emergency Water Supply Conditions						Scenario 1C Normal Range of Expected Operations Worst Case Non-Emergency Water Supply Conditions					
	Recycled Water Used (AF)	SWP Used (AF)	Banked SWP Used (AF)	MRB Adjudicated Groundwater Used (AF)	Total Cooling Water Used (AF)	ABS Storage Balance (AF)	Recycled Water Used (AF)	SWP Used (AF)	Banked SWP Used (AF)	MRB Adjudicated Groundwater Used (AF)	Total Cooling Water Used (AF)	ABS Storage Balance (AF)	Recycled Water Used (AF)	SWP Used (AF)	Banked SWP Used (AF)	MRB Adjudicated Groundwater Used (AF)	Total Cooling Water Used (AF)	ABS Storage Balance (AF)
2015	1,416	2,396	188	0	4,000	1,780	1,033	2,511	456	0	4,000	1,780	800	1,780	1,420	0	4,000	1,780
2016	1,416	2,396	188	0	4,000	3,023	1,033	2,511	456	0	4,000	1,900	800	2,421	453	326	4,000	453
2017	1,416	2,396	188	0	4,000	4,265	1,033	2,511	456	0	4,000	2,019	800	2,421	93	686	4,000	93
2018	1,416	2,396	188	0	4,000	5,508	1,033	2,511	456	0	4,000	2,052	800	2,421	93	686	4,000	93
2019	1,416	2,396	188	0	4,000	6,424	1,033	2,511	456	0	4,000	2,171	800	2,421	93	686	4,000	93
2020	1,416	2,396	188	0	4,000	7,666	1,033	2,511	456	0	4,000	2,291	800	1,780	93	1,327	4,000	93
2021	1,416	2,396	188	0	4,000	8,909	1,033	2,511	456	0	4,000	2,411	800	2,225	93	882	4,000	93
2022	1,416	2,396	188	0	4,000	10,151	1,045	2,325	630	0	4,000	2,530	800	2,225	93	882	4,000	93
2023	1,416	2,396	188	0	4,000	11,394	1,033	2,511	456	0	4,000	2,075	800	2,225	93	882	4,000	93
2024	1,451	1,940	609	0	4,000	12,637	1,033	2,511	456	0	4,000	2,195	800	2,421	93	686	4,000	93
Averages	**1,419**	**2,350**	**230**	**0**	**4,000**	**7,176**	**1,034**	**2,492**	**474**	**0**	**4,000**	**2,142**	**800**	**2,234**	**262**	**704**	**4,000**	**298**

Year	Scenario 2A Normal Range of Expected Operations + V2 RW Demand Best Case Non-Emergency Water Supply Conditions						Scenario 2B Normal Range of Expected Operations + V2 RW Demand Average Case Non-Emergency Water Supply Conditions						Scenario 2C Normal Range of Expected Operations + V2 RW Demand Worst Case Non-Emergency Water Supply Conditions					
	Recycled Water Used (AF)	SWP Used (AF)	Banked SWP Used (AF)	MRB Adjudicated Groundwater Used (AF)	Total Cooling Water Used (AF)	ABS Storage Balance (AF)	Recycled Water Used (AF)	SWP Used (AF)	Banked SWP Used (AF)	MRB Adjudicated Groundwater Used (AF)	Total Cooling Water Used (AF)	ABS Storage Balance (AF)	Recycled Water Used (AF)	SWP Used (AF)	Banked SWP Used (AF)	MRB Adjudicated Groundwater Used (AF)	Total Cooling Water Used (AF)	ABS Storage Balance (AF)
2015	1,136	2,134	730	0	4,000	1,780	791	2,234	975	0	4,000	1,780	540	1,780	1,680	0	4,000	1,780
2016	1,416	2,396	188	0	4,000	2,481	1,033	2,511	456	0	4,000	1,381	560	2,266	193	982	4,000	193
2017	1,109	2,133	758	0	4,000	3,724	1,033	2,511	456	0	4,000	1,500	546	2,266	93	1,095	4,000	93
2018	1,128	2,103	769	0	4,000	4,397	802	2,193	1,005	0	4,000	1,533	549	2,258	93	1,100	4,000	93
2019	1,148	2,072	780	0	4,000	5,025	811	2,176	1,013	0	4,000	1,104	552	2,251	93	1,104	4,000	93
2020	1,416	2,396	188	0	4,000	5,676	820	2,158	667	355	4,000	667	556	1,780	93	1,571	4,000	93
2021	1,416	2,396	188	0	4,000	6,918	829	2,141	576	454	4,000	576	800	2,225	93	882	4,000	93
2022	1,206	1,980	814	0	4,000	8,161	838	2,124	576	462	4,000	576	562	2,225	93	1,120	4,000	93
2023	1,260	1,918	822	0	4,000	8,778	1,033	2,511	376	80	4,000	376	565	2,225	93	1,117	4,000	93
2024	1,461	1,813	726	0	4,000	9,387	1,041	2,387	572	0	4,000	576	568	2,213	93	1,126	4,000	93
Averages	**1,269**	**2,134**	**597**	**0**	**4,000**	**5,633**	**903**	**2,295**	**667**	**135**	**4,000**	**1,007**	**580**	**2,149**	**262**	**1,010**	**4,000**	**272**

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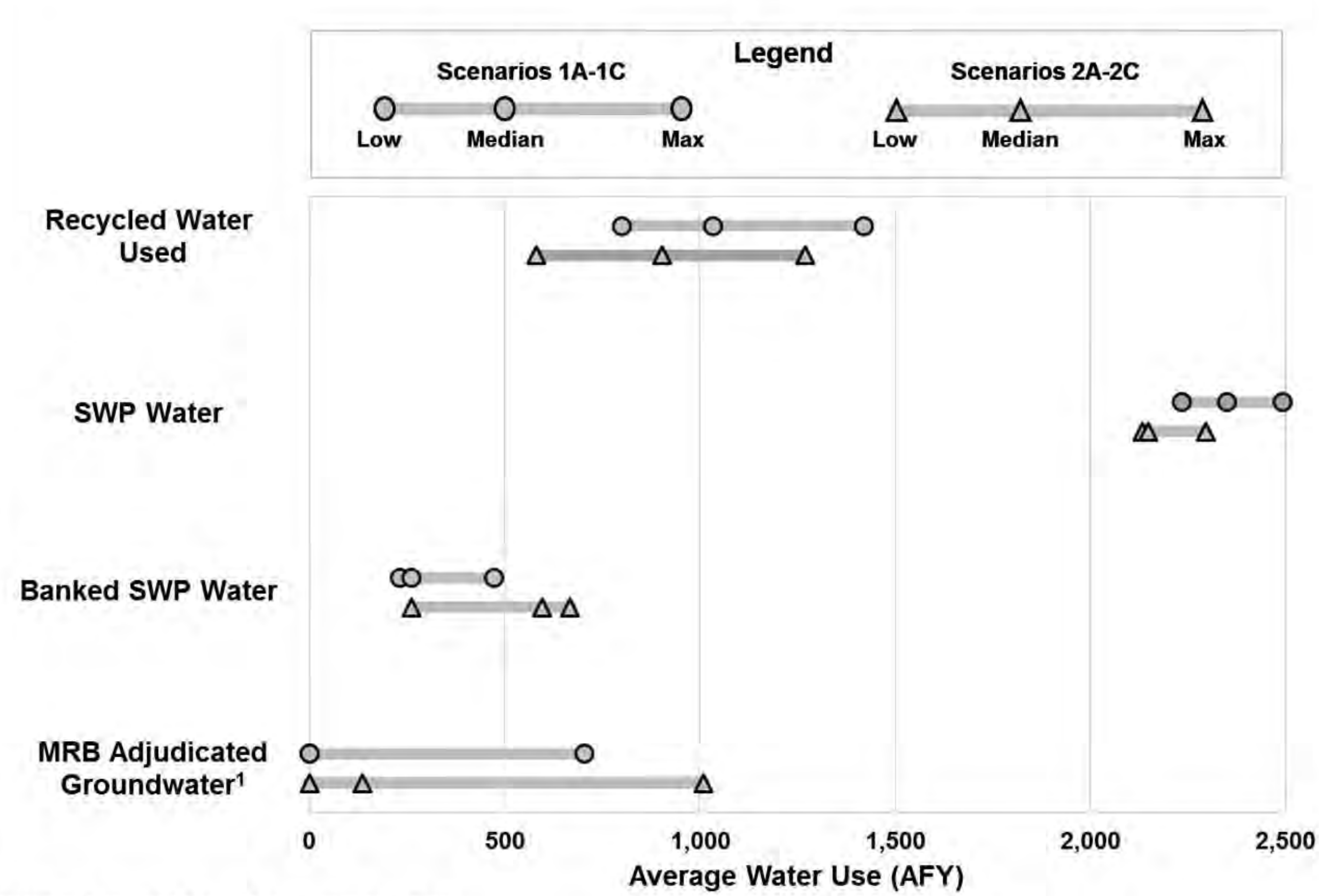
Figure 2. Water Supply Scenario Results – Average 10-Year Usage by Water Source.



Notes: 1. Scenario 1A and 1B results are both zero.

Table 14. Facility Operations and Estimated Mojave River Basin Adjudicated Water Use.

Estimated Generation Associated with Facility Water Demand (Million Megawatt Hours)[2]	Annual Facility Water Demand (AF)	Scenario[1]					
		1A	1B	1C	2A	2B	2C
0.64	500	0	0	0	0	0	0
1.28	1,000	0	0	0	0	0	0
1.92	1,500	0	0	31	0	0	31
2.56	2,000	0	0	128	0	0	175
3.21	2,500	0	0	225	0	0	544
3.85	3,000	0	0	330	0	46	776
4.49	3,500	0	0	488	0	86	842
5.13	4,000	0	0	704	0	135	1,010

Notes:

(1) Results presented in this table were calculated in the same manner described in this report and shown in Appendices B-G, except that the Facility Water Demand values as shown in this table were used instead of the 4,000 AFY as used in the original scenarios.

(2) The Facility's average annual generation over the period 2004 - 2014 was 3.91 MMWh.

3.3 Observations and Conclusions Based upon Water Supply Scenario Calculations

This review focused on two sets of Water Supply Scenarios. Water Supply Scenarios 1A-1C project permanent use of MRB Adjudicated Water as a 4th priority, backup water supply and that the Victorville 2 Plant is not built. Water Supply Scenarios 2A-2C differ only in the projection that the Victorville 2 Hybrid Power Project is built and uses 3,150 AFY of Recycled Water.

Each set of Water Supply Scenarios includes three “sub-scenarios” designed to evaluate water availability under a normal (i.e., non-emergency) range of expected operations as influenced by varying “Water Supply Conditions” (e.g., climate or population growth) as described in Section 3.1 and Table 11. The Scenarios are not intended to address a prolonged SWP outage (e.g., extended critical drought on the SWP system or a Bay Delta earthquake with levee failures). However, MRB Adjudicated Water usage under emergency conditions was calculated using the same approach and is discussed in the results section.

Based upon results and other information discussed in Section 2, the following observations can be made:

1. The amount of Recycled Water (the highest priority water supply) utilized by the Facility is limited by (a) the dilution required to produce water quality that the Facility can functionally utilize, (b) SWP Water availability and suitability for blending, and (c) wastewater treatment plant outages (both planned and un-planned outages). The scenario results indicate that the maximum annual average percentage of Recycled Water that can be utilized by the Facility is 35%; this utilization rate will occur during the occasional very wet climatic periods when high quality diluent water is also available.

2. During high energy production operations, the ability to significantly increase Banked SWP Water volumes is limited to the best-case scenarios, which reinforces the need for backup water supply (i.e., MRB Adjudicated Water).

3. The amount of MRB Adjudicated Water utilized by the Facility is less than approximately 800 acre-feet per year under low to average energy production operations, regardless of the water supply conditions.

4. The Facility will not likely need MRB Adjudicated Water during non-emergency conditions under best-case assumptions, regardless of energy production.

5. MRB Adjudicated Water will not be needed during non-emergency conditions, except under worst-case conditions or when producing at or above the historical average energy production under average-case water supply conditions with Victorville 2 Plant recycled water demands.

6. When operating at 50% or more of the historical average energy production rate under worst-case conditions, the Facility may utilize between approximately 31 and 1,010 AFY of MRB Adjudicated Water.

7. Under emergency conditions (extended drought on the SWP system or catastrophic event that critically disables the SWP), and if SWP Banked Water supplies were depleted, the Facility could

require up to 2,400 to 3,344 AFY of MRB Adjudicated Water if there is no Victorville 2 Hybrid Power Project Recycled Water demand and 2,976 to 3,654 AFY if the Victorville 2 Hybrid Power Project exists and is using 3,150 AFY of Recycled Water.

8. Under emergency conditions (extended drought on the SWP system or catastrophic event that critically disables the SWP), and in the unlikely event that SWP Banked Water supplies were depleted and Recycled Water were not available, the Facility could require up to 4,000 AFY MRB Adjudicated Water.

9. HDPP's impact on MRB Adjudicated Water would be minimal, resulting in use of:

    a. Less than 0.2% of the Alto Subarea safe yield groundwater during average climatic conditions when the Facility is operating at high capacity.

    b. Less than 2% when operating at or below historical average capacity, regardless of climate.

    c. Less than 2% in extreme dry periods when operating at high capacity.

    d. A maximum of 4,000 AFY during a complete SWP outage with no Banked SWP Water or Recycled Water – representing less than 6% of the Alto Subarea Safe Yield.

10. HDPP's use of MRB Adjudicated Water is the last and final source of water to be used in the Loading Sequence, following use of all available SWP and Banked SWP water first. Because of the infrequent need to pump this water, the stress on the aquifer will be less than significant (negligible).

11. For all operating conditions, all MRB Adjudicated Water used by HDPP would be funded to the Watermaster for replenishment on a 2:1 basis, resulting in a net increase of groundwater in storage.

12. Because the anticipated potential annual demands for MRB Adjudicated Water are variable, it would be appropriate to include a rolling average condition for the permitted annual amount of MRB Adjudicated Water.

13. The Facility's design basis requires water delivered on an instantaneous basis (4,000 gpm, 24 hours a day, 7 days a week, 365 days a year). The annualized quantification of water supplies in acre-feet per year terms is only useful at the coarsest of planning perspectives.

14. Having a backup water supply (MRB Adjudicated Water) is critical to ensure the Facility's ability to reliably meet its mandate and purpose to provide power.

Based upon the analyses provided in this report, it is clear that the Facility cannot rely entirely on Recycled Water, SWP Water, and Banked SWP Water alone except during wet periods and during average to dry periods when the Facility is operated at very low capacity. MRB Adjudicated Water may also be needed during (a) temporary interruptions of Recycled Water and/or SWP Water supplies and (b) during an extended drought on the SWP system or catastrophic event that cripples the SWP. Based on the foregoing, the Facility will need access to MRB Adjudicated Water for blending with other supplies to avoid possible generation curtailments and to drought-proof the facility.

3.4 Water Supply Scenario Calculation Limitations

The variables studied here with the Scenarios are illustrative of those variables that we believe will have the greatest potential effects on water supplies, though these are not, and are not intended to be, an exhaustive list of variables potentially affecting future supplies. For example, if lower growth assumptions were used, Recycled Water availability would be less than simulated and water supply shortages would be more pronounced. Further, these analyses did not assume that additional subregional wastewater reclamation facilities are built in the future or that the two known facilities would expand their capacity. If additional subregional wastewater reclamation facilities are built or the two facilities under construction are expanded, these actions would further limit Recycled Water supplies available to the Facility.

Future SWP Water availability is subject to considerable uncertainty due to variable hydrology on the SWP system, climate change, and regulatory requirements necessary for protection of endangered and threatened fish species and protection of fish and wildlife beneficial uses in the Bay Delta estuary. Because of the various regulatory requirements placed on the SWP's Bay Delta operations, the ability to accurately determine the SWP's water delivery capability is a significant challenge (DWR, 2015a). SWP operations are continuously evolving in response to regulatory requirements and new understanding gained through monitoring and operational modifications. Furthermore, SWP Water may not be available at all times throughout a given year, potentially exacerbating short-term water supply shortages.

Significantly, the Water Supply Scenarios focused on annual water usage. Annualized projections do not account for the Facility's design basis need for water delivery instantaneously of 4,000 gpm on a 24-hour day, 7 days a week, 365 days a year basis. That is, while 4,000 AFY of water supplies could be available on an annual basis, this simplified analysis does not account for whether there would be up to 4,000 gpm available during those times when the Facility is required to run at full capacity.

4. References

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Appendix A

DWR State Water Project Table A Allocation Projections

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Table A-1

SWP Model Simulation Result for MWA			Wettest 10-Year Period		Average 10-Year Period		Driest 10-Year Period	
Hydrology Year	Percent of Maximum Table A	10-Yr Average	Hydrology Year	Predicted Table A %	Hydrology Year	Predicted Table A %	Hydrology Year	Predicted Table A %
1922	77%	-	-	-	-	-	-	-
1923	63%	-	-	-	-	-	-	-
1924	24%	-	-	-	-	-	1924	24%
1925	41%	-	-	-	-	-	1925	41%
1926	52%	-	-	-	-	-	1926	52%
1927	70%	-	-	-	-	-	1927	70%
1928	77%	-	-	-	-	-	1928	77%
1929	23%	-	-	-	-	-	1929	23%
1930	37%	-	-	-	-	-	1930	37%
1931	33%	50%	-	-	-	-	1931	33%
1932	32%	45%	-	-	-	-	1932	32%
1933	42%	**43%**	-	-	-	-	1933	42%
1934	26%	43%	-	-	-	-	-	-
1935	67%	46%	-	-	-	-	-	-
1936	75%	48%	-	-	-	-	-	-
1937	75%	49%	-	-	-	-	-	-
1938	100%	51%	-	-	-	-	-	-
1939	54%	54%	-	-	-	-	-	-
1940	65%	57%	-	-	-	-	-	-
1941	87%	62%	-	-	-	-	-	-
1942	70%	66%	-	-	1942	70%	-	-
1943	89%	71%	-	-	1943	89%	-	-
1944	42%	72%	-	-	1944	42%	-	-
1945	74%	73%	-	-	1945	74%	-	-
1946	68%	72%	-	-	1946	68%	-	-
1947	55%	70%	-	-	1947	55%	-	-
1948	52%	66%	-	-	1948	52%	-	-
1949	38%	64%	-	-	1949	38%	-	-
1950	61%	64%	-	-	1950	61%	-	-
1951	78%	**63%**	-	-	1951	78%	-	-
1952	91%	65%	-	-	-	-	-	-
1953	63%	62%	-	-	-	-	-	-
1954	64%	64%	-	-	-	-	-	-
1955	42%	61%	-	-	-	-	-	-
1956	89%	63%	-	-	-	-	-	-
1957	55%	63%	-	-	-	-	-	-
1958	100%	68%	-	-	-	-	-	-
1959	55%	70%	-	-	-	-	-	-
1960	48%	69%	-	-	-	-	-	-
1961	42%	65%	-	-	-	-	-	-
1962	56%	61%	-	-	-	-	-	-
1963	66%	62%	-	-	-	-	-	-
1964	64%	62%	-	-	-	-	-	-
1965	66%	64%	-	-	-	-	-	-

Table A-1 (continued)

SWP Model Simulation Result for MWA			Wettest 10-Year Period		Average 10-Year Period		Driest 10-Year Period	
Hydrology Year	Percent of Maximum Table A	10-Yr Average	Hydrology Year	Predicted Table A %	Hydrology Year	Predicted Table A %	Hydrology Year	Predicted Table A %
1966	63%	62%	-	-	-	-	-	-
1967	100%	66%	-	-	-	-	-	-
1968	54%	61%	-	-	-	-	-	-
1969	100%	66%	-	-	-	-	-	-
1970	76%	69%	-	-	-	-	-	-
1971	68%	71%	-	-	-	-	-	-
1972	52%	71%	-	-	-	-	-	-
1973	78%	72%	-	-	-	-	-	-
1974	85%	74%	-	-	-	-	-	-
1975	71%	75%	-	-	-	-	-	-
1976	42%	73%	-	-	-	-	-	-
1977	11%	64%	-	-	-	-	-	-
1978	81%	66%	1978	81%	-	-	-	-
1979	74%	64%	1979	74%	-	-	-	-
1980	100%	66%	1980	100%	-	-	-	-
1981	56%	65%	1981	56%	-	-	-	-
1982	100%	70%	1982	100%	-	-	-	-
1983	100%	72%	1983	100%	-	-	-	-
1984	79%	71%	1984	79%	-	-	-	-
1985	75%	72%	1985	75%	-	-	-	-
1986	89%	76%	1986	89%	-	-	-	-
1987	21%	**77%**	1987	21%	-	-	-	-
1988	21%	72%	-	-	-	-	-	-
1989	64%	70%	-	-	-	-	-	-
1990	24%	63%	-	-	-	-	-	-
1991	15%	59%	-	-	-	-	-	-
1992	24%	51%	-	-	-	-	-	-
1993	66%	48%	-	-	-	-	-	-
1994	46%	44%	-	-	-	-	-	-
1995	91%	46%	-	-	-	-	-	-
1996	77%	45%	-	-	-	-	-	-
1997	85%	51%	-	-	-	-	-	-
1998	88%	58%	-	-	-	-	-	-
1999	77%	59%	-	-	-	-	-	-
2000	74%	64%	-	-	-	-	-	-
2001	31%	66%	-	-	-	-	-	-
2002	64%	70%	-	-	-	-	-	-
2003	61%	69%	-	-	-	-	-	-
	Maximum	77%						
	Average	63%						
	Minimum	43%						

Source: Table B.23. Mojave WA: Existing Conditions, from The SWP Draft Delivery Capability Report 2015

Appendix B

Scenario 1A Calculations

Scenario 1A Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water[7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	6,500	0.97	-	1,780	1,865	-	1,865	0.95	0.35	602	1,117	1,117	602
2,016	6,500	0.97	-	3,023	1,899	-	1,899	0.95	0.35	612	1,137	1,137	612
2,017	6,500	0.97	-	4,265	1,933	-	1,933	0.95	0.35	623	1,158	1,158	623
2,018	3,500	0.97	-	5,508	1,967	-	1,967	0.95	0.35	634	1,178	1,178	634
2,019	6,500	0.97	-	6,424	2,001	-	2,001	0.95	0.35	645	1,199	1,199	645
2,020	6,500	0.97	-	7,666	2,035	-	2,035	0.95	0.35	656	1,219	1,219	656
2,021	6,500	0.97	-	8,909	2,069	-	2,069	0.95	0.35	667	1,239	1,239	667
2,022	6,500	0.97	-	10,151	2,103	-	2,103	0.95	0.35	678	1,260	1,260	678
2,023	6,500	0.97	-	11,394	2,137	-	2,137	0.95	0.35	689	1,280	1,280	689
2,024	2,000	0.97	-	12,637	2,171	-	2,171	0.95	0.35	700	1,300	1,300	700

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 1A Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water[18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,361	378	9,378	9,253	18,631	3,631	9,144	3,217	-	3,217	0.95	0.35	689	1,279	1,279	689
2,016	12,663	438	9,438	7,385	16,823	1,823	5,747	6,916	-	6,916	0.95	0.35	678	1,258	1,258	678
2,017	10,725	50	9,050	6,558	15,608	608	7,615	3,110	-	3,110	0.95	0.35	667	1,238	1,238	667
2,018	11,027	111	9,111	6,613	15,724	724	8,442	2,585	-	2,585	0.95	0.35	656	1,218	1,218	656
2,019	11,329	171	9,171	11,282	20,453	5,453	8,387	2,942	-	2,942	0.95	0.35	645	1,197	1,197	645
2,020	11,631	232	9,232	8,122	17,354	2,354	3,718	7,913	-	7,913	0.95	0.35	634	1,177	1,177	634
2,021	11,933	292	9,292	5,806	15,098	98	6,878	5,055	-	5,055	0.95	0.35	623	1,157	1,157	623
2,022	12,235	352	9,352	4,738	14,090	(910)	9,194	3,041	-	3,041	0.95	0.35	612	1,136	1,136	612
2,023	12,537	413	9,413	4,557	13,969	(1,031)	9,352	3,184	-	3,184	0.95	0.35	601	1,116	1,116	601
2,024	12,839	473	9,473	3,478	12,951	(2,049)	9,413	3,426	-	3,426	0.95	0.35	590	1,096	640	344

Notes:

10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 1A Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,170	0.40	126	188	188	-	2,367	0.40	-	-	-	-
2,016	1,192	0.40	126	188	188	-	5,892	0.40	-	-	-	-
2,017	1,213	0.40	126	188	188	-	2,288	0.40	-	-	-	-
2,018	1,234	0.40	126	188	188	-	1,800	0.40	-	-	-	-
2,019	1,256	0.40	126	188	188	-	2,150	0.40	0	0	0	-
2,020	1,277	0.40	126	188	188	-	6,883	0.40	-	-	-	-
2,021	1,298	0.40	126	188	188	-	4,179	0.40	-	-	-	-
2,022	1,320	0.40	126	188	188	-	2,277	0.40	-	-	-	-
2,023	1,341	0.40	126	188	188	-	2,424	0.40	-	-	-	-
2,024	1,362	0.40	406	609	609	-	2,910	0.40	0	0	0	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 1A Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	1,416	2,396	188	-	4,000	-	3,909	1,592	-	-	-	4,000	1,431
2,016	1,416	2,396	188	-	4,000	-	3,909	2,834	-	-	-	4,000	1,431
2,017	1,416	2,396	188	-	4,000	-	3,909	4,077	-	-	-	4,000	1,431
2,018	1,416	2,396	188	-	4,000	-	999	5,319	-	-	-	4,000	1,104
2,019	1,416	2,396	188	-	4,000	-	3,909	6,235	-	-	-	4,000	1,431
2,020	1,416	2,396	188	-	4,000	-	3,909	7,478	-	-	-	4,000	1,431
2,021	1,416	2,396	188	-	4,000	-	3,909	8,720	-	-	-	4,000	1,431
2,022	1,416	2,396	188	-	4,000	-	3,909	9,963	-	-	-	4,000	1,431
2,023	1,416	2,396	188	-	4,000	-	3,909	11,206	-	-	-	4,000	1,431
2,024	1,451	1,940	609	-	4,000	-	-	12,027	-	-	-	4,000	60

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Appendix C

Scenario 1B Calculations

Scenario 1B Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	6,500	0.93	-	1,780	1,859	-	1,859	0.90	0.25	389	1,167	1,167	389
2,016	6,500	0.93	-	1,900	1,881	-	1,881	0.90	0.25	394	1,181	1,181	394
2,017	3,000	0.93	-	2,019	1,903	-	1,903	0.90	0.25	398	1,195	1,195	398
2,018	6,500	0.93	-	2,052	1,925	-	1,925	0.90	0.25	403	1,208	1,208	403
2,019	6,500	0.93	-	2,171	1,947	-	1,947	0.90	0.25	407	1,222	1,222	407
2,020	3,500	0.93	-	2,291	1,969	-	1,969	0.90	0.25	412	1,236	1,236	412
2,021	3,500	0.93	-	2,411	1,991	-	1,991	0.90	0.25	417	1,250	1,250	417
2,022	2,500	0.93	-	2,530	2,013	-	2,013	0.90	0.25	421	1,264	1,264	421
2,023	6,500	0.93	-	2,075	2,035	-	2,035	0.90	0.25	426	1,277	1,277	426
2,024	6,500	0.93	-	2,195	2,057	-	2,057	0.90	0.25	430	1,291	1,291	430

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 1B Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water[18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,311	368	9,368	11,282	20,650	5,650	9,144	3,167	-	3,167	0.90	0.25	448	1,344	1,344	448
2,016	12,513	408	9,408	8,122	17,530	2,530	3,718	8,795	-	8,795	0.90	0.25	443	1,330	1,330	443
2,017	10,475	0	9,000	5,806	14,806	(194)	6,878	3,597	-	3,597	0.90	0.25	439	1,316	1,316	439
2,018	10,677	41	9,041	4,738	13,778	(1,222)	9,000	1,676	-	1,676	0.90	0.25	434	1,303	1,303	434
2,019	10,879	81	9,081	4,557	13,638	(1,362)	9,041	1,838	-	1,838	0.90	0.25	430	1,289	1,289	430
2,020	11,081	122	9,122	3,478	12,600	(2,400)	9,081	2,000	-	2,000	0.90	0.25	425	1,275	1,275	425
2,021	11,283	162	9,162	4,135	13,297	(1,703)	9,122	2,161	-	2,161	0.90	0.25	420	1,261	1,261	420
2,022	11,485	202	9,202	8,839	18,041	3,041	9,162	2,323	-	2,323	0.90	0.25	416	1,247	1,061	354
2,023	11,687	243	9,243	6,627	15,869	869	6,162	5,525	-	5,525	0.90	0.25	411	1,234	1,234	411
2,024	11,889	283	9,283	4,396	13,679	(1,321)	8,374	3,515	-	3,515	0.90	0.25	407	1,220	1,220	407

Notes:

10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 1B Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,284	0.30	196	456	456	-	2,402	0.30	(0)	(0)	(0)	-
2,016	1,299	0.30	196	456	456	-	7,472	0.30	(0)	(0)	(0)	-
2,017	1,314	0.30	196	456	456	-	2,798	0.30	0	0	0	-
2,018	1,330	0.30	196	456	456	-	1,075	0.30	(0)	(0)	(0)	-
2,019	1,345	0.30	196	456	456	-	1,225	0.30	(0)	(0)	(0)	-
2,020	1,360	0.30	196	456	456	-	1,375	0.30	(0)	(0)	(0)	-
2,021	1,375	0.30	196	456	456	-	1,525	0.30	(0)	(0)	(0)	-
2,022	1,390	0.30	270	630	630	-	1,737	0.30	-	-	-	-
2,023	1,406	0.30	196	456	456	-	4,562	0.30	(0)	(0)	(0)	-
2,024	1,421	0.30	196	456	456	-	2,757	0.30	(0)	(0)	(0)	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 1B Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	1,033	2,511	456	-	4,000	-	3,534	1,324	-	-	-	4,000	576
2,016	1,033	2,511	456	-	4,000	-	3,534	1,443	-	-	-	4,000	576
2,017	1,033	2,511	456	-	4,000	-	279	1,563	-	-	-	4,000	489
2,018	1,033	2,511	456	-	4,000	-	3,534	1,595	-	-	-	4,000	576
2,019	1,033	2,511	456	-	4,000	-	3,534	1,715	-	-	-	4,000	576
2,020	1,033	2,511	456	-	4,000	-	744	1,835	-	-	-	4,000	576
2,021	1,033	2,511	456	-	4,000	-	744	1,954	-	-	-	4,000	576
2,022	1,045	2,325	630	-	4,000	-	-	1,900	-	-	-	4,000	175
2,023	1,033	2,511	456	-	4,000	-	3,534	1,619	-	-	-	4,000	576
2,024	1,033	2,511	456	-	4,000	-	3,534	1,738	-	-	-	4,000	576

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Appendix D

Scenario 1C Calculations

Scenario 1C Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	2,000	0.89	-	1,780	1,854	-	1,854	0.85	0.2	281	1,122	1,122	281
2,016	3,000	0.89	-	453	1,865	-	1,865	0.85	0.2	282	1,129	1,129	282
2,017	3,500	0.89	-	93	1,876	-	1,876	0.85	0.2	284	1,135	1,135	284
2,018	6,500	0.89	-	93	1,887	-	1,887	0.85	0.2	286	1,142	1,142	286
2,019	6,500	0.89	-	93	1,898	-	1,898	0.85	0.2	287	1,149	1,149	287
2,020	2,000	0.89	-	93	1,909	-	1,909	0.85	0.2	289	1,155	1,155	289
2,021	2,500	0.89	-	93	1,920	-	1,920	0.85	0.2	290	1,162	1,162	290
2,022	2,500	0.89	-	93	1,931	-	1,931	0.85	0.2	292	1,169	1,169	292
2,023	2,500	0.89	-	93	1,942	-	1,942	0.85	0.2	294	1,175	1,175	294
2,024	3,000	0.89	-	93	1,953	-	1,953	0.85	0.2	295	1,182	1,182	295

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 1C Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water [18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,260	357	9,357	5,806	15,163	163	9,144	3,116	-	3,116	0.85	0.2	325	1,299	658	164
2,016	12,361	378	9,378	4,738	14,115	(885)	9,194	3,167	-	3,167	0.85	0.2	323	1,292	1,292	323
2,017	10,222	-	9,000	4,557	13,557	(1,444)	9,378	844	-	844	0.85	0.2	321	1,285	1,285	321
2,018	10,323	-	9,000	3,478	12,478	(2,522)	9,000	1,323	-	1,323	0.85	0.2	320	1,279	1,279	320
2,019	10,424	-	9,000	4,135	13,135	(1,865)	9,000	1,424	-	1,424	0.85	0.2	318	1,272	1,272	318
2,020	10,525	10	9,010	8,839	17,849	2,849	9,000	1,525	-	1,525	0.85	0.2	316	1,265	625	156
2,021	10,626	31	9,031	6,627	15,657	657	6,162	4,464	-	4,464	0.85	0.2	315	1,259	1,063	266
2,022	10,727	51	9,051	4,396	13,447	(1,553)	8,374	2,353	-	2,353	0.85	0.2	313	1,252	1,056	264
2,023	10,828	71	9,071	4,680	13,751	(1,249)	9,051	1,777	-	1,777	0.85	0.2	311	1,246	1,050	262
2,024	10,929	91	9,091	3,713	12,804	(2,196)	9,071	1,858	-	1,858	0.85	0.2	310	1,239	1,239	310

Notes:
10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 1C Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,295	0.20	259	1,036	1,036	-	2,484	0.20	96	384	384	-
2,016	1,303	0.20	195	779	453	326	2,369	0.20	-	-	-	-
2,017	1,311	0.20	195	779	93	686	396	0.20	(0)	(0)	(0)	-
2,018	1,318	0.20	195	779	93	686	805	0.20	-	-	-	-
2,019	1,326	0.20	195	779	93	686	892	0.20	(0)	(0)	(0)	-
2,020	1,334	0.20	267	1,067	93	974	1,140	0.20	88	353	-	353
2,021	1,342	0.20	244	975	93	882	3,529	0.20	-	-	-	-
2,022	1,349	0.20	244	975	93	882	1,736	0.20	-	-	-	-
2,023	1,357	0.20	244	975	93	882	1,248	0.20	-	-	-	-
2,024	1,365	0.20	195	779	93	686	1,269	0.20	(0)	(0)	(0)	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 1C Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	800	1,780	1,420	-	4,000	-	-	360	-	-	-	4,000	93
2,016	800	2,421	453	326	4,000	-	249	-	-	-	-	4,000	93
2,017	800	2,421	93	686	4,000	-	694	-	-	-	-	4,000	93
2,018	800	2,421	93	686	4,000	-	3,364	-	-	-	-	4,000	93
2,019	800	2,421	93	686	4,000	-	3,364	-	-	-	-	4,000	93
2,020	800	1,780	93	1,327	4,000	-	-	-	-	-	-	4,000	93
2,021	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,022	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,023	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,024	800	2,421	93	686	4,000	-	249	-	-	-	-	4,000	93

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Appendix E

Scenario 2A Calculations

Scenario 2A Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	6,500	0.97	-	1,780	1,865	-	1,865	0.95	0.35	602	1,117	1,117	602
2,016	6,500	0.97	-	2,481	1,899	-	1,899	0.95	0.35	612	1,137	1,137	612
2,017	6,500	0.97	-	3,724	1,933	-	1,933	0.95	0.35	623	1,158	1,158	623
2,018	3,500	0.97	-	4,397	1,967	-	1,967	0.95	0.35	634	1,178	1,178	634
2,019	6,500	0.97	-	5,025	2,001	-	2,001	0.95	0.35	645	1,199	1,199	645
2,020	6,500	0.97	-	5,676	2,035	-	2,035	0.95	0.35	656	1,219	1,219	656
2,021	6,500	0.97	-	6,918	2,069	-	2,069	0.95	0.35	667	1,239	1,239	667
2,022	6,500	0.97	-	8,161	2,103	-	2,103	0.95	0.35	678	1,260	1,260	678
2,023	6,500	0.97	-	8,778	2,137	-	2,137	0.95	0.35	689	1,280	1,280	689
2,024	2,000	0.97	-	9,387	2,171	-	2,171	0.95	0.35	700	1,300	1,300	700

Notes:

1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 1A Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water [18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,361	378	9,378	9,253	18,631	3,631	9,144	3,217	-	3,217	0.95	0.35	689	1,279	1,279	689
2,016	12,663	438	9,438	7,385	16,823	1,823	5,747	6,916	-	6,916	0.95	0.35	678	1,258	1,258	678
2,017	10,725	50	9,050	6,558	15,608	608	7,615	3,110	-	3,110	0.95	0.35	667	1,238	1,238	667
2,018	11,027	111	9,111	6,613	15,724	724	8,442	2,585	-	2,585	0.95	0.35	656	1,218	1,218	656
2,019	11,329	171	9,171	11,282	20,453	5,453	8,387	2,942	-	2,942	0.95	0.35	645	1,197	1,197	645
2,020	11,631	232	9,232	8,122	17,354	2,354	3,718	7,913	-	7,913	0.95	0.35	634	1,177	1,177	634
2,021	11,933	292	9,292	5,806	15,098	98	6,878	5,055	-	5,055	0.95	0.35	623	1,157	1,157	623
2,022	12,235	352	9,352	4,738	14,090	(910)	9,194	3,041	-	3,041	0.95	0.35	612	1,136	1,136	612
2,023	12,537	413	9,413	4,557	13,969	(1,031)	9,352	3,184	-	3,184	0.95	0.35	601	1,116	1,116	601
2,024	12,839	473	9,473	3,478	12,951	(2,049)	9,413	3,426	-	3,426	0.95	0.35	590	1,096	640	344

Notes:

10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 1A Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,170	0.40	126	188	188	-	2,367	0.40	-	-	-	-
2,016	1,192	0.40	126	188	188	-	5,892	0.40	-	-	-	-
2,017	1,213	0.40	126	188	188	-	2,288	0.40	-	-	-	-
2,018	1,234	0.40	126	188	188	-	1,800	0.40	-	-	-	-
2,019	1,256	0.40	126	188	188	-	2,150	0.40	0	0	0	-
2,020	1,277	0.40	126	188	188	-	6,883	0.40	-	-	-	-
2,021	1,298	0.40	126	188	188	-	4,179	0.40	-	-	-	-
2,022	1,320	0.40	126	188	188	-	2,277	0.40	-	-	-	-
2,023	1,341	0.40	126	188	188	-	2,424	0.40	-	-	-	-
2,024	1,362	0.40	406	609	609	-	2,910	0.40	0	0	0	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 1A Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	1,416	2,396	188	-	4,000	-	3,909	1,592	-	-	-	4,000	1,431
2,016	1,416	2,396	188	-	4,000	-	3,909	2,834	-	-	-	4,000	1,431
2,017	1,416	2,396	188	-	4,000	-	3,909	4,077	-	-	-	4,000	1,431
2,018	1,416	2,396	188	-	4,000	-	999	5,319	-	-	-	4,000	1,104
2,019	1,416	2,396	188	-	4,000	-	3,909	6,235	-	-	-	4,000	1,431
2,020	1,416	2,396	188	-	4,000	-	3,909	7,478	-	-	-	4,000	1,431
2,021	1,416	2,396	188	-	4,000	-	3,909	8,720	-	-	-	4,000	1,431
2,022	1,416	2,396	188	-	4,000	-	3,909	9,963	-	-	-	4,000	1,431
2,023	1,416	2,396	188	-	4,000	-	3,909	11,206	-	-	-	4,000	1,431
2,024	1,451	1,940	609	-	4,000	-	-	12,027	-	-	-	4,000	60

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Scenario 1B Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water[7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	6,500	0.93	-	1,780	1,859	-	1,859	0.90	0.25	389	1,167	1,167	389
2,016	6,500	0.93	-	1,900	1,881	-	1,881	0.90	0.25	394	1,181	1,181	394
2,017	3,000	0.93	-	2,019	1,903	-	1,903	0.90	0.25	398	1,195	1,195	398
2,018	6,500	0.93	-	2,052	1,925	-	1,925	0.90	0.25	403	1,208	1,208	403
2,019	6,500	0.93	-	2,171	1,947	-	1,947	0.90	0.25	407	1,222	1,222	407
2,020	3,500	0.93	-	2,291	1,969	-	1,969	0.90	0.25	412	1,236	1,236	412
2,021	3,500	0.93	-	2,411	1,991	-	1,991	0.90	0.25	417	1,250	1,250	417
2,022	2,500	0.93	-	2,530	2,013	-	2,013	0.90	0.25	421	1,264	1,264	421
2,023	6,500	0.93	-	2,075	2,035	-	2,035	0.90	0.25	426	1,277	1,277	426
2,024	6,500	0.93	-	2,195	2,057	-	2,057	0.90	0.25	430	1,291	1,291	430

Notes:

1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 1B Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water[18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,311	368	9,368	11,282	20,650	5,650	9,144	3,167	-	3,167	0.90	0.25	448	1,344	1,344	448
2,016	12,513	408	9,408	8,122	17,530	2,530	3,718	8,795	-	8,795	0.90	0.25	443	1,330	1,330	443
2,017	10,475	0	9,000	5,806	14,806	(194)	6,878	3,597	-	3,597	0.90	0.25	439	1,316	1,316	439
2,018	10,677	41	9,041	4,738	13,778	(1,222)	9,000	1,676	-	1,676	0.90	0.25	434	1,303	1,303	434
2,019	10,879	81	9,081	4,557	13,638	(1,362)	9,041	1,838	-	1,838	0.90	0.25	430	1,289	1,289	430
2,020	11,081	122	9,122	3,478	12,600	(2,400)	9,081	2,000	-	2,000	0.90	0.25	425	1,275	1,275	425
2,021	11,283	162	9,162	4,135	13,297	(1,703)	9,122	2,161	-	2,161	0.90	0.25	420	1,261	1,261	420
2,022	11,485	202	9,202	8,839	18,041	3,041	9,162	2,323	-	2,323	0.90	0.25	416	1,247	1,061	354
2,023	11,687	243	9,243	6,627	15,869	869	6,162	5,525	-	5,525	0.90	0.25	411	1,234	1,234	411
2,024	11,889	283	9,283	4,396	13,679	(1,321)	8,374	3,515	-	3,515	0.90	0.25	407	1,220	1,220	407

Notes:

10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 1B Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,284	0.30	196	456	456	-	2,402	0.30	(0)	(0)	(0)	-
2,016	1,299	0.30	196	456	456	-	7,472	0.30	(0)	(0)	(0)	-
2,017	1,314	0.30	196	456	456	-	2,798	0.30	0	0	0	-
2,018	1,330	0.30	196	456	456	-	1,075	0.30	(0)	(0)	(0)	-
2,019	1,345	0.30	196	456	456	-	1,225	0.30	(0)	(0)	(0)	-
2,020	1,360	0.30	196	456	456	-	1,375	0.30	(0)	(0)	(0)	-
2,021	1,375	0.30	196	456	456	-	1,525	0.30	(0)	(0)	(0)	-
2,022	1,390	0.30	270	630	630	-	1,737	0.30	-	-	-	-
2,023	1,406	0.30	196	456	456	-	4,562	0.30	(0)	(0)	(0)	-
2,024	1,421	0.30	196	456	456	-	2,757	0.30	(0)	(0)	(0)	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 1B Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	1,033	2,511	456	-	4,000	-	3,534	1,324	-	-	-	4,000	576
2,016	1,033	2,511	456	-	4,000	-	3,534	1,443	-	-	-	4,000	576
2,017	1,033	2,511	456	-	4,000	-	279	1,563	-	-	-	4,000	489
2,018	1,033	2,511	456	-	4,000	-	3,534	1,595	-	-	-	4,000	576
2,019	1,033	2,511	456	-	4,000	-	3,534	1,715	-	-	-	4,000	576
2,020	1,033	2,511	456	-	4,000	-	744	1,835	-	-	-	4,000	576
2,021	1,033	2,511	456	-	4,000	-	744	1,954	-	-	-	4,000	576
2,022	1,045	2,325	630	-	4,000	-	-	1,900	-	-	-	4,000	175
2,023	1,033	2,511	456	-	4,000	-	3,534	1,619	-	-	-	4,000	576
2,024	1,033	2,511	456	-	4,000	-	3,534	1,738	-	-	-	4,000	576

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Scenario 1C Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	2,000	0.89	-	1,780	1,854	-	1,854	0.85	0.2	281	1,122	1,122	281
2,016	3,000	0.89	-	453	1,865	-	1,865	0.85	0.2	282	1,129	1,129	282
2,017	3,500	0.89	-	93	1,876	-	1,876	0.85	0.2	284	1,135	1,135	284
2,018	6,500	0.89	-	93	1,887	-	1,887	0.85	0.2	286	1,142	1,142	286
2,019	6,500	0.89	-	93	1,898	-	1,898	0.85	0.2	287	1,149	1,149	287
2,020	2,000	0.89	-	93	1,909	-	1,909	0.85	0.2	289	1,155	1,155	289
2,021	2,500	0.89	-	93	1,920	-	1,920	0.85	0.2	290	1,162	1,162	290
2,022	2,500	0.89	-	93	1,931	-	1,931	0.85	0.2	292	1,169	1,169	292
2,023	2,500	0.89	-	93	1,942	-	1,942	0.85	0.2	294	1,175	1,175	294
2,024	3,000	0.89	-	93	1,953	-	1,953	0.85	0.2	295	1,182	1,182	295

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 1C Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water [18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,260	357	9,357	5,806	15,163	163	9,144	3,116	-	3,116	0.85	0.2	325	1,299	658	164
2,016	12,361	378	9,378	4,738	14,115	(885)	9,194	3,167	-	3,167	0.85	0.2	323	1,292	1,292	323
2,017	10,222	-	9,000	4,557	13,557	(1,444)	9,378	844	-	844	0.85	0.2	321	1,285	1,285	321
2,018	10,323	-	9,000	3,478	12,478	(2,522)	9,000	1,323	-	1,323	0.85	0.2	320	1,279	1,279	320
2,019	10,424	-	9,000	4,135	13,135	(1,865)	9,000	1,424	-	1,424	0.85	0.2	318	1,272	1,272	318
2,020	10,525	10	9,010	8,839	17,849	2,849	9,000	1,525	-	1,525	0.85	0.2	316	1,265	625	156
2,021	10,626	31	9,031	6,627	15,657	657	6,162	4,464	-	4,464	0.85	0.2	315	1,259	1,063	266
2,022	10,727	51	9,051	4,396	13,447	(1,553)	8,374	2,353	-	2,353	0.85	0.2	313	1,252	1,056	264
2,023	10,828	71	9,071	4,680	13,751	(1,249)	9,051	1,777	-	1,777	0.85	0.2	311	1,246	1,050	262
2,024	10,929	91	9,091	3,713	12,804	(2,196)	9,071	1,858	-	1,858	0.85	0.2	310	1,239	1,239	310

Notes:

10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 1C Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,295	0.20	259	1,036	1,036	-	2,484	0.20	96	384	384	-
2,016	1,303	0.20	195	779	453	326	2,369	0.20	-	-	-	-
2,017	1,311	0.20	195	779	93	686	396	0.20	(0)	(0)	(0)	-
2,018	1,318	0.20	195	779	93	686	805	0.20	-	-	-	-
2,019	1,326	0.20	195	779	93	686	892	0.20	(0)	(0)	(0)	-
2,020	1,334	0.20	267	1,067	93	974	1,140	0.20	88	353	-	353
2,021	1,342	0.20	244	975	93	882	3,529	0.20	-	-	-	-
2,022	1,349	0.20	244	975	93	882	1,736	0.20	-	-	-	-
2,023	1,357	0.20	244	975	93	882	1,248	0.20	-	-	-	-
2,024	1,365	0.20	195	779	93	686	1,269	0.20	(0)	(0)	(0)	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 1C Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	800	1,780	1,420	-	4,000	-	-	360	-	-	-	4,000	93
2,016	800	2,421	453	326	4,000	-	249	-	-	-	-	4,000	93
2,017	800	2,421	93	686	4,000	-	694	-	-	-	-	4,000	93
2,018	800	2,421	93	686	4,000	-	3,364	-	-	-	-	4,000	93
2,019	800	2,421	93	686	4,000	-	3,364	-	-	-	-	4,000	93
2,020	800	1,780	93	1,327	4,000	-	-	-	-	-	-	4,000	93
2,021	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,022	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,023	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,024	800	2,421	93	686	4,000	-	249	-	-	-	-	4,000	93

Notes:
24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Scenario 2A Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	6,500	0.97	-	1,780	1,865	-	1,865	0.95	0.35	602	1,117	1,117	602
2,016	6,500	0.97	-	2,481	1,899	-	1,899	0.95	0.35	612	1,137	1,137	612
2,017	6,500	0.97	-	3,724	1,933	-	1,933	0.95	0.35	623	1,158	1,158	623
2,018	3,500	0.97	-	4,397	1,967	-	1,967	0.95	0.35	634	1,178	1,178	634
2,019	6,500	0.97	-	5,025	2,001	-	2,001	0.95	0.35	645	1,199	1,199	645
2,020	6,500	0.97	-	5,676	2,035	-	2,035	0.95	0.35	656	1,219	1,219	656
2,021	6,500	0.97	-	6,918	2,069	-	2,069	0.95	0.35	667	1,239	1,239	667
2,022	6,500	0.97	-	8,161	2,103	-	2,103	0.95	0.35	678	1,260	1,260	678
2,023	6,500	0.97	-	8,778	2,137	-	2,137	0.95	0.35	689	1,280	1,280	689
2,024	2,000	0.97	-	9,387	2,171	-	2,171	0.95	0.35	700	1,300	1,300	700

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 2A Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water [18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,361	378	9,378	9,253	18,631	3,631	9,144	3,217	3,150	67	0.95	0.35	67	124	124	67
2,016	12,663	438	9,438	7,385	16,823	1,823	5,747	6,916	3,150	3,766	0.95	0.35	678	1,258	1,258	678
2,017	10,725	50	9,050	6,558	15,608	608	7,615	3,110	3,150	-	0.95	0.35	-	-	-	-
2,018	11,027	111	9,111	6,613	15,724	724	8,442	2,585	3,150	-	0.95	0.35	-	-	-	-
2,019	11,329	171	9,171	11,282	20,453	5,453	8,387	2,942	3,150	-	0.95	0.35	-	-	-	-
2,020	11,631	232	9,232	8,122	17,354	2,354	3,718	7,913	3,150	4,763	0.95	0.35	634	1,177	1,177	634
2,021	11,933	292	9,292	5,806	15,098	98	6,878	5,055	3,150	1,905	0.95	0.35	623	1,157	1,157	623
2,022	12,235	352	9,352	4,738	14,090	(910)	9,194	3,041	3,150	-	0.95	0.35	-	-	-	-
2,023	12,537	413	9,413	4,557	13,969	(1,031)	9,352	3,184	3,150	34	0.95	0.35	34	64	64	34
2,024	12,839	473	9,473	3,478	12,951	(2,049)	9,413	3,426	3,150	276	0.95	0.35	276	513	513	276

Notes:

10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 2A Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,170	0.40	468	702	702	-	-	0.40	-	-	-	-
2,016	1,192	0.40	126	188	188	-	2,900	0.40	-	-	-	-
2,017	1,213	0.40	485	728	728	-	-	0.40	-	-	-	-
2,018	1,234	0.40	494	741	741	-	-	0.40	-	-	-	-
2,019	1,256	0.40	502	753	753	-	-	0.40	-	-	-	-
2,020	1,277	0.40	126	188	188	-	3,891	0.40	-	-	-	-
2,021	1,298	0.40	126	188	188	-	1,187	0.40	-	-	-	-
2,022	1,320	0.40	528	792	792	-	-	0.40	-	-	-	-
2,023	1,341	0.40	536	805	805	-	-	0.40	-	-	-	-
2,024	1,362	0.40	484	726	726	-	-	0.40	-	-	-	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 2A Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	1,136	1,241	702	-	3,080	920	5,064	1,078	893	28	-	4,000	1,431
2,016	1,416	2,396	188	-	4,000	-	3,909	2,293	-	-	-	4,000	1,431
2,017	1,109	1,158	728	-	2,994	1,006	5,147	2,996	976	30	-	4,000	1,431
2,018	1,128	1,178	741	-	3,047	953	2,217	3,656	925	29	-	4,000	1,397
2,019	1,148	1,199	753	-	3,099	901	5,106	4,272	873	27	-	4,000	1,431
2,020	1,416	2,396	188	-	4,000	-	3,909	5,487	-	-	-	4,000	1,431
2,021	1,416	2,396	188	-	4,000	-	3,909	6,730	-	-	-	4,000	1,431
2,022	1,206	1,260	792	-	3,257	743	5,045	7,369	720	22	-	4,000	1,431
2,023	1,260	1,344	805	-	3,409	591	4,961	7,973	574	18	-	4,000	1,431
2,024	1,461	1,813	726	-	4,000	-	127	8,660	-	-	-	4,000	187

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Appendix F

Scenario 2B Calculations

Scenario 2B Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	6,500	0.93	-	1,780	1,859	-	1,859	0.90	0.25	389	1,167	1,167	389
2,016	6,500	0.93	-	1,381	1,881	-	1,881	0.90	0.25	394	1,181	1,181	394
2,017	3,000	0.93	-	1,500	1,903	-	1,903	0.90	0.25	398	1,195	1,195	398
2,018	6,500	0.93	-	1,533	1,925	-	1,925	0.90	0.25	403	1,208	1,208	403
2,019	6,500	0.93	-	1,104	1,947	-	1,947	0.90	0.25	407	1,222	1,222	407
2,020	3,500	0.93	-	667	1,969	-	1,969	0.90	0.25	412	1,236	1,236	412
2,021	3,500	0.93	-	576	1,991	-	1,991	0.90	0.25	417	1,250	1,250	417
2,022	2,500	0.93	-	576	2,013	-	2,013	0.90	0.25	421	1,264	1,264	421
2,023	6,500	0.93	-	376	2,035	-	2,035	0.90	0.25	426	1,277	1,277	426
2,024	6,500	0.93	-	576	2,057	-	2,057	0.90	0.25	430	1,291	1,291	430

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 2B Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water [18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,311	368	9,368	11,282	20,650	5,650	9,144	3,167	3,150	17	0.90	0.25	17	50	50	17
2,016	12,513	408	9,408	8,122	17,530	2,530	3,718	8,795	3,150	5,645	0.90	0.25	443	1,330	1,330	443
2,017	10,475	0	9,000	5,806	14,806	(194)	6,878	3,597	3,150	447	0.90	0.25	439	1,316	1,316	439
2,018	10,677	41	9,041	4,738	13,778	(1,222)	9,000	1,676	3,150	-	0.90	0.25	-	-	-	-
2,019	10,879	81	9,081	4,557	13,638	(1,362)	9,041	1,838	3,150	-	0.90	0.25	-	-	-	-
2,020	11,081	122	9,122	3,478	12,600	(2,400)	9,081	2,000	3,150	-	0.90	0.25	-	-	-	-
2,021	11,283	162	9,162	4,135	13,297	(1,703)	9,122	2,161	3,150	-	0.90	0.25	-	-	-	-
2,022	11,485	202	9,202	8,839	18,041	3,041	9,162	2,323	3,150	-	0.90	0.25	-	-	-	-
2,023	11,687	243	9,243	6,627	15,869	869	6,162	5,525	3,150	2,375	0.90	0.25	411	1,234	1,234	411
2,024	11,889	283	9,283	4,396	13,679	(1,321)	8,374	3,515	3,150	365	0.90	0.25	365	1,096	1,096	365

Notes:
10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 2B Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,284	0.30	385	899	899	-	-	0.30	-	-	-	-
2,016	1,299	0.30	196	456	456	-	4,637	0.30	(0)	(0)	(0)	-
2,017	1,314	0.30	196	456	456	-	-	0.30	-	-	-	-
2,018	1,330	0.30	399	931	931	-	-	0.30	-	-	-	-
2,019	1,345	0.30	403	941	941	-	-	0.30	-	-	-	-
2,020	1,360	0.30	408	952	667	285	-	0.30	-	-	-	-
2,021	1,375	0.30	413	963	576	387	-	0.30	-	-	-	-
2,022	1,390	0.30	417	973	576	397	-	0.30	-	-	-	-
2,023	1,406	0.30	196	456	376	80	1,727	0.30	(0)	(0)	(0)	-
2,024	1,421	0.30	245	572	572	-	-	0.30	-	-	-	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 2B Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	791	1,217	899	-	2,907	1,093	4,828	881	1,016	76	-	4,000	576
2,016	1,033	2,511	456	-	4,000	-	3,534	924	-	-	-	4,000	576
2,017	1,033	2,511	456	-	4,000	-	279	1,044	-	-	-	4,000	489
2,018	802	1,208	931	-	2,941	1,059	4,837	602	985	74	-	4,000	576
2,019	811	1,222	941	-	2,975	1,025	4,823	163	954	72	-	4,000	576
2,020	820	1,236	667	285	3,008	992	2,019	-	922	-	69	4,000	576
2,021	829	1,250	576	387	3,042	958	2,005	-	891	-	67	4,000	576
2,022	838	1,264	576	397	3,075	925	1,061	-	860	-	65	4,000	376
2,023	1,033	2,511	376	80	4,000	-	3,534	-	-	-	-	4,000	576
2,024	1,041	2,387	572	-	4,000	-	3,658	4	-	-	-	4,000	576

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.

Appendix G

Scenario 2C Calculations

Scenario 2C Calculations - IWWTP Recycled Water Blended with SWP Water

	SWP Supply[1]	Fraction of Time SWP Water is Available and Suitable for Cooling[2]	Not Used	Banked SWP Availability[3]	IWWTP Flow[4]	ABS Backwash to IWWTP[5]	Total IWWTP Flow	IWWTP Recycled Water Availability Factor[6]	Allowable Recycled Water Fraction When Blending with SWP Water [7]	Potentially Usable IWWTP RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for IWWTP RW Blending	IWWTP RW Blended with SWP Water
Units	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	A	B	C	D	E	F	G	H	I	J	K	L	M
Calculation	N/A	N/A	N/A	See Footnote	N/A	N/A	E+F	N/A	N/A	Logical[8]	(1-I)*J/I	Logical[9]	L*I/(1-I)
Year													
2,014													
2,015	2,000	0.89	-	1,780	1,854	-	1,854	0.85	0.2	281	1,122	1,122	281
2,016	3,000	0.89	-	193	1,865	-	1,865	0.85	0.2	282	1,129	1,129	282
2,017	3,500	0.89	-	93	1,876	-	1,876	0.85	0.2	284	1,135	1,135	284
2,018	6,500	0.89	-	93	1,887	-	1,887	0.85	0.2	286	1,142	1,142	286
2,019	6,500	0.89	-	93	1,898	-	1,898	0.85	0.2	287	1,149	1,149	287
2,020	2,000	0.89	-	93	1,909	-	1,909	0.85	0.2	289	1,155	1,155	289
2,021	2,500	0.89	-	93	1,920	-	1,920	0.85	0.2	290	1,162	1,162	290
2,022	2,500	0.89	-	93	1,931	-	1,931	0.85	0.2	292	1,169	1,169	292
2,023	2,500	0.89	-	93	1,942	-	1,942	0.85	0.2	294	1,175	1,175	294
2,024	3,000	0.89	-	93	1,953	-	1,953	0.85	0.2	295	1,182	1,182	295

Notes:
1. See Table 9 and text for further explanation.
2. See Text for further explanation.
3. Equals sum of historical injections minus extractions, minus dissipation, minus 1,000 acre-foot buffer. Dissipation is based on average through 2013, which was approximately 34 AFY (Abulaban, 2013).
4. See Table 3 and text for further explanation of values. IWWTP water is provided by the City of Victorville as first priority over VVWRA (pers. Comm., Boyer, 2015).
5. Not used.
6. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
7. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
8. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
9. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A) and availability (column B).

Scenario 2C Calculations - VVWRA Recycled Water Blended with SWP Water

	Adjusted VVWRA Flow[10]	Growth Factor for DFG MOU[11]	Required Discharge to Mojave River	Mojave River Base Flow @ Lower Narrows[12]	Required Discharge + Base Flow	Excess Discharge (Credit if Positive)	Required Discharge to Mojave River	Recycled Water Not Needed to Meet F&G MOU Requirements	Victorville 2 RW Water Demand[15]	Potentially Available VVWRA RW	VVWRA Recycled Water Availability Factor[17]	Allowable Recycled Water Fraction When Blending with SWP Water[18]	Potentially Usable VVWRA RW if Blended with SWP Water	SWP Blending Water Required	SWP Used for VVWRA RW Blending	VVWRA RW Blended with SWP Water
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(-)	(AF)	(AF)	(AF)	(AF)
Column	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
Calculation	N/A	See Footnote	9,000+O	N/A	P+Q	R-15,000	Logical[14]	N-T	N/A	Logical[16]	N/A	N/A	Logical[19]	(1-Y)*Z/Y	Logical[20]	AB*Y/(1-Y)
Year																
2,014	13,554	616	9,616	5,856	15,472	472										
2,015	12,260	357	9,357	5,806	15,163	163	9,144	3,116	3,150	-	0.85	0.2	-	-	-	-
2,016	12,361	378	9,378	4,738	14,115	(885)	9,194	3,167	3,150	17	0.85	0.2	17	67	67	17
2,017	10,222	-	9,000	4,557	13,557	(1,444)	9,378	844	3,150	-	0.85	0.2	-	-	-	-
2,018	10,323	-	9,000	3,478	12,478	(2,522)	9,000	1,323	3,150	-	0.85	0.2	-	-	-	-
2,019	10,424	-	9,000	4,135	13,135	(1,865)	9,000	1,424	3,150	-	0.85	0.2	-	-	-	-
2,020	10,525	10	9,010	8,839	17,849	2,849	9,000	1,525	3,150	-	0.85	0.2	-	-	-	-
2,021	10,626	31	9,031	6,627	15,657	657	6,162	4,464	3,150	1,314	0.85	0.2	315	1,259	1,063	266
2,022	10,727	51	9,051	4,396	13,447	(1,553)	8,374	2,353	3,150	-	0.85	0.2	-	-	-	-
2,023	10,828	71	9,071	4,680	13,751	(1,249)	9,051	1,777	3,150	-	0.85	0.2	-	-	-	-
2,024	10,929	91	9,091	3,713	12,804	(2,196)	9,071	1,858	3,150	-	0.85	0.2	-	-	-	-

Notes:
10. 2014 data from VVWRA; 2015 - 2024 values are 2014 plus increase due to growth minus diversions to subregional plants and IWWTP. See Table 5 and text for further information.
11. Calculated as 20% of VVWRA ADWF increase compared to 2003 ADWF baseline, per CDFG MOU.
12. Value varies with scenario. See Table 6 and text for further explanation.
14. Equals prior year required discharge if no prior year credit. Equals prior year required discharge less credit if one is available.
15. Varies with scenario. See Table 12 for further explanation.
16. Logic statement prevents negative values. U-V, unless result is negative. Zero if result would be negative.
17. Fraction of time wastewater plant is capable of producing Recycled Water. Value varies with scenario. See text for further information.
18. Maximum fraction of Recycled Water that can be blended with SWP Water and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
19. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand, SWP availability, and blending fraction.
20. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior use (column L). -

Scenario 2C Calculations - IWWTP and VVWRA Recycled Water Blended with Banked SWP Water and MRB Adjudicated Groundwater

	Remaining Potentially Usable IWWTP RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	IWWTP RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for IWWTP RW Blending	Adjudicated MRB Groundwater Used for IWWTP RW Blending	Remaining Potentially Usable VVWRA RW	Allowable Recycled Water Fraction When Blending with Banked SWP Water or MRB Adjudicated Groundwater[21]	VVWRA RW Blended with Banked SWP Water or MRB Adjudicated Groundwater	Banked SWP or MRB Adjudicated Groundwater Needed For Blending	Banked SWP Used for VVWRA RW Blending	Adjudicated MRB Groundwater Used for VVWRA RW Blending
Units	(AF)	(-)	(AF)	(AF)	(AF)	(AF)	(AF)	(-)	(AF)	(AF)	(AF)	(AF)
Column	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
Calculation	(G*H)-M	N/A	Logical[22]	AF*(1-AE)/AE	Logical[23]	AG-AH	(W*X)-AC	N/A	Logical[22]	AL*(1-AK)/AK	Logical[23]	AM-AN
Year												
2,014												
2,015	1,295	0.20	259	1,036	1,036	-	-	0.20	-	-	-	-
2,016	1,303	0.20	261	1,042	193	850	-	0.20	-	-	-	-
2,017	1,311	0.20	262	1,049	93	956	-	0.20	-	-	-	-
2,018	1,318	0.20	264	1,055	93	962	-	0.20	-	-	-	-
2,019	1,326	0.20	265	1,061	93	968	-	0.20	-	-	-	-
2,020	1,334	0.20	267	1,067	93	974	-	0.20	-	-	-	-
2,021	1,342	0.20	244	975	93	882	851	0.20	-	-	-	-
2,022	1,349	0.20	270	1,079	93	986	-	0.20	-	-	-	-
2,023	1,357	0.20	271	1,086	93	993	-	0.20	-	-	-	-
2,024	1,365	0.20	273	1,092	93	999	-	0.20	-	-	-	-

Notes:

21. Maximum fraction of Recycled Water that can be blended with Banked SWP Water or MRB Groundwater and meet cooling tower blowdown monitoring parameters. See Table 12 and text for further explanation.
22. Logic statement prevents result from exceeding maximum amount of Recycled Water that can be used by Facility when considering water demand and blending fraction.
23. Logic statement prevents result from exceeding available Banked SWP Water.

Scenario 2C Calculations - Unblended Banked SWP Water and MRB Adjudicated Groundwater Use; Total Water Use; and SWP Banking

	Total RW Used For Cooling	Total SWP Used for RW Blending	Total Banked SWP Used for RW Blending	Total Adjudicated MRB Groundwater Used for RW Blending	Total Blended Water Used for Cooling	Deficit After Using Blended Water	Remaining SWP Available for Cooling	Remaining Banked SWP Available for Cooling	Total SWP Used Directly for Cooling	Total Banked SWP Used Directly for Cooling	Total Adjudicated MRB Groundwater Used Directly for Cooling	Total Water Used for Cooling	SWP Banked[26]
Units	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)	(AF)
Column	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB
Calculation	M+AC+AF+AL	L+AB	AH+AN	AI+AO	AP+AQ+AR+AS	4800-AT	(A*B)-AQ	D-AR	Logical[24]	Logical[25]	AU-AX-AY	AT+AX+AY+AZ	See Footnote
Year													
2,014													
2,015	540	1,122	1,036	-	2,698	1,302	658	744	658	644	-	4,000	93
2,016	560	1,196	193	850	2,798	1,202	1,474	-	1,070	-	132	4,000	93
2,017	546	1,135	93	956	2,730	1,270	1,980	-	1,130	-	140	4,000	93
2,018	549	1,142	93	962	2,746	1,254	4,643	-	1,116	-	138	4,000	93
2,019	552	1,149	93	968	2,762	1,238	4,636	-	1,102	-	136	4,000	93
2,020	556	1,155	93	974	2,778	1,222	625	-	625	-	597	4,000	93
2,021	800	2,225	93	882	4,000	-	-	-	-	-	-	4,000	93
2,022	562	1,169	93	986	2,810	1,190	1,056	-	1,056	-	134	4,000	93
2,023	565	1,175	93	993	2,826	1,174	1,050	-	1,050	-	124	4,000	93
2,024	568	1,182	93	999	2,842	1,158	1,488	-	1,031	-	127	4,000	93

Notes:

24. Logic statement prevents SWP water use in excess of available SWP Water when considering SWP supply (column A), availability (column B) and prior uses (column AQ).
25. Logic statement prevents result from exceeding available Banked SWP Water when considering prior uses (column AR).
26. Remaining available SWP water is banked. Banking is volume capped at historical average banking volume. See text for further information.