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NATIONAL PARKS CONSERVATION ASSOCIATION
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STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Water Quality Certification for Eagle Crest Energy Company's Eagle Mountain Pumped Storage Hydroelectric Project, Federal Energy Regulatory Commission Project No. 13123	**PETITION FOR RECONSIDERATION OF CLEAN WATER ACT SECTION 401 CERTIFICATION DECISION BY STATE WATER RESOURCES CONTROL BOARD EXECUTIVE DIRECTOR THOMAS HOWARD**

Pursuant to Section 13330 of the California Water Code and Section 3867 of Title 23 of the California Code of Regulations, National Parks Conservation Association and San Bernardino Valley Audubon Society (collectively "Petitioner") hereby petitions the State Water Resources Control Board ("State Board") to review Executive Director Thomas Howard's July 15, 2013 issuance of a water quality certification under section 401 of the Clean Water Act, 33 U.S.C. § 1341, and the State's implementing regulations, 23 Cal. Code Regs. §§ 3830-69, for the Eagle Mountain Pumped Storage Hydroelectric Project ("Project"), Federal Energy Regulatory Commission ("FERC") Project No. 13123, proposed by Eagle Crest Energy Company ("Eagle Crest"). Section 401 of the Clean Water Act provides that any certification "shall set forth any effluent limitations and other limitations, and monitoring requirements necessary to *assure that any applicant* for a Federal license or permit *will comply* with any applicable effluent limitations and other limitations . . . standard of performance . . . or prohibition, effluent standard, or pretreatment standard . . . *and with any other appropriate requirement of State law* . . ." 33 U.S.C. § 1341(d) (emphasis added). As explained below, the July 15, 2013 certification decision does not comport with this requirement or with the requirements of the California Environmental Quality Act ("CEQA"), Cal. Pub. Res. Code § 21000 *et seq.*

In accordance with section 3867(d) of Title 23 of the California Code of Regulations, Petitioner provides the following information:

1. NAME, ADDRESS, AND TELEPHONE NUMBER OF THE PETITIONER:

National Parks Conservation Association
400 South 2nd Avenue, #213
Barstow, CA 92311
Telephone: 760-219-4916
Attention: David Lamfrom, California Desert Senior Program Manager

San Bernardino Valley Audubon Society
P.O. Box 10973
San Bernardino, CA 92423
Telephone: 909-881-6081
Attention: Drew Feldmann, Conservation Chair

2. THE SPECIFIC ACTION WHICH THE STATE BOARD IS REQUESTED TO RECONSIDER AND A COPY OF ANY ORDER OR RESOLUTION OF THE REGIONAL BOARD WHICH IS REFERRED TO IN THE PETITION:

Petitioner seeks review of Executive Director Thomas Howard's decision on July 15, 2013 to issue a Clean Water Act section 401 water quality certification for the proposed Eagle Mountain Pumped Storage Hydroelectric Project ("Certification"). A copy of the Certification is attached hereto as Exhibit A.

3. THE DATE ON WHICH THE CERTIFICATION ACTION OR FAILURE TO ACT OCCURRED:

The Executive Director issued the Certification on July 15, 2013.

4. A FULL AND COMPLETE STATEMENT OF REASONS WHY THE ACTION OR FAILURE TO ACT WAS INAPPROPRIATE OR IMPROPER:

Proponent Eagle Crest proposes to construct and operate a pumped storage hydroelectric generation facility on approximately 2,500 acres of federal and private land adjacent to Joshua Tree National Park. The Project will utilize two large former iron ore mine pits, pumping water into the higher elevation pit during low electricity demand periods and releasing water to the lower elevation pit during times of higher electricity demand. The released water will run through underground turbines, generating electricity that will be conveyed through a new transmission line to a power substation south of the Eagle Mountains. At capacity, the Project is designed to produce 1,300 MW of power, generating up to 4,308 Gigawatt hours ("GWh) per year. But operation of the Project will consume 1,600 MW, or 5744 GWh annually, to pump water to the upper mining reservoir, resulting in a net energy loss of 1,436 GWh per year over an estimated project life of 50 years. In issuing the section 401 certification, the State Board acted as the CEQA lead agency, preparing and certifying an Environmental Impact Report ("EIR") for the Project and filing a CEQA Notice of Determination with the Office of Planning and Research on July 15, 2013.

As demonstrated by uncontradicted evidence and expert comments in the record, the State Board has not accurately analyzed or adequately disclosed the greenhouse gas emissions associated with the Project's net 300 MW energy expenditure. Moreover, operation of the Project will have significant – but not yet fully evaluated – adverse impacts on groundwater quality and quantity and on sensitive species, vulnerable desert ecosystems, and Joshua Tree National Park's wilderness values. The EIR and Certification documents concede that a full and thorough evaluation of these potential impacts has not yet been completed. Accordingly, issuance of the Certification was at best premature, and the CEQA review for the Executive Director's decision was legally improper.

The section 401 application and proposed Project have a long history of proceedings before both the State Board and FERC. Throughout these processes, numerous individuals, non-governmental organizations, private corporations, and federal, state, and local government agencies have raised a plethora of concerns about the Project's impacts on air quality and climate, groundwater quantity and quality, protected species and ecosystems, and other desert resources. Uniform to these comments has been the concern that neither the State Board nor FERC has sufficiently evaluated the environmental setting and project impacts, in part because Eagle Crest and its consultants have never had access to the Project site. Rather than delay certification and address these significant and legitimate concerns, however, the Executive Director issued the section 401 Certification with conditions requiring further site investigation and future approvals by the Deputy Director. As nearly every commenter has repeatedly explained, this approach puts the cart before the horse, violating the fundamental tenets of CEQA and failing to provide substantial evidence to support the certification decision. *See* Comments on Draft EIR, Draft Water Quality Certification, and Draft Final Water Quality Certification, available at http://www.waterboards.ca.gov/waterrights/water_issues/programs/ water_quality_ cert/eaglemtn_ferc13123.shtml.

Rather than rehash here the myriad analytic flaws identified by commenters and not adequately addressed by State Board staff, Petitioner provides the following summary of issues and incorporates by reference the supporting analyses set forth in various written comments and expert evaluations in the existing record.

<u>Energy Use/Greenhouse Gas Emissions/Air Quality Impacts</u>. It is undisputed that the Project, although touted as an energy generation project, will result in a net expenditure of 300 MW of energy, or over 1,400 GWh per year. Eagle Crest nevertheless claims that the Project will reduce greenhouse gas emissions by displacing future peaker power plants. As explained in detail in the comments of the Laborers International Union of North American, Local Union 1185 and its consultants, this conclusion is based on assumptions about sources of "displaced" power for which there is no supporting analysis or documentation in the record. *See* Comment Letter from Lozeau Drury LLC at 7-11 (April 10, 2013). Moreover, as those comments demonstrate, there are significant, unexplained discrepancies and contradictions within the EIR's analysis of greenhouse gas emissions; reconciliation of those discrepancies suggests that, even if the displaced power source assumptions are accurate, the Project may result in a net increase of

more than 13,000 metric tons of greenhouse gas emissions (expressed as carbon dioxide equivalents) per year, well above relevant regulatory thresholds. *Id.* at 11. These legitimate concerns, which are not addressed in the Certification decision or the EIR, suggest that the Project does not provide a net public benefit and is not consistent with applicable state law.

Additionally, as the National Park Service explained, local air quality impacts from the Project, especially in combination with other proposed projects in the region, may be a significant concern. In particular, the region is non-attainment for the California ozone standard, and EPA is considering a reduction in the federal ozone standard. Construction of the Project may produce sufficient ozone precursors to bring the area into nonattainment with the federal standards for a Class 1 area. Comment Letter from National Park Service at 3 (Oct. 4, 2010). These concerns are not adequately addressed in the Certification or the EIR. Further analysis of air pollution emissions is critical to protecting the region's important conservation and recreation values.

Groundwater Quantity and Quality Impacts. Virtually every comment on the Project raised serious concerns about groundwater usage and potential contamination. The National Park Service, for example, explained in its comments that the groundwater analysis "grossly over-estimates the amount of natural recharge coming into the Chuckwalla Valley, Pinto Valley, and Orocopia Valley and therefore, under-estimates the amount of groundwater storage depletion that will occur." Comment Letter from National Park Service at 2 (Oct. 4, 2010). In particular, the Park Service pointed out that the EIR neglected important, credible analysis prepared by the U.S. Geological Service in 2004, showing very limited groundwater recharge in the area. *Id.* For additional detail on this key issue, Petitioner incorporates by reference, and directs the State Board, to the Park Service's detailed discussion in that agency's Standard Review Form for the Draft Environmental Impact Report Eagle Crest Pumped Storage Energy Project (Oct. 4, 2010), posted on the State Board's webpage for the Project and attached hereto as Exhibit B.

More recently, the Bureau of Land Management reiterated that despite the initiation of recent efforts to study groundwater in the Chuckwalla Basin, "abundant uncertainty" continues to exist concerning the basin's recharge rate, perennial yield, and water budget. Comment Letter from BLM at 3-4 (April 10, 2013). With two energy projects in the Chuckwalla Basin under construction and an additional nine projects authorized or proposed, BLM has expressed substantial concern about groundwater depletion and the recharge situation, which potentially affects uses both within the basin and in downgradient Colorado River. *Id.* 4-5. Like many other commenters, BLM noted that previously published estimates of groundwater recharge, on which the Project environmental review relies, likely overestimate basin recharge, meaning that the Project will exacerbate overdraft risks and potentially create significant obstacles to future renewable energy development in the area to a degree not evaluated by the State Board. *Id.* at 6; *see also* Comment Letter from Lozeau Drury at 14-16 (April 10, 2013); Comment Letter from NPCA and Sierra Club at 2 (April 8, 2013); Comment Letter from L.A. County Sanitation Districts at 2 (April 10, 2013). Indeed, there is some suggestion that very little, if any, groundwater recharge has occurred in the basin during the last half century. Comment Letter from Desert Protection Society at 2 (April 10, 2013) (summarizing personal communication to that effect with Michael Wright of USGS).

Rather than repeat the concerns in more detail here, Petitioner refers the State Board to BLM's careful evaluation and discussion of the groundwater situation, which incorporates and elaborates on earlier analysis of the available science by the Park Service. Comment Letter from BLM at 6-11 (April 10, 2013), a copy of which is attached hereto as Exhibit C.[1] Based on this analysis, BLM concluded that the Project poses "a real risk of harm to the BLM, its management goals in the Chuckwalla Basin, and renewable energy proponents." *Id.* at 11. Moreover, "[t]here is a real risk of harm to authorized users of Colorado River water." *Id.*

To address widespread groundwater quantity concerns in the area, BLM is currently undertaking several interagency investigations designed to develop baseline data on water trends and to better understand the cumulative impacts of several proposed renewable energy projects. Comment Letter of BLM at 2-3, 12 (April 10, 2013). Rather than await further clarification from the ongoing groundwater analysis, however, the Executive Director pushed ahead with the Certification, even while conceding that the Project will result in the extraction of 110,000 acre-feet from the groundwater aquifer over the operating life of the FERC license. Certification at 8.

Despite the deep concern expressed by several agencies, including those that manage desert resources, Executive Director Howard apparently does not see this significant consumptive use, including 1,800 acre-feet per year in evaporation losses, as a problem. The Certification concludes that potential drawdown from the aquifer, after the initial filling of the mine pit with 32,000 acre-feet of water, "will be in the range of historic (from 1965 to 1986) pumping" and that "[p]roject use of groundwater by itself is not expected to result in drawdown of groundwater in excess of maximum historic levels." Certification at 10. Apparently for this reason, Mr. Howard concluded that "[t]herefore, the potential impact of subsidence beneath the [Colorado River Aquaduct] is at less than significant levels . . ." and does not pose a significant impact to the resource. *Id.* Similarly, the document notes that analytic modeling (as opposed to the data being collected by BLM) suggests that total aquifer drawdown as a result of the Project and other potential future uses by solar generators will not exceed 18 feet, thereby "leaving over 130 feet of saturated alluvium to continue to supply water" in the Chuckwalla Basin. *Id.* at 13. In other words, because the Project will not *entirely* deplete the aquifer, the Executive Director concluded that project groundwater use is not problematic, even though others who are studying the region believe that there may be little to no recharge occurring within the basin. Mr. Howard's conclusion that a 12 percent increase in the current overdraft is somehow acceptable – without evaluating how that change will affect competing uses or the ecological resources dependent on this aquifer – does not comport with the State Board's obligation to protect state water resources and other uses of those resources.

The Certification decision contains similar omissions and flaws with respect to potential seepage of Project water from the abandoned mine pits into groundwater. As the Certification and EIR acknowledge, the highly fractured bedrock in the former iron ore mine pits poses a real

[1] Although BLM, in what is a transparently politically-motivated communication, subsequently downplayed its recommendations and noted that it would defer to the State Board, the federal agency did not – and could not – refute the basic facts and conclusions of its initial comment letter. Comment Letter of BLM (April 19, 2013). Indeed, the later correspondence continues to recognize the significant discussion and uncertainty around groundwater recharge and depletion rates. That fact alone must give the State Board serious pause in certifying the water-intensive Project.

risk that metal-laden seepage and acid mine drainage leaching from pyrite soils will contaminate groundwater, which flows from the site toward the Chuckwalla Valley Groundwater Basin, a source of municipal, domestic, agricultural, and industrial supply water. Although adequate field testing has not been completed, consultants have estimated seepage from the two mining pits at approximately 3,000 acre-feet per year. Certification at 14. As numerous commenters have pointed out, the State Board cannot fully evaluate and disclose potential contamination impacts without a better understanding of both the mine tailings in the pits and the geologic structure of the underlying bedrock. *See, e.g.*, April 10, 2013 Comment Letter from Lozeau Drury comments at 16-18 (April 10, 2103); Comment Letter from L.A. County Sanitation District comments at 2-3 (April 10, 2013); Comment Letter from Kaiser Eagle Mountain at 5 (April 10, 2013).

With insufficient data to assess seepage impacts or even develop an appropriate seepage model, *see* Certification at 16, the State Board cannot accurately or adequately evaluate the potential contamination impacts on groundwater. As discussed below, it is not sufficient for the Board to impose post-approval conditions to assess contamination concerns; under CEQA, the relevant evaluation of baseline conditions and project impacts, as well as the formulation of potential mitigation measures, must be completed *before* project certification occurs. Accordingly, the Certification is premature and inconsistent with applicable state law.

<u>Wildlife/Habitat/Wilderness Impacts</u>. The Project raises a number of concerns related to potential impacts on imperiled species, native plant habitat, and the nearby Joshua Tree wilderness area. These biological impacts are not adequately addressed by either the EIR or the Certification, as discussed at length in the comment letters cited above. Here, we address only the most significant of the myriad wildlife concerns raised during the comment period.

Most significant, and as many commenters have repeatedly pointed out, large amounts of project water in the mine pits and onsite brine ponds will attract feeding and nesting ravens, which are recognized desert tortoises predators. *See, e.g.*, Comment Letter from Lozeau Drury, Exh. 2 at 3-5 (April 10, 2013). The project vicinity, and in particular Joshua Tree National Park, provide key habitat for the desert tortoise, a federally listed threatened species that is at the core of significant BLM and Park Service management and recovery efforts. Indeed, the National Park Service has estimated that artificial water at Eagle Mountain will potentially impact 330,000 acres of prime desert tortoise habitat, including 178,000 acres within the Park. *See* National Park Service, Impacts of the Eagle Mountain Pumped Storage Project at 2 (July 2013), a copy of which is attached hereto as Exhibit D. The Park provides relatively protected habitat for desert tortoises, which continue to suffer serious population declines throughout their range. Accordingly, the Park Service believes that the Project's effects on the declining desert tortoise population, especially when combined with impacts from other proposed solar projects, "could be devastating to the wildlife preservation directive" of the agency. *Id.* Moreover, impacts to this species may be compounded by placement of the transmission line and power substation serving the Project in or near key tortoise habitat. *See* Sept. 30, 2010 Comment Letter from California Department of Fish and Game at 4-5 (Sept. 30, 2010); Comment Letter from U.S. Fish and Wildlife Service at 1-2 (Oct. 27, 2010).

The State Board's response to these serious concerns is uninformative and inadequate. The EIR notes that the so-called Eagle Mountain "townsite" – which previously supported the mining activities and now supports minimal human activity – "appears to have open water resources" in the form of a treatment plant and that the Colorado River Aquaduct, the Eagle Mountain pumping plant, and the Lake Tamarisk ponds also provide open water. Based on these observations, the EIR concludes: "A simple increase in quantity of water when it is already fully available does not change the availability to opportunistic predators." Final EIR at 3.5-42. In short, the EIR does not evaluate or address the potential impact on desert tortoises from likely increased raven activity on Project land adjacent to the Park; instead, it simply assumes that there will be no increase in raven presence or activity. There is nothing in the record to support this flippant response, which contradicts the legitimate concerns of expert wildlife and federal management agencies. The Certification adds nothing further to the analysis or disclosure, stating only that: "The Project may adversely affect Desert Tortoise, and as such, this impact is potentially significant and subject to mitigation." Certification at 17. The identified "mitigation," however, is nothing more than surveys, monitoring, and potential fees for purchase of desert habitat elsewhere. EIR at 6-22 to 6-26. Such measures will not protect the important desert tortoise habitat within the Park from the effects of raven predation. *See, e.g.*, Comment Letter from L.A. County Sanitation District at 4 (April 10, 2013); Comment Letter from California State Lands Commission at 3-4 (July 27, 2010).

As the Park Service also has noted, the placement and operation of the Project will likely adversely affect many other native species, as well as wilderness values in the nearby 585,000-acre congressionally-designated wilderness. In particular, the Project may have visual, night sky, invasive species and other adverse affects on wilderness resources and the wilderness experience. Comment Letter from National Park Service (Oct. 4, 2010). For example, the creation of large-scale artificial lakes (in the form of the upper and lower water reservoirs) "will inevitably promote exotic plant invasion and spread," threatening the native biodiversity of the Park. *See* Exhibit C at 3. Neither the Certification nor the EIR addresses these impacts in any meaningful way.

<u>Improper Deferral of Impacts Assessment and Mitigation under CEQA</u>. Many of these identified flaws in the EIR and Certification – and other flaws raised by commenters throughout the administrative process – stem from the same source: The State Board and its consultants have *not* conducted site-specific evaluation due to "site access constraints." Certification at 26. Rather than defer approval until site access is obtained and sufficient evaluation and public disclosure is completed, the Executive Director elected to proceed in reverse order, certifying the Project and proposing to undertake further evaluation at some later date. *Id.* ("Once site access is granted, Phase I and Phase II Site Investigations will be conducted to confirm that the basic Project feature locations are appropriate, confirm previous studies findings of the Central Project Area, and to provide parameters for the final layout and design of the Project.")

This approach not only violates common sense and sound public policy, but it is specifically prohibited by CEQA. Enacted in 1970, "CEQA is a comprehensive scheme designed to provide long-term protection to the environment." *Mountain Lion Foundation v. Fish & Game Comm'n* (1997) 16 Cal.4th 105, 112. "In enacting CEQA, the Legislature declared its intention that all public agencies responsible for regulating activities affecting the environment give prime consideration to preventing environmental damage when carrying out their duties." *Id*. For this reason, CEQA must "be interpreted . . . [so] as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language." *Friends of Mammoth v. Board of Supervisors* (1972) 8 Cal.3d 247, 259.

CEQA's core requirement is the EIR, an "informational document" that must "provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; . . . ways in which the significant effects of such a project might be minimized; and . . . alternatives to such a project." Cal. Pub. Res. Code § 21061. Agencies preparing an EIR are directed "first to identify the environmental effects of projects, and then to mitigate those adverse effects." *Sierra Club v. State Board of Forestry* (1994) 7 Cal.4th 1215, 1233. The EIR must include an analysis of "cumulative impacts" that may result from "the combination of the project evaluated in the EIR together with other projects causing related impacts." CEQA Guidelines § 15130. This evaluation must consider the "change in the environment" that results from the combination of projects which while individually minor, may cause collectively significant impacts over time. CEQA Guidelines § 15355. CEQA also requires that EIRs include an accurate baseline – that is, "a description of the physical environmental conditions in the vicinity of the project, as they exist at the time . . . environmental analysis is commenced." CEQA Guidelines § 15125(a) (explaining that this description "will normally constitute the baseline physical conditions by which a[n] . . . agency determines whether an impact is significant").

The EIR serves as a "document of accountability" which is "intended 'to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action.'" *Laurel Heights Improvement Ass'n. v. Regents of Univ. of California* (1998) 47 Cal.3d 376, 392. In particular, "the public, being duly informed" by an EIR, "can respond accordingly" to the agency's action; in this way, the CEQA process "protects not only the environment but also informed self-government." *Id*. Thus, a legally sufficient EIR must provide enough information so as to "enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project." *Id.* at 405. To do so, the EIR must evaluate potential impacts with "[t]he degree of specificity [that] . . . corresponds to the degree of specificity involved in the underlying activity addressed by the EIR." CEQA Guidelines § 15146.

An EIR must disclose all potentially significant adverse environmental impacts of a project. Cal. Pub. Res. Code, § 21100(b)(1); CEQA Guidelines, § 15126(a); *Berkeley Keep Jets Over the Bay v. Bd. of Port Comm'rs*. (2001) 91 Cal. App. 4th 1344, 1354. CEQA requires that an EIR must not only identify the impacts, but must also provide "information about how adverse the impacts will be." *Santiago County Water Dist. v. County of Orange* (1981) 118 Cal.App.3d 818, 831. The lead agency may deem a particular impact to be insignificant only if it produces rigorous analysis and concrete substantial evidence justifying the finding. *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692.

Importantly, CEQA requires public agencies to avoid or reduce environmental damage when "feasible" by requiring mitigation measures. CEQA Guidelines, § 15002(a)(2) and (3); *see also*, *Berkeley Jets*, 91 Cal. App. 4th at 1354; *Citizens of Goleta Valley, supra*, 52 Cal.3d at 564. The EIR serves to provide agencies and the public with information about the environmental impacts of a proposed project and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines, §15002(a)(2). If the project will have a significant effect on the environment, the agency may approve the project only if it finds that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns." Cal. Pub. Res. Code, § 21081; CEQA Guidelines, § 15092(b)(2)(A) & (B).

In general, mitigation measures must be designed to minimize, reduce, or avoid an identified environmental impact or to rectify or compensate for that impact. CEQA Guidelines, § 15370. Where several mitigation measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified. *Id.* § 15126.4(a)(1)(B). A lead agency may not make the required CEQA findings unless the administrative record clearly shows that all uncertainties regarding the mitigation of significant environmental impacts have been resolved. EIRs, including their mitigation analysis, should be prepared "as early in the planning process as possible to enable environmental considerations to influence" the project. *Laurel Heights*, 47 Cal.3d at 395.

In short, *before* project approval, an EIR must: (1) fully analyze and disclose the project's environmental impacts and (2) based on that analysis, formulate concrete measures for mitigating the identified impacts. CEQA Guidelines § 15126.4 (an EIR "shall identify mitigation measures for each significant environmental effect identified in the EIR."). "Formulation of mitigation should not be deferred." *Id*. The reason for this prohibition is self-evident: "A study conducted after approval of a project will inevitably have a diminished influence on decisionmaking. Even if the study is subject to administrative approval, it is analogous to the sort of post hoc rationalization of agency actions that has been repeatedly condemned in decisions construing CEQA." *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296.

If "practical considerations prohibit devising such measures early in the planning process," an agency may formulate and evaluate potential mitigation measures and then defer until later the actual *selection* of particular measures from among the proposed options, but *only* "so long as the measures are coupled with specific and mandatory performance standards to ensure that the measures, as implemented, will be effective." *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 94-95. Even in the unusual instances where deferred selection of mitigating measures has been permitted, the agency may never defer impacts analysis. Before project approval, the agency must undertake a "complete analysis of the significance of the environmental impact." *Id*. at 95. Put differently, "the determination of whether a project will have significant environmental impacts, and the formulation of measures to mitigate those impacts, must occur *before* the project is approved. On the other hand . . . when a public agency has evaluated the potentially significant impacts of a project and has identified measures that will mitigate those impacts, the agency does not have to commit to any particular mitigation measure in the EIR, as long as it commits to mitigating the significant impacts of the project." *California Native Plant Society v. City of Rancho Cordova* (2009) 172 Cal. App. 4th 603, 621 (emphasis in original). Thus, an EIR *must* first evaluate the significance of impacts and then formulate concrete measures to mitigate those impacts determined to be significant; once it satisfies these two pivotal CEQA requirements, the EIR *may* then defer *selection* of the ultimate mitigation as long as it articulates sufficiently specific performance criteria that provide "objective performance standards by which the success of mitigation . . . actions can be measured." *City of San Diego v. Board of Trustees of California State University* (2011) 201 Cal. App. 4th 1134, 1182.

As many commenters have indicated over the last three years, the EIR for the Eagle Crest Pumped Storage Hydroelectric Project fails to comply with CEQA because it defers both evaluation of potentially significant site-specific impacts *and* formulation of potential mitigation measures for those impacts until *after* certification of the EIR and approval of the Project. Moreover, by relying on outdated or incomplete information and ignoring the persistent comments of various entities and agencies demonstrating that further analysis is warranted, the EIR and the Certification frustrate the disclosure and accountability objectives of CEQA and undermine the public nature of the section 401 review process. These violations can only be cured by withdrawal of the Certification and recirculation of a supplemental EIR that evaluates specific site conditions and current scientific data, especially concerning groundwater and wildlife impacts. *See* CEQA Guidelines § 15162(a).

5. THE MANNER IN WHICH THE PETITIONER IS AGGRIEVED:

Petitioner National Parks Conservation Association ("NPCA") is a nonprofit organization dedicated to "protecting and enhancing America's national parks for present and future generations." On behalf of its 800,000 active members and supporters nationwide and over 100,000 in the state of California. On behalf of its members, NPCA works actively to protect America's shared natural and cultural heritage as preserved by units of the National Park System and, in particular, has a long history of working to protect the natural resources, conservation values, and wilderness amenities of Joshua Tree National Park and the adjacent California Desert, an area in which many of NPCA's members have deep and abiding recreational, aesthetic, and other interests.

NPCA and its members are aggrieved by the Executive Director's July 15, 2013 issuance of a Clean Water Act section 401 Certification for the Eagle Crest Pumped Storage Project because that action will allow the construction and operation of a long-term energy project with significant adverse impacts on groundwater, species, local and global air quality, and other resources in and near Joshua Tree National Park. NPCA has worked tirelessly and successfully for over two decades to protect the specific Project area in question from inappropriate industrial development activities that would adversely affect desert, wilderness, and park resources. Construction of the Eagle Crest Project will undermine those efforts and detrimentally harm NPCA and its members.

Petitioner San Bernardino Valley Audubon Society ("SBVAS") is the local chapter of the National Audubon Society for almost all of Riverside and San Bernardino Counties and has approximately two thousand members in that area. Its missions are the protection of natural habitat for birds and other wildlife and public education about the environment.

SBVAS and its members are aggrieved by the Executive Director's July 15, 2013 issuance of a Clean Water Act section 401 certification for the Eagle Crest Pumped Storage Project because that action will allow the construction and operation of a long-term energy project with significant adverse impacts on groundwater, species, local and global air quality, and other resources in and near Joshua Tree National Park. Joshua Tree National Park and the nearby areas are in the SBVAS chapter area and its members go there to observe birds and other wildlife. Construction of the Eagle Crest Project will undermine those efforts and detrimentally harm SBVAS and its members. SVBAS is particularly concerned about the drawdown of ground water adversely affecting the sensitive desert habitat, leading to the reduction of natural vegetation and the destruction of seeps and springs, such as Cottonwood Springs.

6. THE SPECIFIC ACTION BY THE STATE BOARD WHICH PETITIONER REQUESTS:

Petitioner urges the State Board to reconsider and reverse the Executive Director's July 15, 2013 Certification decision and direct staff to deny Eagle Crest's application as inconsistent with state law and with the protection of groundwater, wildlife species, and wilderness values pursuant to its authority under California Water Code section 13330 and title 23, section 3869 of the California Code of Regulations. In the alternative, the State Board should withdraw the section 401 certification as premature until full and complete environmental review and disclosure occurs.

7. A LIST OF PERSONS, IF ANY, OTHER THAN THE PETITION AND APPLICANT, IF NOT THE PETITIONER, KNOWN TO HAVE AN INTEREST IN THE SUBJECT MATTER OF THE PETITION:

In addition to Project Applicant Eagle Crest and Petitioner, the following persons, agencies, or entities may have a continuing interest in the subject matter of this petition:

- Brendan Hughes
- Citizens for Chuckwalla Valley
- Colorado River Basin Regional Water Quality Control Board of California
- California Department of Fish and Wildlife
- California State Lands Commission
- Desert Protection Society
- Federal Emergency Management Administration
- Federal Energy Regulatory Commission
- Gary Cruz
- Hidaberto Sanchez
- Kaiser Ventures, LLC
- Kaiser Eagle Mountain, LLC
- Laborers International Union of North America, Labor Union 1184
- L.A. County Sanitation District
- Margit F. Chiriaco Rusche
- Metropolitan Water District
- Morongo Band of Mission Indians
- Ms. Johnney Coon
- Native American Heritage Commission
- National Park Service, Department of Interior

- Ralph Figuroa
- Ron Brinkley
- Sierra Club
- U.S. Bureau of Land Management, Department of Interior
- U.S. Fish and Wildlife Service, Department of Interior

8. A STATEMENT THAT THE PETITION HAS BEEN SENT TO THE APPROPRIATE EXECUTIVE OFFICER AND TO THE APPLICANT, IF NOT THE PETITIONER:

A true and correct copy of this petition was sent by overnight Federal Express for next day delivery on August 14, 2013 to the State Water Board Executive Director Thomas Howard and Eagle Crest Energy Company at the following addresses:

Thomas Howard, Executive Director (via Federal Express Overnight Delivery)
State Water Resources Control Board
1001 I Street
P.O. Box 2815
Sacramento, CA 95812-2815

Stephen Lowe, President (via Federal Express Overnight Delivery)
Eagle Crest Energy Company
3000 Ocean Park Blvd., Suite #1020
Santa Monica, CA 90405

In addition, this petition is being served by electronic mail on the State Board Office of Chief Counsel at the email address below:

State Water Resources Control Board (via Electronic Mail)
Office of Chief Counsel
Attention: Jeannette L. Bashaw, Legal Analyst
E-mail: jbashaw@waterboards.ca.gov

9. A COPY OF A REQUEST TO THE EXECUTIVE DIRECTOR FOR PREPARATION OF THE STATE BOARD RECORD, IF APPLICABLE AND AVAILABLE, WHICH WILL INCLUDE A TAPE RECORDING OR TRANSCRIPT OF ANY PERTINENT REGIONAL BOARD OR STAFF HEARING.

A copy of Petitioner's request for preparation of the State Board record of proceedings is attached hereto as Exhibit E.

10. A SUMMARY OF THE MANNER IN WHICH AND TO WHAT EXTENT THE PETITIONER PARTICIPATED IN ANY PROCESS, IF AVAILABLE, LEADING TO THE ACTION OR FAILURE TO ACT IN QUESTION:

Petitioner National Parks Conservation Association submitted timely written comments on the Draft Water Quality Certification issued on June 27, 2012, and on the Draft Final Water Quality Certification issued on April 10, 2013. In addition, Petitioner timely submitted written comments on the Draft Environment Impact Report issued in July 2010. In addition, many other parties (including private entities, non-governmental organizations, and government agencies) timely submitted similar and detailed written comments on the Project, on which Petitioner draws and incorporates. All of these comments are available at the State Board webpage for the Certification: [http://www.waterboards.ca.gov/waterrights/water_issues/ programs/ water_quality_cert/ eaglemtn_ferc13123.shtml](http://www.waterboards.ca.gov/waterrights/water_issues/programs/water_quality_cert/eaglemtn_ferc13123.shtml)

*   *   *   *

If you have any questions regarding this petition, please feel free to contact us directly.

Dated: August 13, 2013   Respectfully submitted,

By: Debbie Sivas
Deborah Sivas

Attachments:
Exhibit A (July 15, 2013 Certification)
Exhibit B (Oct. 4, 2010 National Park Service Comments on DEIR)
Exhibit C (April 10, 2013 Bureau of Land Management Comments on Draft Final Certification)
Exhibit D (NPS Interpretation of Existing Science, July 2013)
Exhibit E (Request for Preparation of Record of Proceedings)

Exhibit A

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Water Quality Certification for

EAGLE CREST ENERGY COMPANY'S

EAGLE MOUNTAIN PUMPED STORAGE HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 13123

Source: Eagle Creek and Chuckwalla Valley Groundwater Basin

County: Riverside

WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE

EAGLE CREST ENERGY COMPANY'S

EAGLE MOUNTAIN PUMPED STORAGE HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 13123

WATER QUALITY CERTIFICATION

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Attachments:

STATE OF CALIFORNIA
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Source: Eagle Creek and Chuckwalla Valley Groundwater Basin

County: Riverside

WATER QUALITY CERTIFICATION FOR FEDERAL PERMIT OR LICENSE

BY THE EXECUTIVE DIRECTOR:

1.0 Project Description

The Eagle Crest Energy Company (Applicant or Licensee) filed a License Application with the Federal Energy Regulatory Commission (FERC or Commission) to construct and operate the Eagle Mountain Pumped Storage Hydroelectric Project (Project). The Commission assigned Project Number 13123 to the Project.

The Project is located near the town of Eagle Mountain (approximately 12 miles northwest of the unincorporated town of Desert Center), in eastern Riverside County, California. Project area maps are contained in Attachment A, and made part of this water quality certification by reference. The Project footprint is up to 2,527 acres: 660 acres are located on federal lands managed by the Bureau of Land Management (BLM) and the remaining 1,867 acres on privately owned lands.

The Project is a pumped storage project. Pumped storage projects transfer water between two water bodies located at different elevations (e.g., an upper and lower reservoir) to store energy by pumping water from the lower water body to the upper water body during periods of low electricity demand, and then generate electricity by releasing water through turbines from the upper water body to the lower water body during periods of high electricity demand. The Commission considers pumped storage projects to be capable of providing a range of ancillary services to support the integration of renewable resources and allow for more reliable and efficient functioning of the electric grid.[1]

The Project will primarily use off-peak energy to pump water from a lower reservoir to an upper reservoir and generate energy during periods of high energy demand by transferring the water

[1] http://www.ferc.gov/industries/hydropower/gen-info/licensing/pump-storage.asp (last visited June 12, 2013)

from the upper reservoir to the lower reservoir through four reversible turbines. Two former iron ore mine pits that are part of the Eagle Mountain Mine form the reservoirs. The existing East Pit of the mine will form the Project's Lower Reservoir and the existing Central Pit of the mine will form the Project's Upper Reservoir. The elevation difference between the reservoirs will provide an average net head of 1,410 feet. The Project will have an installed capacity of 1,300 megawatts.

The Upper and Lower Reservoirs will be linked by subsurface tunnels to convey water through four reversible turbines housed in an underground powerhouse. Existing access roads within the former mining area will be improved to provide access for heavy machinery to the Project site during construction. Tunneling will be within the reservoir sites, and waste rock from tunnel boring will be used to meet construction needs such as road base for access roads, miscellaneous backfills for access roads and around structures, flood berms, and potentially for concrete in the dams. Any excess material will be placed in the reservoirs or in spoil areas from which fine tailings have been removed.

Data used for characterization of the Central Project Area, which includes the area where the reservoirs and powerhouse will be located, were drawn from previous reports and observations made during the 1992 to 1994 FERC licensing process (Eagle Mountain Pumped Storage Project, FERC Project No. 11080), during the development of the proposed Eagle Mountain Landfill (Landfill), and from geologic reports and technical literature prepared by others. The previous investigations were not intended to obtain data that would support design of a large hydroelectric development with dams, tunnels, and related structures. However, data are available to understand the site characteristics in sufficient detail to document the feasibility of constructing the Project, comply with analyses required by the California Environmental Quality Act (CEQA), and issue a water quality certification.

The Central Project Area includes privately owned land. The feasibility of the Project depends, in part, on the Applicant acquiring ownership or control of the Project site via a lease or easement. The Applicant has not been granted access to the Central Project Area by the current land owner. This water quality certification shall not be construed as granting permission for site access or commencement of any other activity outside the scope of this water quality certification.

Due to site access constraints, the Applicant will undertake detailed site investigations to support the final configuration and design of the Project after the FERC license is issued, access to the Central Project Area is obtained, and regulatory agencies grant approval for ground disturbing activities. These detailed investigations will be conducted in two phases, in part to validate the information, data, and results obtained using previous studies, as follows:

Phase I Site Investigations: Based on available information and the current Project configuration, the Applicant will conduct a limited pre-design field investigation program designed to confirm that basic Project feature locations are appropriate, and to provide basic design parameters for the final layout of the Project features. Phase I Site Investigations will, at a minimum, evaluate:

- Upper and Lower Reservoir site conditions;
- Hydraulic structures (inlet/outlet structures);
- Underground conditions for construction of tunnels, shafts, and powerhouse;
- Reservoir, brine pond, and tunnel seepage potential;
- Reservoir-triggered seismicity; and

- Water quality issues in the reservoirs and groundwater associated with ore-body contact.

Phase II Site Investigations: Using the results of the Phase I Site Investigations Report, and based on any design refinements developed during pre-design engineering, the Applicant will conduct additional explorations to support final design of the Project features. Phase II Site Investigations will be conducted, at a minimum, to determine:

- Compatibility of the Project with existing and proposed land uses within the Project area;
- Background groundwater levels and background groundwater quality;
- Project operations and permanent impact on the aquifer's storativity;
- Seepage and monitoring well network locations, well types, and well depths;
- Most suitable location and design for horizontal monitoring wells under the reservoir's liners;
- Mass wasting, landsliding, and slope stability issues related to loading and unloading the reservoirs;
- Use of geosynthetic liners as a seepage control measure for the reservoirs and the brine ponds;
- Aquifer hydraulic conditions; and
- Hydrocompaction and subsidence potentials.

Phase I and Phase II Site Investigations will be conducted in accordance with Technical Memorandum 12.1 of the Project's Final Environmental Impact Report (Final EIR), and as required by Condition 1 of this water quality certification. If the Phase I or Phase II Site Investigations identify issues that may have significant environmental impacts not addressed in the Final EIR, the Project's environmental review document may need to be revised to address any newly discovered potential impacts and satisfy CEQA requirements.

Groundwater from the Chuckwalla Valley Groundwater Basin will be used to initially fill the reservoirs and provide make-up water to offset evaporation losses. The Applicant will acquire land and attendant water rights to three properties in the Chuckwalla Valley where three new wells will be installed and connected to a central collection pipeline corridor prior to groundwater withdrawal. The water supply pipeline will be buried and extend approximately 15 miles from the wells to the Lower Reservoir. The pipeline corridor will parallel an existing power transmission line, but the existing disturbed area will need to be widened and will cross some small, typically dry, desert tributary washes.

The total water storage will be approximately 20,000 acre-feet (AF) in the Upper Reservoir and approximately 21,900 AF in the Lower Reservoir. To allow for operations of the pumped storage reservoirs, only one reservoir can be full at a time. Due to the configuration of the reservoirs and the location of the water inlets and outlets, some water will always remain in each reservoir and is considered dead storage. Seepage control measures will be applied to minimize seepage from the reservoirs. However, because some seepage is anticipated, a series of seepage interceptor wells will be constructed downgradient of the reservoirs to return the seepage volume to the reservoirs. The total water recovered by the seepage interceptor wells will be a combination of seepage and native groundwater. Because not all seepage can be captured by the seepage interceptor wells, reservoir seepage water quality shall be equal to or better than native groundwater quality beneath the reservoirs. Reservoir seepage water quality will be determined at the horizontal monitoring wells installed immediately below the liner at each reservoir.

Power will be supplied to and delivered from the Project by a double circuit 500 kilovolt transmission line. The power line will extend approximately 17 miles, from a new interconnection substation (Eastern Red Bluff Substation) located south of Highway 10, then extend north to parallel the water supply collection pipeline until reaching Kaiser Road, and then continue along an existing transmission line alignment to the Project switchyard.

2.0 Background

As part of the License Application and CEQA requirements, the Applicant conducted studies to assess the potential impact of the Project on the environment. The studies included assessment of the geology, hydrogeology, biology, cultural resources, visual resources, noise, air quality, and design and construction at the Project site and surrounding area (see Final EIR, Appendix C).

The State Water Resources Control Board (State Water Board) is the CEQA lead agency for the Project and independently prepared an EIR as described in Section 6.3 of this water quality certification. The Applicant has agreed to implement all measures identified in the Final EIR to minimize the Project's environmental impacts. All mitigation measures identified in Section 6 of the Final EIR are considered requirements of the Project for this water quality certification.

Measures that protect the beneficial uses of water resources form the basis of the conditions of this certification. Additionally, the conditions of this water quality certification are intended to address the range of possible environmental impacts that may result from Project construction and operation. Due to limited site access and the necessary use of previous studies to complete the environmental review, this water quality certification recognizes the need to develop more specific and detailed site information, and includes the required approval of subsequent reports to ensure conditions of the certification are met. The conditions of this water quality certification, in part, include additional studies required to refine measures intended to protect water quality and beneficial uses and reduce environmental impacts identified in the Final EIR.

2.1 Geology

Surface geology of the Eagle Mountain area generally consists of unconsolidated alluvial deposits. The alluvial deposits include sands, silts, gravels, and debris-flow deposits. The eastern edge of the Project site contains the most substantial alluvial deposits, which form a laterally extensive alluvial fan that extends and thickens to the east into the Chuckwalla Valley.

The Central Project Area occupies a portion of the Eagle Mountain Mine that contains a mineral-rich ore zone. Large-scale iron ore mining at the Eagle Mountain Mine was curtailed in 1983. However, the Eagle Mountain Mine has continued to ship rock, rock products, and stockpiled iron ore products over the years. Mining within Project boundaries will not be feasible during the FERC license term. However, the Project will not prevent access or mining activities outside the Project boundaries.

Iron is the most important ore found within the Central Project Area. The iron ore reserves are: magnetite mixed with pyrite; and magnetite and hematite with small amounts of pyrite. The mine facility began operations to extract iron ore from these deposits in 1948 and continued operations until 1983 when large-scale iron mining was suspended. Virtually all of the equipment and mining and processing facilities for large-scale iron ore mining are no longer in existence.

The Upper and Lower Reservoirs will be surface impoundments that will likely discharge to groundwater to some extent. Water quality in the reservoirs and groundwater must therefore be monitored. Reservoir water and groundwater quality could potentially be affected by contact with the existing ore body. If the ore contains metal sulfides, a natural oxidation process can increase the reservoirs' water acidity. As the water becomes more acidic, the capacity to dissolve other elements from the ore increases. In the event that acid production potential is found during the Phase I and II Site Investigations, the water treatment facility will be designed to be able to neutralize this acid. Metal leaching – when metals leach into contact water without acidification – must also be evaluated during the Phase I and II Site Investigations.

The water quality performance standard that shall be met will be maintenance of surface water quality in the reservoirs (monitored at horizontal wells immediately underneath the reservoirs' liner) and maintenance of groundwater quality in the aquifer beneath the reservoirs (monitored at the monitoring well network surrounding the reservoirs) at a level comparable to the source groundwater background values as required by the *Water Quality Control Plan for the Colorado River Basin – Region 7* (Colorado River Basin Plan) goals. With respect to groundwater quality objectives, the Colorado River Regional Water Quality Control Board's (Colorado River Regional Water Board) goal is to maintain the existing water quality of all non-degraded high quality groundwater basins.

2.2 Hydrogeology

The Chuckwalla Valley Groundwater Basin consists of about 900 feet of sand and gravel with a few discontinuous layers of silt and clay. The saturated sediments are about 650 feet thick near Desert Center. The approximate depth to groundwater in the area of the Project supply wells is approximately 225 to 250 feet below ground surface.

Based on the geologic conditions, aquifer characteristics and groundwater levels, the aquifer appears to be unconfined in the Upper Chuckwalla Valley from the Pinto Basin through the Desert Center area. In the central portion of the Chuckwalla Valley, east of Desert Center, the aquifer may be semi-confined to confined because of the accumulation of a thick clay layer.

The total storage capacity of the Chuckwalla Valley Groundwater Basin was estimated to be about 9.1 million AF (DWR, 1975). A later analysis estimates that there are 15 million AF of recoverable water in the Chuckwalla Valley Groundwater Basin (DWR, 1979). The Project, by itself, proposes to extract approximately 110,000 AF of groundwater over the 50-year FERC license. Not accounting for any natural recharge during that 50-year period, the amount proposed to be used by the Project is estimated to be less than one percent of the total amount of recoverable groundwater in storage in the Chuckwalla Valley Groundwater Basin.

Two groundwater-related issues associated with the Project are: 1) the potential effects of groundwater extraction on the Desert Center area due to the Project's initial filling of the reservoirs and replacement of annual losses from evaporation; and 2) the potential effects of seepage from the reservoirs on local groundwater, the Colorado River Aqueduct (CRA), and the proposed Landfill.

When the Eagle Mountain Mine was active between 1948 and about 1983, Kaiser[2] pumped groundwater from three wells in the Pinto Valley Groundwater Basin. Kaiser added four wells in the upper Chuckwalla Valley Groundwater Basin, starting in 1958, to supply additional water to the mine. Between 1965 and 1981 the groundwater pumping was relatively consistent and at rates sufficiently high to affect local groundwater elevations. Data from nearby wells show that there was approximately 15 feet of drawdown at the eastern edge of the Pinto Valley Groundwater Basin and up to 24 feet of drawdown in the upper Chuckwalla Valley Groundwater Basin between 1952 and 1981. Approximately 200,000 AF of groundwater was extracted for the mine operations during this 38-year period (1948-1985), about 180 percent of the amount the Project proposes to extract in the 50-year FERC license period.

During a six year period from 1981 through 1986, there was an increase in groundwater pumping near Desert Center due to increased agricultural use (primarily jojoba and asparagus) in the area. In 1986, groundwater pumping for agricultural use in the Chuckwalla Valley was approximately 20,800 acre-feet per year (AFY). Groundwater level data in the Desert Center area show that the local drawdown during the 1981-1986 period was approximately 130 feet. Elsewhere in the Chuckwalla Valley Groundwater Basin, during the same time period, groundwater levels increased and decreased locally, typically on the order of less than tens of feet, indicating the groundwater drawdown of 130 feet was a local pumping effect. As of 2007, irrigation for agriculture in the Desert Center area was estimated to be 6,400 AFY, and measurements showed a 4-foot rise from the 1981 groundwater levels (GEI Consultants, Inc., 2009a).

2.2.1 Groundwater Supply Pumping Effects

Potential impacts to the Chuckwalla Valley Groundwater Basin from Project pumping were analyzed in 2009 and presented in a technical memorandum titled: *Eagle Mountain Pumped Storage Project – Groundwater Supply Pumping Effects* (GEI Consultants, Inc., 2009a). A water balance was created to assess the Project's basin-wide effects on groundwater and the cumulative effects on the perennial yield of the basin.

The water balance evaluates groundwater level changes during the Project period and predicts the time for the Chuckwalla Valley Groundwater Basin to recover to pre-Project levels. Results from the analyses show:

- Groundwater pumping to fill the reservoirs and operate the Project will create local drawdown areas near Project supply wells and could regionally lower groundwater levels basin-wide.
- The Project will use groundwater to fill the reservoirs and to make up for losses due to seepage and evaporation. Approximately 32,000 AF of water is needed to fill the reservoirs to full operating capacity, accounting for seepage and evaporation.
- During the initial fill, all three supply wells will be used. Based on analysis of the hydraulic characteristics of the Chuckwalla Valley Groundwater Basin, it is estimated that cumulatively the wells will pump approximately 6,000 gallons per minute (gpm). At this pumping rate it will take approximately 1.3 years to fill the reservoirs to

[2] In this document "Kaiser" refers to several companies that have filed for bankruptcy, merged or reorganized over the years. The Eagle Mountain Mine was bought by Kaiser Steel Corporation in 1944 with the Kaiser Eagle Mountain Mine operating from 1948 to 1983. Other more recent names for Kaiser interests in the Eagle Mountain area include Kaiser Ventures Inc., Kaiser Steel Corporation, and Kaiser Ventures LLC.

minimum operating capacity and approximately 4.1 years to fill the reservoirs to full operating capacity. These fill rates assume that the wells will be pumped for 24 hours a day from October through May when there is low power system demand, and 12 hours a day from June through September when there is high power demand. If monitoring indicates that groundwater is being drawn down faster than expected (see Final EIR, Table 3.3-8), pumping rates for the initial fill will be reduced and the initial fill period will be extended up to a maximum of six years.

- After the reservoirs are filled to full operating capacity, one or two of the supply wells will be used to make up for evaporation losses. Seepage interceptor wells will be used to make up for seepage losses, with water returned to the reservoirs. Preliminary estimates for reservoir losses due to seepage and evaporation during Project operation are presented in Table 1.

  The expected quantity of seepage through the Upper and Lower Reservoirs was evaluated by performing seepage analyses (details are presented in Section 2.2.2). The evaporation loss was calculated using a reservoir evaporation rate of 7.5 feet per year. Seepage and evaporation estimates are based on a preliminary analysis that will be supplemented with complete data and additional analyses, based on the Phase I and Phase II Site Investigations, which must be submitted to and approved by the Deputy Director for Water Rights (Deputy Director). If modified seepage and evaporation values are approved by the Deputy Director, the new values will supersede the estimates presented in the Final EIR and Table 1. The approved seepage values will be used as baseline conditions to monitor reservoir liner performance.

Table 1
Estimated Reservoir Losses due to Seepage and Evaporation during Project Operation

	Seepage Rate[3] (AFY)	Evaporation Rate[4] (AFY)
Upper Reservoir	689	908
Lower Reservoir	713	855
Total	1,402	1,763

- Drawdown effects resulting from pumping of the Project water supply wells and the amount of drawdown that could occur beneath the CRA were estimated using analytical methods described in the report titled *Groundwater Supply Pumping Effects* (GEI Consultants, Inc., 2009a). Due to the lack of groundwater level data, especially near the Project supply wells and CRA, analytical methods were used to estimate drawdown instead of a numerical groundwater model. The results were compared to drawdown that occurred as a result of Kaiser groundwater pumping in the upper Chuckwalla Valley Groundwater Basin over the 17-year period from 1965 to 1981 (average pumping rate of 2,208 gpm) and from agriculture pumping near Desert Center between 1981 and 1986 (average pumping rate of 10,702 gpm). Project water supply pumping, after the initial fill of the reservoirs, will be in the range of historic (from 1965 to 1986) pumping. Therefore, the potential impact of subsidence beneath the CRA is at less than significant levels because there was no documented

[3] Assuming an 8-foot thick liner using grouting and seepage blanket for the Upper Reservoir, and grouting, seepage blanket, and roller compacted concrete for the Lower Reservoir (GEI Consultants, Inc., 2009b). Actual seepage rates to be confirmed by water balance methods during Phase I and Phase II Site Investigations.
[4] Eagle Crest Energy Company, 2009

subsidence during historic pumping. The analysis indicates that groundwater pumping for the life of the Project would create 3.5 to 4.2 feet of drawdown in the groundwater levels beneath the CRA, which is less than the 9.4 to 18.7 feet of drawdown in groundwater levels beneath the CRA during the 17 years of pumping by Kaiser in the Chuckwalla Valley Groundwater Basin from 1965 to 1981.

- Hydraulic characteristics of the Chuckwalla Valley Groundwater Basin were estimated based on aquifer tests that were conducted in two wells near Desert Center and from data collected from three wells in the Eagle Mountain Mine area. Table 2 is a summary of the aquifer hydraulic characteristics of the Chuckwalla Valley Groundwater Basin based on the test data and assumed values that were incorporated into an analytical groundwater model that uses a Taylor series approximation of the Theis non-equilibrium well function (Theis, 1935).

Table 2
Summary of Aquifer Characteristics of Chuckwalla Valley Groundwater Basin

Source of Test Data	Storativity (unit less)[5]	Hydraulic Conductivity (feet/day)	Transmissivity (gallons per day/foot)	Saturated Aquifer Thickness (feet)
Well Log	Not Reported	101	64,000	85
Well Log	Not Reported	39	48,000	166
Well Log	Not Reported	44	57,000	175
Well Log	Not Reported	51	57,000	150
Pump Test	0.06	118	264,002	300
Pump Test	0.05	139	311,288	300
Values used for water supply modeling	0.05	125	280,000	300
Values used for seepage modeling	0.05	50	56,000	150

To reduce the impacts of groundwater pumping, the Project supply wells will be constructed to minimize overlapping cones of depression, and seepage interceptor wells will be installed to recover seepage and groundwater equal to the estimated seepage volume from the reservoirs, as established under Condition 7 of this water quality certification. Because not all seepage will be captured by the seepage interceptor wells, reservoir surface water quality and reservoir seepage water quality shall be higher or equal to native groundwater quality. Reservoir seepage water quality will be determined at the horizontal monitoring wells installed immediately below the liner at each reservoir. Groundwater and recovered seepage will be used to offset evaporative and seepage losses from the reservoirs.

2.2.1.1 Groundwater Modeling

Hydraulic data and groundwater level measurements were supplemented with the Taylor series approximation of the Theis non-equilibrium well function analytical model to assess pumping effects. Using the aquifer characteristics presented in Table 2, the analytical

[5] Storativity is a ratio of the volume of water that a permeable unit will absorb or expel from storage per unit surface area per unit change in head.

model was used to estimate drawdown from Project pumping. Use of the analytical approach correlated favorably, $R^2 = 0.994$, with the available groundwater level measurements (projections versus actual groundwater level measurement differences range from one to seven feet). Sensitivity analyses show that using lower hydraulic conductivities would predict less drawdown at a distance from the well, indicating that the model estimated maximum drawdown is a conservatively high estimate.

Project-Specific Results:

The analytical model was used to estimate the maximum drawdown from Project-only pumping at the end of 50 years[6]. Model results show maximum estimated drawdown from Project-only pumping at the following locations:

- Four feet beneath the CRA in the upper Chuckwalla Valley Groundwater Basin;
- Four feet beneath the CRA in the Orocopia Valley;
- Three feet at the mouth of the Pinto Valley Groundwater Basin;
- 50 feet at the Project supply wells near Desert Center; and
- 10 feet at a distance of one mile from the Project supply wells.

After the four-year initial fill of the reservoirs to full operating capacity, it will take approximately two years for water levels at the Project supply wells to rebound from 50 feet of drawdown to about 11 feet of pre-drawdown levels. After 50 years of Project operation, there will be approximately 14 feet of drawdown at the Project supply wells associated with the Project. Project use of groundwater by itself is not expected to result in drawdown of groundwater in excess of maximum historic levels.

Project and Non-Project Results:

The analytical model was also used to estimate cumulative effects of groundwater drawdown from Project and non-Project use. The analytical model evaluated Project use of groundwater, existing uses of the aquifer, and potential future uses of the groundwater proposed by solar energy generators and a proposed Landfill. Over a 50-year period, overall cumulative groundwater use will add about 3 to 10 feet of additional drawdown in pumping areas. Model results showed a maximum cumulative estimated drawdown in the following locations:

- 14 feet beneath the CRA in the upper Chuckwalla Valley Groundwater Basin;
- 9 feet beneath the CRA in the Orocopia Valley;
- 10 feet at the mouth of the Pinto Valley Groundwater Basin;
- 60 feet near the Project supply wells near Desert Center; and
- 10 feet at a distance of about 1.5 miles from the Project supply wells.

[6] A 50-year term license is sought by the Applicant. The Project is required to undergo a new environmental analysis prior to relicense or surrender of the license.

Analytical modeling results show that cumulative groundwater use will result in exceedance of the maximum historic drawdown in the following locations:

- CRA in the upper Chuckwalla Valley Groundwater Basin (seven feet below historic levels);
- CRA in the Orocopia Valley (six feet below historic levels); and
- Mouth of the Pinto Valley Groundwater Basin (one foot below historic levels).

The maximum depletion in storage from the Chuckwalla Valley Groundwater Basin, as a result of the Project, and existing and future uses, will be about 104,000 AF and is projected to occur approximately 33 years after starting the initial fill of the reservoirs. The maximum projected depletion in storage would be about one percent or less of the 9.1 to 15 million AF of groundwater in the basin estimated by DWR (DWR 1975 and DWR 1979).

There are about 150 feet of saturated alluvium in the upper Chuckwalla Valley Groundwater Basin. Cumulative impacts from Project and non-Project uses, conservatively assuming zero groundwater recharge, will lower groundwater levels by about 10 to 18 feet over a 50-year period, leaving over 130 feet of saturated alluvium to continue to supply water to the wells in the upper Chuckwalla Valley Groundwater Basin.

2.2.2 Reservoir Seepage Analyses

Potential seepage from the reservoirs was analyzed and presented in the Final EIR in two technical memorandums titled: *Eagle Mountain Pumped Storage Project – Seepage Analyses for Upper and Lower Reservoirs, prepared by GEI Consultants, Inc.* (GEI Consultants, Inc., 2009b), and *Eagle Mountain Pumped Storage Project – Seepage Recovery Assessment* (GEI Consultants, Inc., 2009c).

The expected quantity of seepage through the Upper and Lower Reservoirs was evaluated by performing seepage analyses using the SEEP/W module of the two dimensional, finite-element geotechnical engineering software GeoStudio 2007. Different input parameters were used in the model to review alternatives that could be used to reduce seepage from the Lower and Upper Reservoirs and to account for variable subsurface conditions of the two reservoirs. The Lower Reservoir will be partially situated on unconsolidated alluvium, whereas the Upper Reservoir will sit atop fractured bedrock. The estimates of hydraulic conductivity for the various geologic materials were developed based on the results of field permeability tests, laboratory permeability tests, correlations with published values based on material descriptions, and empirical correlations between grain size and permeability. These estimates are based on a small quantity of samples because the Applicant currently does not have access to the site. Seepage flow rates and gradients were estimated at both the Upper and Lower Reservoir sites using liner thicknesses of three, five, and eight feet at minimum and maximum water storage elevations.

Results of the seepage analyses found that:

- Upon filling of the Upper and Lower Reservoirs some seepage is expected. The seeping water could potentially result in ground subsidence near the CRA resulting from hydrocompaction of the sediments. The majority of the seepage from the reservoirs is anticipated to travel generally from west to east towards the Chuckwalla

Valley Groundwater Basin, similar to the existing groundwater conditions at the Project site (GEI Consultants, Inc., 2009b).

- Based on the seepage analyses and assuming no reservoir seepage reduction measures, the estimated annual average seepage volume from the Upper Reservoir is approximately 1,200 AF, and the estimated annual seepage volume from the Lower Reservoir is approximately 1,730 AF. The estimated annual seepage volume for the Lower Reservoir is about 44 percent or 530 AF more than the Upper Reservoir because the eastern wall of the Lower Reservoir primarily consists of alluvial sediments and debris flow deposits, which have significantly higher hydraulic conductivities.
- Grouting and a fine tailings liner in the Upper Reservoir of eight feet in thickness would reduce the average annual seepage volume by about 40 percent. The average reduction for the Upper Reservoir is estimated to be approximately 510 AF annually, with an eight-foot thick liner in place. Additional seepage measures may be needed for the Upper Reservoir and will be evaluated further as part of the Phase I and Phase II Site Investigations (Condition 1) and seepage management (Condition 7).
- The maximum reduction estimated for the Lower Reservoir was approximately three percent or 50 AF annually using a fine tailings liner only. The fine tailings liner thickness had minimal impact on the estimated reduction in annual seepage volume from the Lower Reservoir. The upper half of the east walls in the Lower Reservoir consists of an alluvium deposit that is too steep to support the fine tailings liner. Using an eight-foot thick liner composed of fine tailings, grouting rock fractures, and roller compacted concrete, as needed, would reduce the average annual seepage volume of the Lower Reservoir by approximately 1,020 AF. Additional seepage measures may be needed for the Lower Reservoir and will be evaluated further as part of the Phase I and Phase II Site Investigations (Condition 1) and seepage management (Condition 7).

2.2.2.1 Potential Impacts from Reservoir Seepage

Seepage from the reservoirs has the potential to affect groundwater quality, the CRA, and the liner of the proposed Landfill. The beneficial uses of groundwater identified for the Chuckwalla Valley Hydrologic Unit are: municipal supply and domestic supply (MUN); industrial service supply (IND); and agricultural supply (AGR). The Colorado River Regional Water Board water quality standards for groundwater apply to the Project's surface waters. The Colorado River Basin Plan states that whenever existing water is better than the quality established as objectives, such water quality shall be maintained. Table 3 shows the numeric standards for inorganic chemical constituents that apply to water designated for MUN use, as outlined in the Colorado River Basin Plan at the time of water quality certification issuance. Table 3 also contains preliminary background water quality near the proposed reservoirs location and Desert Center. The preliminary background groundwater quality currently exceeds the numeric MUN standards for some constituents. In cases where the preliminary background groundwater quality exceeds the numeric MUN standards, groundwater quality shall not be degraded. The background groundwater quality will be confirmed during the Phase II Site Investigations and prior to Project construction, as presented in Condition 1 of this water quality certification.

Table 3
Colorado River Regional Water Board Numeric Standards for Inorganic Chemical Constituents for MUN Use Designation and Chuckwalla Valley Groundwater Quality

Inorganic Chemical Constituent	**Basin Plan MCL** (mg/L)**	**Preliminary Background Groundwater Quality (Bedrock beneath Project)[1]**		**Preliminary Receiving Groundwater Quality (Alluvium in Upper Chuckwalla Valley)**		**Source Water to Fill Reservoirs (Near Proposed Project Wells)**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**
Arsenic	0.01	<0.01	<0.01	0.0058*	0.024*	0.009*	0.025*
Barium	1.0	Unk	Unk	0.011	0.049	Unk	Unk
Cadmium	0.005	Unk	Unk	<0.0001	0.0002	Unk	Unk
Chromium (total)	0.05	0.02	0.98	<0.001	0.07	Unk	Unk
Fluoride	2.0	0.6*	5.1*	0.5	10	3.6*	12*
Lead	0.015	<0.01*	0.01*	<0.001	0.29	Unk	Unk
Mercury	0.002	Unk	Unk	<0.0002	<0.0002	Unk	Unk
Nitrate (as NO3)	45	0.2*	74*	<0.1	51	0.65*	14*
Nitrate+Nitrite (as N)	10	Unk	Unk	Unk	Unk	Unk	Unk
Selenium	0.005	Unk	Unk	<0.005	0.008	<0.5*	<0.5*
Silver	0.10	Unk	Unk	<0.010	<0.010	Unk	Unk
Total Dissolved Solids (TDS)	N/A	685*	1,170*	430	1,480	390*	925*
pH	N/A	7.7	8.1	6.6	8.6	7.1*	8.7*

Unk = Unknown
mg/L = Milligrams per Liter
N/A = Not Applicable (no MCL)
[1] Data provided from monitoring wells in the mining pits area. Background groundwater quality for water quality certification compliance will be determined once the Applicant has access to the Central Project Area and prior to Project construction.
* Indicates that there were less than four quarters of data.
** Colorado River Basin Plan, 2011.

Without reservoir seepage reduction measures and interceptor wells, it will take at least 15 years for the steady-state groundwater profile of the Lower Reservoir to fully develop. This estimate conservatively assumes a two-year filling period, a continually full Lower Reservoir, and the maximum estimated seepage volume is achieved from the Lower Reservoir. Under the same assumptions, the Upper Reservoir groundwater profile will take at least 50 years to reach steady-state conditions. Existing groundwater levels are estimated to be 1,000 feet below the lowest level of the Upper Reservoir and less than 100 feet below the lowest level of the Lower Reservoir.

Groundwater resource impacts will be addressed by implementation of Condition 5. Impacts associated with reservoir seepage will be addressed by implementation of Condition 7.

Background on the potential impacts to groundwater associated with each reservoir is presented below.

Lower Reservoir:

The numerical model MODFLOW was used to assess the effects of seepage from the Lower Reservoir on local groundwater levels. Based on the seepage analysis and geologic assessment of the Upper and Lower Reservoirs, the Lower Reservoir will have larger increases in groundwater elevations. Operation of the Project will allow only one reservoir to be full at any one time, but there will always be dead storage water left in each reservoir. To provide a conservatively high estimate of the potential impacts of seepage on the CRA facilities, the reservoir that will produce the most seepage while full (i.e., the Lower Reservoir) was evaluated.

Results of the MODFLOW model indicate that groundwater levels in the vicinity of the CRA would increase by up to three feet as a result of seepage from the Lower Reservoir if seepage volume is not recovered by interceptor wells. Because the estimated groundwater elevation is predicted to be approximately 450 feet below the ground surface in the vicinity of the CRA, no uplift forces are expected on the concrete lining of the CRA. The MODFLOW model considered that six seepage interceptor wells would be constructed east of the Lower Reservoir to recover seepage from the Lower Reservoir and return it to the Lower Reservoir. Condition 1 and Condition 7 of this water quality certification require additional assessment of potential seepage impacts.

Upper Reservoir:

A groundwater model was not developed to assess seepage from the Upper Reservoir because there is insufficient data available to develop a valid model.

A geologic assessment of the major faulting pattern was prepared to develop a preliminary seepage interceptor well network to recover the seepage from the Upper Reservoir. Seepage from the Upper Reservoir is anticipated to occur along joints, fractures, and faults that cross beneath the Upper Reservoir. Observations from two borings completed in the Upper Reservoir site vicinity suggest that water may be present in joints and fractures at various depths and that lower fractures are either dry or at lower heads. Seepage interceptor wells will be installed in the proximity of the major faults south of the Upper Reservoir and along the axis of Eagle Creek Canyon to recover seepage and provide secondary control to prevent groundwater levels from rising beneath the proposed Landfill.

The Project could be operating in conjunction with the neighboring proposed Landfill. The site for the proposed Landfill is east (downgradient) of the Upper Reservoir. In the case of consistently high water levels in the Upper Reservoir and efficient interconnectivity of bedrock fractures, there is the potential that seepage from the reservoir could encounter the lining of the proposed Landfill. However, with seepage control measures, groundwater levels resulting from seepage from the Upper Reservoir are estimated to rise to 125 feet below ground surface. If the Upper Reservoir is kept constantly full with no seepage control wells, groundwater levels are estimated to rise to 50 feet below ground surface. Potential impacts to the proposed Landfill, associated with reservoir seepage, will be addressed by implementation of Condition 7.

2.3 Biology

Four federal- or state-listed species are included in the list of special-status species that may occur or have been documented to occur in the Project vicinity. The federal- or state-listed species with the potential to be affected by Project activities include: Coachella Valley Milkvetch; American Peregrine Falcon; Gila Woodpecker; and Desert Tortoise. Federal-listed species are identified by the United States Fish and Wildlife Service (USFWS) and BLM. State listed species are identified by the California Department of Fish and Wildlife (CDFW, formerly known as the California Department of Fish and Game) and/or the California Native Plant Society.

Potential impacts to the four listed species are described in the Final EIR as follows:

- Coachella Valley Milkvetch. Based on site reconnaissance and literature review, this species is not expected to be located on-site, or in areas that will be affected by the Project. Therefore, it is highly unlikely that there would be any Project effects on the Coachella Valley Milkvetch. However, if found, this impact would be potentially significant. Project Design Feature (PDF) BIO-2, included in the Final EIR's Mitigation Monitoring and Reporting Plan (MMRP), is designed to ensure that no Coachella Valley Milkvetch will be disturbed. Per PDF BIO-2, if Coachella Valley Milkvetch is found, the Applicant will immediately notify and obtain guidance from CDFW on appropriate mitigation.

- American Peregrine Falcon. Based on site reconnaissance and literature review, this species is not expected to be located on-site or in areas affected by the Project. This species is not found in Riverside County, and has not been found during previous surveys of the Project area, including the Central Project Area. Therefore, it is highly unlikely that there would be any Project effects on the American Peregrine Falcon. However, if found on site, this impact would be potentially significant. PDF BIO-1, included in the Final EIR's MMRP, requires pre-construction surveys to verify that no American Peregrine Falcon will be disturbed. Per PDF BIO-1, if any American Peregrine Falcons are found, the Applicant will immediately notify and obtain guidance from CDFW on appropriate mitigation.

- Gila Woodpecker. Based on site reconnaissance and literature review, this species is not expected to be located on-site, in areas affected by the Project, or residential areas. Between the small residential areas (town of Eagle Mountain, town of Desert Center, and the community of Lake Tamarisk) and the Central Project Area is a broad area of inhospitable habitat. However, if found, this impact would be potentially significant. PDF BIO-1, included in the Final EIR's MMRP, requires pre-construction surveys to be conducted to ensure that no Gila Woodpecker will be disturbed. Per PDF BIO-1, if any Gila Woodpeckers are found, the Applicant will immediately notify and obtain guidance from CDFW on appropriate mitigation.

- Desert Tortoise. Desert Tortoise may be affected by Project construction, particularly along the proposed transmission corridor. The Project may adversely affect Desert Tortoise, and as such, this impact is potentially significant and subject to mitigation. Comprehensive Desert Tortoise surveys were conducted by the Applicant in early April of 2008, 2009, and 2010. Results of the surveys show that habitat for Desert Tortoise exists within the Project area. The recommendations and findings from the surveys are incorporated in seven mitigation measures (MM TE-1 through MM TE-7) identified in the Final EIR's MMRP. A Biological Opinion (BO) for the Desert Tortoise was prepared by the USFWS, and CDFW issued a related Consistency Determination for the Project.

In addition to the four species listed above, the Final EIR evaluates the potential for the Project to increase the local raven population. If ravens increase in response to additional water resources at the Project, these ravens could forage in the Joshua Tree National Park (JTNP) or disperse into JTNP from enhanced reproductive opportunities. This impact is potentially significant and is addressed in MM TE-5 of the Final EIR's MMRP.

Couch's spadefoot toad was also identified as a species that could be affected by Project construction. During construction of all Project facilities, any ephemeral pools that develop in response to intense rainfall showers from early spring through fall shall be examined for larvae of the Couch's spadefoot toad. Construction activities will avoid disturbing or restricting flow to impoundments that could support Couch's spadefoot toad. If larvae are present, the pools shall be flagged and avoided by construction activities. Where pools cannot be avoided, new pools shall be constructed and larvae transplanted, as outlined in MM BIO-9 of the Final EIR's MMRP.

Implementation of Condition 2 of this water quality certification addresses impacts to biological resources.

3.0 Construction Activities

Construction activities fall into three general categories: (1) construction related to the generation of electrical power; (2) construction related to pollution prevention and control measures; and (3) other construction activities not described in (1) or (2). Each category is described further below.

3.1 Electrical Power Generation

Construction activities related to the generation of electrical power for the Project include: construction of three new wells for water supply; excavation for and installation of the water supply pipeline; construction of support pads and installation of the power transmission lines; construction of two dams in the Upper Reservoir; construction of spillways and discharge channels for both reservoirs; tunnel excavation for water conveyance between the two reservoirs including inlet structures; underground excavation for the powerhouse; construction of an on-site switchyard; construction of permanent access roads including road cuts and embankments; construction of Project offices and security lighting structures; and construction of an interconnection switchyard near Desert Center.

3.2 Pollution Prevention and Control Measures

Construction activities associated with pollution prevention and control measures include: installation of liners in the Upper and Lower Reservoirs; construction of seepage interceptor wells to recover and return seepage to the reservoirs; construction of a water treatment system to treat reservoir and seepage water to maintain water quality; a waste management system for storage of wastewater; potential modification of the Eagle Creek channel to increase capacity; installation of vertical and horizontal monitoring wells to measure groundwater levels and to monitor groundwater and seepage water quality; and installation of extensometers to measure ground subsidence.

3.3 Other

Other construction activities include minor construction such as fence installation and road maintenance that will occur over the life of the Project.

Construction in the Project area may impact wildlife that occupy or migrate through the Project area.

Implementation of Condition 2, Condition 3, and Condition 4 of this water quality certification addresses impacts associated with construction activities.

4.0 Control Measures and Environmental Mitigation

The following control measures and environmental mitigation will be implemented to ensure that there will be minimal impacts to the environment from Project activities.

4.1 Erosion Control

Erosion and sediment control measures will be implemented to minimize the erosion of soils in construction areas and prevent the off-site transport of sediment.

Three area types are defined for erosion and sedimentation control measures based on their similar characteristics and anticipated impacts: Area Type 1 represents locations and activities with a high potential for environmental impacts; Area Type 2, represents locations and activities with a moderate potential for environmental impacts; and Area Type 3, represents the lowest potential for environmental impacts. The different area types are shown on Figure 4 in the Erosion and Sedimentation Control Plan included in Section 12.2 of the Final EIR.

Area Type 1

Area Type 1 includes cleared and graded areas for minor cuts and fills of permanent features such as roads, power cable conduit trenches, the interconnection switchyard near Desert Center, and transmission tower pads.

This area type encompasses construction where Project facilities and above ground structures will remain after construction is finished. Most of these areas were impacted during previous mining activities on the Project site. Area Type 1 locations include:

- The staging, storage and administrative area, where a permanent office will remain after construction activities finish;
- The work around permanent access roads;
- The Project site switchyard and surrounding area, including east along the access road;
- Road cuts and embankments;
- Transmission tower pads along the power transmission line that will extend aboveground from the Project site switchyard approximately 17 miles south to the Eastern Red Bluff Substation, which is located south of Interstate 10 and about four miles east of Desert Center;
- The water treatment facility;
- The waste management and storage area for water treatment wastes;
- Lower Reservoir inlet/outlet structure;

- Upper Reservoir inlet/outlet structure;
- West and south saddle dams on the Upper Reservoir;
- Upper and Lower Reservoir spillways and discharge channels; and
- Eagle Creek channel improvements.

Material from the tunnel excavation will be used during construction of the proposed Project to the extent feasible. Tunnel material can be used for backfill, road base, rough grading, flood berms, and possibly as aggregate for roller compacted concrete in the dams. Any material from the tunnel excavation in excess of what is used in construction will be placed in the reservoirs or in areas from which fine tailings were removed. Any material removed from tunnel excavation shall be tested before being placed in the reservoirs and not contribute to water acidity or metal leaching. The Upper Reservoir will have 2,300 AF of dead storage volume, and the Lower Reservoir will have 4,300 AF of dead storage volume. A portion of this volume could be used for disposal of tunnel excavation spoil material as long as it does not interfere with performance of the reservoir intake and outlet works and will not impact water quality. The estimated quantity of material to be excavated is shown in Table 4.

Table 4
Estimated Quantity of Excavated Material During Project Construction

Feature	**Quantity of material (in-place volume)**
Tunnel Excavations	736,000 cubic yards (CY)
Underground Caverns	132,000 CY
Excavations and Benching for Intakes	673,000 CY
Total if Compacted	1,541,000 CY (approximately 955 AF)
Total (includes additional 15% volume for air voids)	1,772,000 CY (approximately 1,100 AF)

Area Type 2

Area Type 2 includes areas that will be cleared and graded (minor cuts and fills) to accommodate construction operations and access. These temporary use areas would be initially cleared of vegetation and would be re-vegetated after construction. The following areas are identified as Area Type 2:

- The area around the surge tank and shaft and above the powerhouse;
- The area where the transmission line daylights from the tunnel portal and along the overhead transmission line alignment to the switchyard;
- The water supply pipeline extending from wells in the Chuckwalla Valley approximately 15 miles northwest to the Lower Reservoir;
- The area around the water treatment facility supply pipeline from the Upper Reservoir to the water treatment facility site and staging area;
- The area around the water treatment facility pipeline to the waste disposal area;
- Any areas that contain washes, dry streams, or channels that intersect with proposed alignments and construction activities; and
- The areas adjacent to temporary access and construction roads, and temporary soil stockpiles.

Area Type 3

Area Type 3 includes locations for the Upper and Lower Reservoirs used for temporary stockpiling of construction materials and the monitoring and seepage interceptor wells. The following areas are identified as Area Type 3:

- The eastern portion of the Upper Reservoir;
- The western portion of the Lower Reservoir; and
- Construction areas for monitoring and seepage interceptor wells.

4.2 Pollution Prevention Management Practices

The Applicant will use appropriate management practices to: (1) stabilize soil and prevent erosion to retain sediment before it can travel into surface drainages; (2) limit or reduce potential pollutants at their sources; and (3) eliminate off-site discharge. Management practices commonly used to protect water quality for this type of construction project are presented in the Erosion and Sedimentation Control Plan, in Section 12.2 of the Final EIR.

4.2.1 Erosion and Sediment Control Management Practices

Soil stabilization, also referred to as erosion control, consists of source control measures that are designed to prevent soil particles from detaching and becoming suspended in runoff. Soil stabilization practices protect the surface by covering or binding soil particles. Construction operations for the Project will follow dust control guidelines that are defined in the protection, mitigation, and enhancement measures developed for air quality in the Final EIR. The Applicant will implement management practices for effective soil stabilization during and after construction, as required by Condition 3 of this water quality certification.

4.2.2 General Pollution Prevention Management Practices

The Applicant will implement general source control measures as described in Condition 4 of this water quality certification to prevent or minimize pollution.

4.3 Environmental Mitigation

Environmental mitigation measures are identified in the Final EIR for the Project. The Applicant, by letter to the State Water Board dated February 27, 2013, committed to implement all mitigation measures listed in the Final EIR, at the appropriate times, throughout the life of the Project. The Final EIR, CEQA Findings, and Statement of Overriding Considerations will be adopted concurrently with this final water quality certification. The CEQA Findings and Statement of Overriding Considerations will be included as Attachment C of this final water quality certification.

Prior to Project construction, Phase I and Phase II Site Investigations, as described in Condition 1 of this certification and Section 12.1 in Appendix C of the Final EIR, must be completed to confirm previous studies conducted in the Central Project Area. If the results from the Phase I and Phase II Site Investigations identify additional impacts not addressed in the Final EIR, Project activities will cease until appropriate mitigation measures are identified and incorporated into the Project. Any newly identified significant impacts will need to be analyzed in accordance with CEQA before the Project's final design is completed.

4.4 Surface Water Protection

No perennial streams occur within the Project boundary or Project drainage area. There are two main surface drainage features at the Project site: Eagle Creek and Bald Eagle Creek. Both creeks are ephemeral streams. They are generally dry throughout the year, except during large storm events that occur infrequently in the area. Eagle Creek is located on the southern edge of the Project site. Eagle Creek is currently diverted in two locations by embankments in the main channel that direct flood flows into the proposed Lower Reservoir site. These engineered embankments were constructed during active mining operations to provide flood protection to the Eagle Mountain town site. Bald Eagle Creek also drains into the proposed Lower Reservoir site. Additionally, the proposed reservoir sites receive incidental runoff and sheet flow from surrounding slopes in a limited watershed area within the historically mined lands. Both the Upper and Lower Reservoir sites are located in closed basins, with minimal drainage areas.

Once full, the Upper and Lower Reservoirs will become two large water bodies. The newly created surface water will be used for hydropower generation to improve interstate and intrastate grid operations. The conditions in this certification, along with the mitigation measures adopted by the Applicant will ensure that water quality of the reservoirs will be maintained consistent with the Colorado River Basin Plan.

With the Project, runoff from Eagle Creek will follow current drainage channels to discharge into the Lower Reservoir. Water from the reservoirs will be treated to maintain salinity levels, pH levels, and metal concentrations at or below the existing background groundwater quality levels. Background groundwater quality will be established before construction of the Project as described in Condition 7 of this water quality certification.

The CRA is located east of the proposed reservoirs. If unmanaged, seepage from the reservoirs could cause groundwater levels to rise in the sediments underlying the CRA and cause structural instability or subsidence. In order to protect the CRA, seepage from the reservoirs will be recovered via interceptor wells, which will be constructed and operated to maintain groundwater levels per Condition 7. The groundwater collected at the seepage interceptor wells will be returned to the reservoirs.

To prevent uncontrolled over-topping of the reservoirs, spillways will be installed in both reservoirs. The Upper Reservoir spillway is designed to discharge into the Eagle Creek channel, which drains into the Lower Reservoir. Engineering surveys will be performed to determine if the Eagle Creek channel needs to be modified to increase its capacity. If modifications to the Eagle Creek channel are necessary, a Lake and Streambed Alternation Agreement, pursuant to section 1602 of the Fish and Game Code, may be necessary. The overflow spillway will be located on the southeast rim of the Lower Reservoir and will discharge into a channel. The channel will cross Eagle Mountain Mine property and pass over the underground CRA. Channel characteristics are described in Section 12.9 of the Final EIR.

Flows will be discharged downgradient from the CRA and are expected to spread laterally at shallow depths over the alluvial fan.

Springs that are fed by groundwater in the Eagle Mountains (see Final EIR, Figure 3.3-1) are hydrologically disconnected from the aquifers of the Pinto Valley Groundwater Basin and the Chuckwalla Valley Groundwater Basin (United States Department of the Interior, NPS, 1994). The proposed Upper Reservoir operating level will be at a higher elevation than the Eagle Tank and Buzzard springs. The springs are located in the bedrock above the Pinto Valley Groundwater Basin and the Chuckwalla Valley Groundwater Basin. The spring water comes from joints and fractures in the rocks above the springs. There are two predominant fracture systems, as demonstrated by major faults in the area, which are oriented northeast-southwest and generally east-west (see Final EIR, Figures 3.3-3 and 3.3-18). Seasonal precipitation likely fills the fractures. None of the springs are documented as permanent, year round springs (SCS Engineers, 1990). Both springs are identified as Unlisted Springs in the Colorado River Basin Plan with the following site-specific use classifications: groundwater recharge; water contact recreation; non-contact water recreation; warm and/or cold freshwater habitat; wildlife habitat; and preservation of rare, threatened, or endangered species.

Buzzard spring is located 4.3 miles from the southern edge of the Upper Reservoir and 3.4 miles from the western tip of the Lower Reservoir. Bald Eagle Canyon is in between the reservoirs and Buzzard spring, at a lower elevation than the spring, so seepage from the reservoirs is not expected to affect Buzzard spring.

Eagle Tank spring is located more than three miles from the western edge of the proposed Upper Reservoir. It is unlikely that there are major geologic fractures connecting the Upper Reservoir to the Eagle Tank spring over the distance separating the two features.

Reservoir water quality could potentially be affected by contact with the ore body and tailings. The primary minerals found in the reservoir sites are magnetite and pyrite. Pyrite and other sulfide minerals can oxidize in the presence of oxygen and water, and form acidic water conditions in the reservoirs. As the water becomes more acidic, the capacity to dissolve other elements from the ore increases. Water contact with the ore body can lead to metals leaching into the water, even without acidic conditions. On-site studies during the Phase I Site Investigations will be conducted to determine the acid production potential from the ore body and tailings, and the potential for metal leaching, as required by Condition 1 of this water quality certification.

Reservoir Seepage Control Measures and Recovery

Seepage control measures will be constructed to limit seepage from the reservoirs. In addition to the installation of a fine tailings liner, the Applicant will consider seepage control measures such as geosynthetic liners, roller compacted concrete, soil cement treatment and grouting of faults, fractures, and joints.

Seepage interceptor wells will be constructed and used to control seepage from the reservoirs and maintain groundwater levels and quality. Seepage interceptor wells will be constructed in the downgradient direction of both the Upper and Lower Reservoirs. Groundwater quality monitoring will be conducted in the seepage interceptor wells, private neighboring wells whose owners voluntarily cooperate, and other monitoring wells to determine whether groundwater is being adversely impacted by Project operations.

Seepage control methods will be further investigated and refined using data from the Phase I and Phase II Site Investigations conducted after the Applicant gains full site access. Control methods will be identified to maintain seepage below the updated estimated seepage volumes developed based on the investigations. Such seepage control methods may include, but are not limited to, the following:

- Curtain grouting of the foundation beneath the Upper Reservoir dam's footprint and around the reservoir rim;
- Backfill concrete placement and/or slush grouting of the faults, fissures and cracks on the Upper Reservoir;
- Placement of low permeability materials, as technically feasible, over zones too large to be grouted in the Upper Reservoir and over areas of alluvium within the Lower Reservoir;
- Blanket the entire alluvial portion of the Lower Reservoir with stepped roller compacted concrete or soil cement overlay; and
- Seepage collection and monitoring systems positioned based on the results of the hydrogeologic analyses.

A Seepage Management Plan will be developed to describe the controls and monitoring that will be used to protect groundwater from reservoir seepage, as required by Condition 7 of this water quality certification.

Water Treatment

The water treatment facility will treat water drawn from the Upper Reservoir to maintain TDS in both reservoirs at roughly the same average salinity concentration as the background groundwater. Preliminary tests show that the background groundwater TDS is approximately 660 mg/L, based on available data for existing Chuckwalla Valley Groundwater Basin wells. Treated water will be discharged to the Lower Reservoir. Water treatment facilities are expected to remove approximately 2,500 tons of salts from the reservoirs each year. The facilities are expected to generate approximately 270 AF of brine per year. In addition to removing salts from the reservoirs, other contaminants (including nutrients and minerals), if present, would be removed. Depending on the constituents found in the dried brine, final disposal may require a facility approved to receive hazardous waste.

The water treatment technologies evaluated in the Final EIR consist of dissolved air flotation (DAF); automatic backwash screens; microfiltration (MF); and reverse osmosis (RO). If these technologies are not supplanted by more effective technologies prior to license issuance, the Applicant plans to incorporate these technologies in the design of the water treatment facility. DAF is a clarification process to treat water from the reservoirs for turbidity and suspended solids control. DAF removes algae, which could be a potential problem as it could foul turbines and pumps. The RO system will separate dissolved salts from Upper Reservoir water, producing finished (treated) water and brine. Finished water from the RO treatment plant would be returned to the Lower Reservoir. Brine from the treatment process will be discharged to brine ponds for evaporation, concentration and storage, and ultimate off-site disposal.

The Final EIR discloses impacts associated with waste management through the use of brine ponds managed as Class II surface impoundments.

Brine will be discharged to brine ponds for drying and storage. Brine will enter the brine ponds at a rate of approximately 170 gpm or 270 AFY. The total pond area will be approximately 56 acres or about 2.5 million square feet, excluding protective berms.

The initial design for the brine ponds includes six evaporation ponds, where brine salinity concentrations will vary, and five salt solidifying ponds. Each of the six evaporation ponds will cover approximately 8.2 acres, and each salt solidifying pond will cover approximately 1.3 acres. The brine will flow from one pond to another, with increasing salinity as evaporation of water occurs. Pond design includes berms with double liners to protect against seepage. A leachate collection and recovery system will be installed between the liners.

Over a period of approximately 10 years, the salt level in the ponds will increase and salts will be mechanically removed from the ponds unless state, regional or local rules direct otherwise. Based on the pond size and the salt balance, the estimated rate of salt build-up is on the order of 0.25 to 0.5 inches per year. Salts will be collected, removed and disposed of from the brine ponds on an as-needed basis (anticipated to be approximately every 10 years). After salt removal, brine pond liners will be inspected and repaired or replaced as needed.

A Water Treatment, Waste Management, Storage, and Disposal Plan will be developed as required in Condition 8 to identify the proposed manner for handling water treatment facility wastes, including solids from the DAF unit and brine resulting from RO.

5.0 Rationale for Water Quality Certification Conditions

The State Water Board: held two CEQA scoping meetings with interested parties prior to the development of the Draft EIR; publicly circulated a Draft EIR; received comments on the Draft EIR; responded to comments on the Draft EIR; released a Draft Final EIR; and reviewed and considered the Colorado River Basin Plan, the Commission's Final Environmental Impact Statement (EIS), and other information in the record. In addition, the State Water Board considered the existing water quality conditions and Project-related controllable factors, and developed conditions to ensure protection of the water quality and beneficial uses of the water bodies affected by the Project.

Measures that provide protection to beneficial uses of water resources form the basis for the conditions of this certification. Some conditions call for development of a plan subsequent to certification. This approach is necessary to ensure all Project-related impacts are addressed during the construction period and during operations for the life of the Project. These plans must be reviewed and approved by the Deputy Director prior to implementation unless otherwise noted. This water quality certification may also specify instances where other agencies are anticipated to exercise approval authority. The Deputy Director shall be notified when approval is sought from another agency for a plan, action or report.

The following describes the rationale used to develop most of the conditions in the water quality certification. The conditions for which additional rationale is not provided below (Conditions 10 – 35) are additional conditions commonly applicable to hydroelectric projects that, in this case, are necessary to ensure the protection of water quality standards over the term of the license and any annual extensions.

Rationale for Specific Water Quality Certification Conditions

Due to site access constraints, detailed site investigations have not been conducted at the Central Project Area, which includes both reservoir sites and the powerhouse location. Once site access is granted, Phase I and Phase II Site Investigations will be conducted to confirm that the basic Project feature locations are appropriate, confirm previous studies findings of the Central Project Area, and to provide parameters for the final layout and design of the Project. Implementation of Condition 1 will ensure that construction does not begin until Phase I and Phase II Site Investigations Reports confirm the location of Project features, the site geology, and the appropriateness of measures identified to control seepage and protect water quality. Condition 1 requires that the Phase I and Phase II Site Investigations Reports be submitted to the Deputy Director for review and approval prior to any construction activities.

Construction and daily operations of the Project may impact wildlife that occupy or migrate through the Project area. Implementation of Condition 2 will ensure wildlife protection from potential Project impacts.

Construction and operation of the Project has a potential to impact surface waters unless appropriate management practices are used. Management actions during construction will control the discharge of stormwater runoff. Erosion control practices and sediment control practices will be implemented during construction and for the life of the Project to minimize erosion of soils and sediment transport to surface waters. Compliance with the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit; Order No. 2009-0009-DWQ and NPDES No. CAS000002, as amended by Order No. 2010-0014-DWQ, as amended by Order No. 2012-0006-DWQ), and implementation of the PDFs included in the Final EIR will minimize impacts to surface waters. Condition 3 addresses stormwater runoff impacts from construction and operation of the Project. Implementation of Condition 3 will ensure that erosion and sedimentation are minimized or avoided.

Construction and operation of the Project includes the use of materials, oils, fuels, and chemicals that have the potential to pollute water and the environment. Implementation of Condition 4 will minimize the opportunity for these pollutants to enter water and the environment.

The Project reservoirs will be filled, and water levels maintained, with groundwater extracted from the Chuckwalla Valley Groundwater Basin. Groundwater levels are expected to decline (albeit to a lesser extent than the average observed during the 1981 through 1986 period) due to Project operation, existing uses, and proposed projects. Without mitigation, Project operation poses a potentially significant impact to the CRA and existing private wells. A Groundwater Level Monitoring Plan is necessary to confirm that impacts of Project pumping will be mitigated to the maximum extent feasible and that groundwater resources will be maintained as described in Section 2.2.2.1 of this water quality certification. Pumping will be monitored throughout the life of the Project to evaluate the potential effects of hydrocompaction and subsidence on the CRA. Condition 5 addresses potential impacts to nearby supply wells and the CRA.

Although water for Project operations will be supplied by groundwater, surface water management actions are needed to control the discharge of stormwater runoff from the Project site, to manage the reservoirs and reservoir discharges, and to prevent impacts to the Chuckwalla Valley Groundwater Basin, perennial springs, and other water bodies in the Project area. Implementation of Condition 6 will ensure surface water quality is maintained similar to background groundwater quality to prevent reservoir surface water discharges from degrading water-bodies in the Project area.

The Upper and Lower Reservoirs will be designed with engineered seepage control measures to minimize seepage losses. However, some seepage is expected from both the Upper and Lower Reservoirs. Reservoir water and seepage may be in contact with ore. To prevent groundwater quality degradation, seepage interceptor wells will be constructed around the perimeter of the reservoirs in the down-gradient direction to recover seepage volume and return it to the reservoirs. Horizontal wells under the reservoir, seepage interceptor wells, and down-gradient monitoring wells will be used to monitor and assess impacts to groundwater quality and levels. Condition 7 addresses seepage management and groundwater quality monitoring.

Water quality in the reservoirs will be maintained by an RO treatment plant or other water treatment method. Operation of the water treatment facility will generate waste. The Final EIR considered long-term on-site waste storage of liquid treatment wastes in brine ponds. To ensure proper facility layout and waste management, the Applicant will submit a Water Treatment, Waste Management, Storage, and Disposal Plan to the Deputy Director for approval prior to Project construction. Implementation of Condition 8 will ensure that treatment wastes are managed, stored, and disposed of appropriately.

The water quality certification requires Deputy Director approval of several studies and plans. The purpose of requiring additional studies and plans is to further assess site conditions and to address potential Project impacts. Due to the duration of a FERC license, and in order to ensure the Project will not cause environmental degradation, a Contingency Plan is needed to address unforeseen issues that may arise related to Project construction and operation. Condition 9 requires the Applicant to develop a Contingency Plan to ensure the Project can modify operations if water quality or beneficial uses are being degraded after implementation of the mitigation measures identified in the Final EIR, the MMRP, and other provisions of this water quality certification.

6.0 Regulatory Authority

The Federal Clean Water Act (33 U.S.C. §§ 1251-1387) was enacted “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” (33 U.S.C. § 1251(a).) Section 101 of the Clean Water Act (33 U.S.C. § 1251 (g)) requires federal agencies to “co-operate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources.”

Section 401 of the Clean Water Act (33 U.S.C. §1341) requires every applicant for a federal license or permit which may result in a discharge into navigable waters to provide the licensing or permitting federal agency with certification that the project will be in compliance with specified provisions of the Clean Water Act, including water quality standards and implementation plans promulgated pursuant to section 303 of the Clean Water Act (33 U.S.C. § 1313). Clean Water Act section 401 directs the agency responsible for certification to prescribe effluent limitations and other limitations necessary to ensure compliance with the Clean Water Act and with any other appropriate requirement of state law. Section 401 further provides that water quality certification conditions shall become conditions of any federal license or permit for the project. The State Water Board is the state agency responsible for such certification in California. (Wat. Code § 13160.) The State Water Board has delegated this function to its Executive Director by regulation. (Cal. Code Regs., tit. 23, § 3838, subd. (a).)

6.1 State Water Board and Regional Water Quality Control Board Authority

The California Regional Water Quality Control Boards (Regional Water Boards) adopt, and the State Water Board and United States Environmental Protection Agency approves water quality control plans (basin plans) for each watershed basin in the State. These basin plans designate the beneficial uses of waters within each watershed basin, and water quality objectives designed to protect those beneficial uses. Section 303 of the Clean Water Act requires the states to develop and adopt water quality standards. (33 U.S.C. § 1313.) The beneficial uses together with the water quality objectives and implementation plans that are contained in the basin plans and state and federal anti-degradation requirements constitute California's water quality standards.

In accordance with section 13245 of the Water Code, the Colorado River Regional Water Board adopted the Colorado River Basin Plan on November 17, 1993. The Colorado River Basin Plan includes amendments adopted by the Colorado River Regional Water Board through December 2011. Chapter 2 of the Colorado River Basin Plan defines beneficial uses and water quality objectives for waters of the State in the region, including groundwater and surface waters as discussed below.

Water use for the Project will be primarily from groundwater, with incidental surface water inflow (from storm events) to the reservoirs. The beneficial uses of groundwater of the Chuckwalla Valley Hydrologic Unit (717.00) are: MUN; IND; and AGR. The Colorado River Basin Plan does not list beneficial uses for surface waters in the Chuckwalla Valley; however, in 1988, the State Water Board adopted Resolution No. 88-63 (SB 88-63), the Sources of Drinking Water Policy. SB 88-63 considers all surface and groundwater to be suitable, or potentially suitable, for municipal or domestic water supply and that such water should be so designated by the Regional Water Boards. Criteria were provided in SB 88-63 that could be used by the Regional Water Boards to exempt water bodies through the basin plan amendment process. These criteria included: (1) surface and groundwater with greater than 3,000 mg/L of TDS; (2) surface and groundwater that cannot be reasonably treated for domestic use; (3) groundwater sources with yields below 200 gallons per day; (4) surface water in systems designed or modified to convey wastewaters and/or runoff; and (5) groundwater regulated as geothermal sources.

In the Chuckwalla Valley Groundwater Basin, historic groundwater quality TDS concentrations only occasionally exceed 3,000 mg/L (see Final EIR, Table 3.3-3). None of the other exceptions would apply to the aquifer, reinforcing that the current municipal or domestic water supply classifications are generally appropriate. Therefore, the Colorado River Regional Water Board water quality objective to maintain the existing groundwater quality applies to the Project waters.

6.2 Water Quality Certification

The Applicant originally applied for water quality certification for the Project on September 26, 2008. On an annual basis since 2008, the Applicant has withdrawn and resubmitted its application on a timely basis. The State Water Board provided public notice of the application pursuant to California Code of Regulations, title 23, section 3858 on December 17, 2008, and posted information describing the Project on the Division of Water Rights' (Division) website.

6.3 California Environmental Quality Act

The State Water Board reviewed the Applicant's application for water quality certification and the Draft EIR prepared by the Applicant's consultant. The State Water Board subjected the Draft EIR to its own review and analysis. The Draft, Draft Final and Final EIRs reflect the State Water Board's independent judgment pursuant to its Lead Agency status under CEQA [Public Resources Code §§21000-21178 and California Code of Regulations, title 14, sections15000-15387 (CEQA Guidelines)].

The State Water Board released a Draft EIR for the Project on July 23, 2010 (State Clearinghouse No. 2009011010), and accepted comments on the draft until October 7, 2010. The Draft EIR evaluated potential impacts from the Project to water supply; water quality; compatibility with the proposed Landfill, existing Eagle Mountain Mine, and other adjacent proposed projects; biological resources; cultural resources; air quality; and aesthetics. The State Water Board received comments on the Draft EIR from 19 parties. These included comments from four federal agencies; six state and local government agencies; three environmental organizations; one Native American Tribe; one private company; three private individuals, and the Applicant. The State Water Board considered all the comments in the development of the Final EIR and released responses to comments received on the Draft EIR on January 25, 2013.

The Final EIR identifies three unavoidable and significant impacts: (1) air quality during Project construction activities; (2) visual resources; and (3) cumulative impacts to groundwater resources due to Project pumping combined with groundwater use for other reasonably foreseeable projects in the region. For unavoidable and significant impacts, CEQA requires public agencies to prepare a statement of overriding considerations, which reflects the ultimate balancing of competing public objectives (including environmental, legal, technical, social, and economic factors) that the agency must consider before deciding to carry out or approve a project. The State Water Board also prepared CEQA Findings[7] as required pursuant to CEQA Guidelines sections 15091-15093, and a MMRP. All mitigation measures in the Final EIR are incorporated by reference. The MMRP is included as Attachment B of this final water quality certification. The Applicant has agreed to implement all measures identified in the Final EIR to minimize the Project's environmental impacts.

The State Water Board will file a Notice of Determination, pursuant to CEQA Guidelines section 15094, within five days of issuance of this water quality certification.

6.4 Federal Authority

After consultation with state and federal resource agencies, tribes, local governments, non-governmental agencies, the public, and upon approval of FERC, the Applicant chose to use the Traditional Licensing Process (TLP) for the licensing of the Project. The Applicant submitted an application for a preliminary permit for the Project to FERC on March 3, 2008. As part of the licensing process, FERC, in its federal Lead Agency capacity under the National Environmental Policy Act (NEPA), prepared an EIS [42 U.S.C. § 4321 *et seq.*, the Council on Environmental Quality Regulations for Implementing NEPA (40 C.F.R. §§1500-1508)]. FERC released the Draft EIS on December 23, 2010, and issued the Final EIS on January 30, 2012.

[7] CEQA Findings are included as Attachment C of this final water quality certification.

ACCORDINGLY, BASED ON AN INDEPENDENT REVIEW OF THE RECORD, THE STATE WATER RESOURCES CONTROL BOARD CERTIFIES THAT THE CONSTRUCTION AND OPERATION OF THE EAGLE MOUNTAIN PUMPED STORAGE HYDROELECTRIC PROJECT BY EAGLE CREST ENERGY COMPANY will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided the Licensee complies with the following terms and conditions during the Project activities certified herein.

7.0 Conditions

CONDITION 1. SITE INVESTIGATIONS

The purpose of the Phase I and Phase II Site Investigations is to confirm that basic Project feature locations are appropriate, provide basic design parameters for the final layout of Project features, and confirm previous Central Project Area studies used as part of the environmental review.

The Licensee shall follow procedures outlined in the Phase I and Phase II Site Investigations Plan in Section 12.1 of the Final EIR, unless an alternative plan or procedure is approved by the Deputy Director. The Licensee shall begin the Phase I Site Investigations within 60 days after the following three requirements are met: (1) the FERC license is granted; (2) site access is obtained; and (3) regulatory agencies grant approval for ground disturbing activities.

The Phase I Site Investigations shall include, but are not limited to:

- Detailed reconnaissance of the Upper and Lower Reservoir site conditions;
- Evaluation of geologic and geotechnical conditions at the locations of the reinforced concrete hydraulic structures (inlet/outlet structures);
- Evaluation of underground conditions affecting design and construction of water conveyance tunnels, access tunnels, shafts between tunnels, and the underground powerhouse;
- Detailed evaluation and description of reservoir, brine ponds, and tunnel seepage potentials;
- Detailed description of reservoir mapping and evaluation of reservoir-triggered seismicity;
- Evaluation of updated sensitive species surveys; and
- Evaluation of potential water quality impacts to the reservoirs and groundwater associated with ore-body contact.

Results of the Phase I Site Investigations shall be compiled in a report and submitted to the Deputy Director for review and approval. The Deputy Director may require modifications as part of the approval. Within 120 days of receiving the Phase I Site Investigations Report, the Deputy Director will either approve, deny, request additional information, require modifications or additional studies, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Phase I Site Investigations Report.

Following Deputy Director approval of the Phase I Site Investigations Report, and based on any design refinements developed during pre-design engineering, the Licensee shall develop a Phase II Site Investigations Plan. The Deputy Director may require modifications as part of the approval. The Licensee shall submit the Phase II Site Investigations Plan to the Deputy Director for review and approval. Within 60 days of receiving the Phase II Site Investigations Plan, the Deputy Director will either approve, deny, request additional information, require modifications or additional studies, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Phase II Site Investigations Plan. The Phase II Site Investigations shall not begin until the Phase II Site Investigations Plan is approved by the Deputy Director.

The Phase II Site Investigations shall, at a minimum:

- Ensure compatibility of the Project with existing and proposed land uses within the Project area;
- Confirm background groundwater levels and background groundwater quality as outlined in Condition 5 and Condition 7 of this water quality certification;
- Determine if Project operations will have a permanent impact on the Chuckwalla Valley Groundwater Basin storativity;
- Confirm seepage for both reservoirs;
- Determine monitoring well network locations, well types, and well depths;
- Identify the most suitable location for horizontal monitoring wells under the reservoirs and brine ponds;
- Evaluate mass wasting, landslide, and slope stability issues related to loading and unloading the reservoirs;
- Evaluate the use of geosynthetic liners as a seepage control measure for the reservoirs and the brine ponds;
- Assess whether the Chuckwalla Valley Groundwater Basin aquifers are confined or not;
- Determine if modifications to the Eagle Creek channel are required and describe the extent of earthwork required; and
- Assess hydrocompaction and subsidence potentials.

The Licensee shall consult with the Colorado River Regional Water Board and BLM during the monitoring well location determination to allow Project-specific wells to complement a comprehensive monitoring well network for the Chuckwalla Valley Groundwater Basin.

A Phase II Site Investigations Report, summarizing the comprehensive findings of the Phase I and Phase II Site Investigations, shall be submitted to the Deputy Director for review and approval before the final Project design is completed. Within 120 days of receiving the Phase II Site Investigations Report, the Deputy Director will either approve, deny, request additional information, require modifications or additional studies, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Phase II Site Investigations Report. The Deputy Director may require modifications as part of the approval.

The Licensee shall provide opportunity for public participation during the development of the Phase I and Phase II Site Investigations Reports. The Licensee shall conduct at least one public workshop following completion of each phase of the Site Investigations to inform interested parties of the results and obtain public comments. As part of the public workshop on the Phase I Site Investigations, the Licensee shall also solicit comments on the draft Phase II Site Investigations Plan. The Licensee shall review and, as appropriate, incorporate public comments as part of the Phase I and Phase II Site Investigations Reports prior to submitting the reports to the Deputy Director for review and approval. As part of the submittal to the Deputy Director, the Phase I and Phase II Site Investigations Reports shall include the comments made by the public, and a description of how the report addresses the public comment(s) or why the comment(s) was not addressed. The Licensee shall notify the Deputy Director, FERC, and interested parties at least 30 days in advance of any public workshops related to the Project.

The Licensee shall conduct public workshops and provide a public comment period before submitting the final Project design to the Deputy Director.

If Phase I and Phase II Site Investigations results indicate that there are site conditions that have not been evaluated previously and that could potentially have significant environmental impacts, additional analysis shall be performed to comply with CEQA, prior to completion of the Project's final design and construction.

CONDITION 2. WILDLIFE PROTECTION

The Licensee shall conduct sensitive species surveys, as described in the MMRP, after the following two requirements are met: (1) the FERC license is granted; and (2) site access is obtained. The Licensee shall modify sensitive species protective measures identified in Section 3.6 of the Final EIR based on this additional survey information. Any modifications to protection measures shall be developed in consultation with USFWS and CDFW and presented in a Wildlife Protection Plan. Results from the sensitive species surveys shall be included in the Wildlife Protection Plan. The Wildlife Protection Plan shall include an evaluation of potentially impacted species and habitat resulting from Project operations. The Wildlife Protection Plan shall be approved by the Deputy Director, after consultation with USFWS and CDFW, before starting construction. Within 60 days of receiving the Wildlife Protection Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Wildlife Protection Plan. The Deputy Director may require modifications as part of the approval. Construction activities shall not begin until the Wildlife Protection Plan is approved by the Deputy Director.

The Licensee shall provide opportunities for public participation as part of the sensitive species surveys. Following the sensitive species surveys, the Licensee shall conduct at least one public workshop to inform interested parties of the results and obtain public comments. The public workshop may be combined with the Phase I or Phase II Site Investigations workshops. The Licensee shall review and, as appropriate, incorporate public comments as part of the Wildlife Protection Plan prior to submitting the Wildlife Protection Plan to the Deputy Director for review and approval. As part of the submittal to the Deputy Director, the Wildlife Protection Plan shall include the comments made by the public, and a description of how the plan addresses the public comments or why the comments were not addressed. The Licensee shall notify the Deputy Director, FERC, and interested parties at least 30 days in advance of any public workshops related to the Project.

If the sensitive species surveys indicate that there are site conditions that have not been evaluated previously and that could potentially have significant environmental impacts, additional analysis shall be performed to comply with CEQA, prior to completion of the Project's final design and construction.

The Licensee shall avoid disturbance of impoundments and avoid restriction of surface flow to impoundments. Surveys in the Project area shall identify the presence of any artificial impoundment or ephemeral pools that could support Couch's spadefoot toad reproduction. Surveys shall be conducted in accordance with the Northern and Eastern Colorado Desert Coordinated Management Plan identified in Section 3.5 of the Final EIR. During construction of all Project facilities, any ephemeral pools that develop in response to intense rainfall showers from early spring through fall shall be examined for larvae of the Couch's spadefoot toad. Construction activities shall avoid disturbing or restricting flow to impoundments that could support Couch's spadefoot toad. If larvae are present, the pools shall be flagged and avoided by construction activities. Where pools cannot be avoided, new pools shall be constructed and larvae transplanted, as outlined in MM BIO-9 of the MMRP.

All mitigation measures contained in the Desert Tortoise Plan, as identified in the Final EIR, and all monitoring and reporting as required by the MMRP are hereby incorporated as conditions of this water quality certification. All mitigation measures contained in the Predator Monitoring and Control Plan, as identified in the Final EIR, and all monitoring and reporting as required by the MMRP are hereby incorporated as conditions of this water quality certification. The final Predator Monitoring and Control Plan shall be approved by the Deputy Director, after consultation with USFWS and CDFW, prior to initiation of ground-disturbing activities. Within 60 days of receiving the Predator Monitoring and Control Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Predator Monitoring and Control Plan. The Deputy Director may require modifications as part of the approval. The Licensee shall implement the approved Predator Monitoring and Control Plan throughout the life of the Project.

To reduce potential Project impacts to wildlife all mitigation measures relevant to wildlife contained in the Final EIR and incorporated into the MMRP are hereby incorporated as conditions of this water quality certification. Additional wildlife protection measures associated with fencing are outlined in Condition 3.

Notwithstanding any more specific conditions in this water quality certification, the Licensee shall comply with all survey, monitoring and mitigation measures contained in the USFWS BO for the Project.

CONDITION 3. CONSTRUCTION AND EROSION CONTROL

Prior to starting construction of the Project, the Licensee shall submit a request to the Deputy Director for concurrence that all the pre-construction plans and reports required by this water quality certification have been submitted and approved. Construction of the Project shall not commence until the Licensee has received Deputy Director concurrence that pre-construction requirements are satisfied.

The Licensee shall design, construct and maintain downstream drainage and water control structures and facilities to resist erosion and be of sufficient capacity and nature to safely divert a 100-year flood event or a sudden reservoir spill from the town of Eagle Mountain and any projects existing at the time of completion of construction of the Project.

The Licensee shall limit soil erosion through implementation of the Erosion and Sedimentation Control Plan, limiting surface disturbance to only those areas necessary for construction as required by California Code of Regulations, title 23, section 122.26. All erosion and sediment control measures including management practices in the Erosion and Sedimentation Control Plan, and the Revegetation Plan, as identified in the Final EIR, are hereby incorporated as conditions of this water quality certification. Additionally, all construction and geological mitigation measures contained in the Final EIR and monitoring and reporting of those measures as outlined in the MMRP are hereby incorporated as conditions of this water quality certification. The Project's Environmental Coordinator shall oversee implementation of the Erosion and Sedimentation Control Plan and the Revegetation Plan, and redesign, if needed, the best management practices described in Section 12.2 of the Final EIR.

Following the Phase I and Phase II Site Investigations required by Condition 1 of this certification, the Licensee shall revise the Erosion and Sedimentation Control Plan and the Revegetation Plan as needed and submit any revised plan(s) to the Deputy Director for review and approval. The Deputy Director may require modifications as part of approval. Within 90 days of receiving the Erosion and Sedimentation Control Plan and the Revegetation Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Erosion and Sedimentation Control Plan and the Revegetation Plan. The revised Erosion and Sedimentation Control Plan shall include an adaptive management strategy to minimize unforeseen impacts. The adaptive management strategy shall be developed in consultation with the Eagle Mountain Mine owner or operator, the proposed Landfill's owner or operator, and any other proposed projects adjacent to the Project, prior to submitting the revised Erosion and Sedimentation Control Plan to the Deputy Director for approval. The Licensee shall monitor, maintain, and report results annually, by March 1, to the Deputy Director of sediment measures used for the Project for the life of the Project.

Any material removed from tunnel excavation shall be tested before being placed in the reservoirs or disposed of on-site, to ensure the material will not contribute to water acidity, metal leaching, or water quality impairments. Testing results shall be submitted to the Deputy Director for review and approval before the materials can be used in the reservoirs or disposed of on-site. The Deputy Director may require modifications as part of the approval. Within 90 days of receiving the soils testing results, the Deputy Director will either approve, deny, request additional information, require modifications, request additional studies or testing, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the soils testing results.

The Licensee shall implement practices to control sediment for the life of the Project to prevent an increase of sediment in stormwater discharge and comply with the water quality objectives identified in Chapter 3 of the Colorado River Basin Plan (Revised December 2011), and amendments thereto.

The Licensee shall also implement the following management practices for effective temporary and final soil stabilization during construction and to preserve existing vegetation where required to prevent and minimize erosion:

Fencing

The Licensee shall install permanent security fences around the Upper and Lower Reservoirs, switchyard, brine ponds and any structure or area that may be dangerous to wildlife in the Project area prior to construction of these facilities. Fences should be constructed in a manner that excludes wildlife from the reservoirs. The fencing shall not contain dips or allow wildlife access to drinking water in any other manner.

All permanent fences shall be maintained in a fully functional condition for the life of the Project. All fences, including desert tortoise exclusion fences, shall be inspected monthly as well as immediately following all major rainfall events for the life of the Project. Any damage to the fences shall be repaired immediately. If immediate repair is not possible, the Licensee shall monitor the damaged area continuously for desert tortoise, in accordance with the wildlife protection plans required by Condition 2 of this water quality certification, until repairs are made. Where exclusion fencing is required, security gates should remain closed except during immediate passage.

Construction General Permit

The Licensee shall comply with the NPDES Construction General Permit, and amendments thereto, including development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

The SWPPP must detail the management practices that will be implemented for the Project. The SWPPP must detail the inspection, documentation, implementation procedures for contingency plans and triggers for amending the SWPPP. During construction, the management practices shall be evaluated and, if further protective measures are necessary, the SWPPP shall be amended.

Inspections shall be conducted by the Licensee on a routine basis and after significant storm events in conformance with the SWPPP. Inspection reports shall be prepared to document the inspections. The reports shall include information on performance of the erosion control measures, damage to or deficiencies with installed control measures, needed maintenance or repair activities, monitoring information, and the degree of vegetation establishment. Reporting documents shall be kept on file with the SWPPP and construction records. A monitoring plan shall be incorporated into the SWPPP to ensure that stormwater is managed to control erosion.

The Licensee shall submit the SWPPP to the Deputy Director for review and approval. Within 60 days of receiving the SWPPP, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the SWPPP. The Deputy Director may require modifications as part of the approval. Project construction shall not start until the SWPPP is approved by the Deputy Director.

<u>CONDITION 4. POLLUTION PREVENTION</u>

The Licensee shall ensure the safe delivery, storage, and use of various construction materials, oils, fuels, and chemicals by following all relevant federal, state and local laws, regulations and ordinances. The Licensee shall consult with the Riverside County Office of Environmental Health and comply with local handling, planning, reporting and transport requirements for these materials and their waste products. The Licensee shall notify the Deputy Director and the Colorado River Regional Water Board’s Executive Officer (Executive Officer) when hazardous material or waste is discharged that could impact surface water or groundwater. If County or local-level guidance on waste management does not exist, the Licensee shall, at a minimum, implement the following:

- Spill prevention control measures shall be implemented to contain and cleanup spills and prevent material discharges outside the construction area.
- Solid waste management and hazardous waste management shall be implemented to minimize stormwater contact with waste materials and prevent waste discharges. The Licensee shall, at a minimum, inform the County, the Executive Officer, and any neighboring fire departments when hazardous material or hazardous waste is present or discharged.
- Non-hazardous solid wastes shall be stored in dumpsters throughout the Project site. Dumpster locations will change according to where construction activities are occurring. One dumpster shall always be located next to the contractor's office trailers and yard.
- Hazardous wastes shall be stored in a covered containment area in accordance with state and federal laws and local ordinances. Hazardous wastes shall be stored in appropriate and clearly marked containers. Hazardous wastes shall be segregated from other non-waste materials.
- Concrete waste shall be managed to reduce or eliminate stormwater contamination during construction activities. Concrete and rubble shall be stockpiled at least 20 feet from washes and channels and hauled away for off-site disposal when necessary.
- Trucks used to haul concrete may require occasional washouts. Rinse water may contain traces of residual concrete (e.g., Portland cement, aggregates, admixtures, and water). Concrete rinsate may only be discharged to land in compliance with local ordinances, the Colorado River Basin Plan, and statewide policies. Concrete trucks shall not washout within 20 feet of any watercourse. Excess concrete shall be broken up and used onsite as fill material or hauled away for off-site use or disposal.
- Sanitary and septic waste management shall be implemented throughout the Project area in accordance with state and local regulations and ordinances. Portable toilets shall be located throughout the Project site and maintained for the duration of the Project. The location of the toilets shall follow the construction activity throughout the site. The toilets shall always be positioned away from concentrated flow paths and heavy traffic flow to minimize the chance of accidental discharge.

CONDITION 5. GROUNDWATER SUPPLY

All Project supply wells shall be enrolled in the Groundwater Recordation Program through the Division.

Prior to the Phase II Site Investigations, the Licensee shall submit a Pre-Construction Groundwater Level Monitoring Plan to the Deputy Director for review and approval. The Pre-Construction Groundwater Level Monitoring Plan shall identify the sampling frequency, methods, and locations in order to establish the background groundwater levels for the Project area. Static groundwater levels shall be recorded at the supply wells in the Chuckwalla Valley Groundwater Basin, at the monitoring and seepage wells in the Central Project Area and surrounding area, and at neighboring private wells, as allowed by the well owners. Background groundwater levels shall be established based on a minimum of two years of data collected prior to initiation of reservoir filling. Monitoring should commence no later than during the Phase II Site Investigations described in Condition 1.

Within 90 days of receiving the Pre-Construction Groundwater Level Monitoring Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Pre-Construction Groundwater Level Monitoring Plan. The Deputy Director may require modifications as part of the approval.

Following the two years of groundwater level data collection that is required to establish background groundwater levels, the Licensee shall submit a Pre-Construction Groundwater Level Report to the Deputy Director for review and approval. Project construction, including, but not limited to groundwater pumping and reservoir filling shall not proceed until the Deputy Director approves the Pre-Construction Groundwater Level Report. The Pre-Construction Groundwater Level Report shall include: (1) data collected in accordance with the approved Pre-Construction Groundwater Level Monitoring Plan; (2) proposed background groundwater levels for the Project area; and (3) the Long Term Groundwater Level Monitoring Plan. The Licensee shall conduct at least one public workshop and provide a public comment period before submitting the Pre-Construction Groundwater Level Monitoring Report to the Deputy Director for approval. As part of the submittal to the Deputy Director, the Pre-Construction Groundwater Level Monitoring Report shall include the comments made by the public, and a description of how the report addresses the public comment(s) or why the comment(s) was not addressed.

Within 90 days of receiving the Pre-Construction Groundwater Level Report, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Pre-Construction Groundwater Level Report. The Deputy Director may require modifications as part of the approval. In approving the Pre-Construction Groundwater Level Monitoring Report, the Deputy Director will establish the background groundwater levels for the Project area. No groundwater pumping, other than for aquifer testing, shall commence until the Pre-Construction Groundwater Level Monitoring Report is approved by the Deputy Director.

The Long Term Groundwater Level Monitoring Plan shall identify the sampling frequency, methods, and locations in order to monitor groundwater levels over the term of the Project. At a minimum, the Long Term Groundwater Level Monitoring Plan shall be prepared to meet the following objectives and include the following provisions:

- Confirm that the Project pumping rate is maintained at or below the range of historic pumping (between 1965 and 1986) as presented in Appendix C, Section 12.4 of the Final EIR - *Groundwater Supply Pumping Effects* technical memorandum (GEI, 2009a). The Licensee shall track the pumping rate and duration associated with the Project supply wells and report the amount of water extracted quarterly. The groundwater monitoring network shall consist of both existing and new wells to assess changes in groundwater levels at: the Project supply wells; beneath the CRA in the upper Chuckwalla Valley Groundwater Basin and Orocopia Valley; at the mouth of Pinto Basin; and in areas east of the Project supply wells. Wells shall be monitored quarterly for groundwater level, water quality, and the amount of water extracted.

- Monitor for potential inelastic subsidence due to drawdown from Project pumping. The Licensee shall install and monitor extensometers: near the CRA, in the upper Chuckwalla Valley, and in the Orocopia Valley. Extensometer monitoring shall be recorded on a daily basis to evaluate natural elastic subsidence and rebound. Extensometer monitoring shall begin prior to Project groundwater pumping and continue until approved by the Deputy Director, at least two years after the initial reservoir fill is complete. The Long Term Groundwater Level Monitoring Plan must specify how the extensometers will measure subsidence, how many extensometers will be installed, and the locations of the extensometer installations with respect to the CRA, the proposed Landfill, and other critical structures.

- Track groundwater drawdown in the Chuckwalla Valley Groundwater Basin and comply with the maximum allowable changes presented in Section 3.3 of the Final EIR or as required by the Deputy Director.

Monitoring groundwater levels for the Project license term shall commence within 30 days of Deputy Director approval of the Long Term Groundwater Level Monitoring Plan.
A groundwater level monitoring network shall be installed, in accordance to the approved Phase II Site Investigations Report and the MMRP, to confirm that Project pumping will not cause groundwater to exceed historic drawdown levels. The groundwater level monitoring network will also be used to determine if Project pumping is affecting neighboring water production wells. Water production at wells operated on properties close to the Project supply wells could potentially be affected by Project pumping. The Long Term Groundwater Level Monitoring Plan shall include monthly monitoring of groundwater levels at the Project supply wells, Project monitoring wells, and neighboring production wells (if granted permission by the land owners) within a two-mile radius of the Project's supply wells during initial fill of the reservoirs and one-mile radius thereafter. Monitoring of neighboring production wells shall continue until no longer required by the Deputy Director, and at least four years after the initial reservoir fill is complete. Monitoring of groundwater level monitoring wells shall continue for the life of the Project. All monitoring conducted as part of the Long Term Groundwater Level Monitoring Plan shall be submitted to the State Water Board within 60 days after each sampling event and annually, by March 1, in a summary report. All water quality monitoring shall comply with requirements set forth in Code of Federal Regulations Title 40, Chapter I, Subchapter D, Part 136 (40 C.F.R. § 136). The Licensee shall submit the monitoring data and reports required by this water quality certification electronically in a format accepted by the State Water Board as described in Condition 11 of this water quality certification. The monitoring data and reports shall be made available to the public and all interested parties, including FERC and BLM.

Project pumping shall comply with the maximum drawdown levels outlined in Table 3.3-8 of the Final EIR, or as approved by the Deputy Director in the Long Term Groundwater Level Monitoring Plan. If monitoring indicates that Project operation has adversely affected existing neighboring production well water levels by increasing pumping depth by five feet or more from the background levels established prior to Project construction , the Licensee shall consult, within 30 days of obtaining the monitoring results, with the owner of the affected well, and State Water Board and Colorado River Regional Water Board staffs to develop a plan to mitigate impacts to nearby production well operation. Within 60 days of initiating consultation with the owner, the Licensee shall submit the production well mitigation plan to the Deputy Director for review and approval. The production well mitigation plan shall be implemented immediately following Deputy Director approval or 30 days after submittal, whichever is sooner. Mitigation actions that may be required include, but are not limited to, the following:

- Reduce or cease Project pumping from the Project supply wells;
- Replace pumps or modify pumping systems on affected wells;
- Deepen existing well(s);
- Construct a new well(s); and/or
- Compensate well owner(s) for increased pumping costs associated with the lower water table.

CONDITION 6. SURFACE WATER QUALITY

The Licensee shall maintain water quality in the Upper and Lower Reservoirs consistent with background groundwater quality. Background groundwater quality beneath each reservoir shall be determined during the Phase II Site Investigations (Condition 1), and following the Establishment of Background Groundwater Quality Conditions described in Condition 7. All water quality monitoring shall comply with requirements set forth in Code of Federal Regulation, title 40, section 136. Data to establish background groundwater quality shall be submitted to the Deputy Director as part of the Background Groundwater Quality Report (Condition 7). Seepage, waste discharges, and any controllable factors attributable to the Project, shall not cause or contribute to the degradation of the existing background groundwater quality.

The Licensee shall treat the water in the Upper and Lower Reservoirs to maintain salinity, trace mineral (metals) and acidity levels not to exceed the background concentrations established in the Background Groundwater Quality Report approved by the Deputy Director. To verify that water quality is maintained over the life of the Project, the Licensee shall submit a site-specific Monitoring and Reporting Plan for Surface Waters (Surface Waters MRP) to the Deputy Director for review and approval. Within 90 days of receiving the Surface Waters MRP, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Surface Waters MRP. The Surface Waters MRP shall be submitted after Phase I and Phase II Site Investigations are complete and must be approved prior to starting the initial fill of the reservoirs.

The Surface Waters MRP shall be implemented upon initiation of filling of the reservoirs. The Surface Waters MRP shall include a Detection Monitoring Program to detect seepage from the reservoirs. The Surface Waters MRP shall be coordinated with the plans required in Conditions 5 and 7. The Surface Waters MRP shall be coordinated with the Contingency Plan (Condition 9). The Surface Waters MRP shall identify corrective action that may be implemented if reservoir water quality or reservoir seepage does not meet the established background groundwater quality. To ensure seepage from the reservoirs does not cause or contribute to the degradation of the receiving groundwater throughout the life of the Project, the water quality in the reservoirs shall be maintained at a quality equivalent to or better than background groundwater quality as established in the Background Groundwater Quality Report[8] approved by the Deputy Director.

Results of all monitoring conducted as part of the Surface Waters MRP shall be submitted to the Deputy Director. The Licensee shall submit the monitoring data and reports required by this water quality certification electronically in a format accepted by the State Water Board as

[8] Additionally, in no instances shall seepage cause groundwater to: (1) exhibit a pH of less than 6.5 or greater than 8.5 pH units; or (2) acquire taste, odor, toxicity or color that creates nuisance or impairs beneficial use.

described in Condition 11 of this water quality certification. The monitoring data and reports shall be made available to the public and all interested parties, including FERC and BLM.

The Final EIR describes potential issues associated with surface water quality based on the mineralogy at the Project site and identifies measures to mitigate potential impacts. All surface water mitigation measures identified in Section 3.2 of the Final EIR are hereby incorporated as conditions of this water quality certification. All monitoring and reporting relevant to surface waters required by the MMRP are hereby incorporated as conditions of this water quality certification.

CONDITION 7. GROUNDWATER QUALITY MONITORING AND SEEPAGE MANAGEMENT

Seepage shall be minimized by partially or fully lining the reservoirs. Final design of the liner(s) shall include findings from the Phase I and Phase II Site Investigations (Condition 1). The Licensee shall construct all reservoir liners under the observation and supervision of a qualified third-party construction quality assurance (QA) firm. The QA firm shall be approved by the Deputy Director prior to starting construction. If any problems are discovered during the installation of the liners, the QA firm shall, within 30 days, provide a report to the Deputy Director, FERC, and the Licensee, on the issues discovered and recommended actions. The QA firm shall prepare a detailed construction report and file the report with the Deputy Director and FERC within 90 days of completing the liners construction.

The Licensee shall install seepage interceptor wells to recover seepage from the Upper and Lower Reservoirs. Seepage interceptor wells shall be constructed in the downgradient direction of both the Upper and Lower Reservoirs and reach existing groundwater levels. Seepage interceptor wells shall recover seepage and groundwater equal to the reservoirs seepage volume as confirmed during the Phase II Site Investigations (Condition 1).

Horizontal monitoring wells shall be installed immediately underneath the reservoirs and brine ponds liners to qualify the seepage, monitor groundwater quality, and allow for early detection of potential groundwater degradation. Seepage monitored at the horizontal monitoring wells shall exhibit pH, TDS, general minerals, and total metals comparable to the source groundwater background values. All water quality monitoring shall comply with requirements set forth in Code of Federal Regulation, title 40, section 136. Any exceedance of background groundwater quality values recorded at the monitoring wells shall be considered a violation of this water quality certification and shall be reported to the Deputy Director within 15 days of receipt of the sampling results[9]. The Licensee may perform two confirmation samplings within five working days after the initial detection to validate or invalidate the initial sampling results. Confirmation sampling results shall be reported to the Deputy Director within 15 days of receipt of the sampling results. Groundwater quality shall not exceed the values established in the Background Groundwater Quality Report approved by the Deputy Director.

The Licensee shall be required to monitor groundwater quality to establish background conditions and monitor for Project-related changes in these conditions over the life of the Project.

[9] Seepage and discharges from the reservoirs or the brine ponds shall not cause groundwater to: (1) exhibit a pH of less than 6.5 or greater than 8.5 pH units; or (2) acquire taste, odor, toxicity or color that causes nuisance or impairs beneficial uses.

Establishment of Background Groundwater Quality Conditions

Prior to the Phase II Site Investigations, the Licensee shall submit a Background Groundwater Quality Monitoring Plan to the Deputy Director for review and approval. Within 90 days of receiving the Background Groundwater Quality Monitoring Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Background Groundwater Quality Monitoring Plan. The Deputy Director may require modifications as part of the approval. The Background Groundwater Quality Monitoring Plan shall be implemented as part of or prior to the Phase II Site Investigations Plan, as outlined in Condition 1.

The Background Groundwater Quality Monitoring Plan shall identify the sampling frequency, constituents to be analyzed, and groundwater sampling locations in order to establish the background groundwater quality for the Project. Background groundwater quality shall be established for the supply wells in the Chuckwalla Valley Groundwater Basin, as well as the monitoring and seepage wells in the Central Project Area and surrounding area. Background groundwater quality shall be established based on a minimum of two years of data collected prior to initiation of reservoir filling.

Following the two years of data collection required above and as part of the Background Groundwater Quality Monitoring Plan, the Licensee shall submit the Background Groundwater Quality Report to the Deputy Director for review and approval. The Background Groundwater Quality Report shall include: (1) data collected in accordance with the approved Background Groundwater Quality Monitoring Plan; (2) proposed background groundwater quality concentrations for the Project; and (3) the Long Term Groundwater Quality Monitoring Plan. In addition to the requirements outlined in the Groundwater Monitoring for Project Term section below, the Long Term Groundwater Quality Monitoring Plan shall identify the sampling frequency, constituents to be analyzed, and groundwater sampling locations in order to monitor groundwater quality over the term of the Project. Within 90 days of receiving the Background Groundwater Quality Report, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Background Groundwater Quality Report. The Deputy Director may require modifications as part of approval. Deputy Director approval of the Background Groundwater Quality Report and Long Term Groundwater Quality Monitoring Plan shall establish the background groundwater quality for the Project.

Groundwater Monitoring for Project Term

The Licensee shall conduct groundwater monitoring for the life of the Project. At a minimum the Licensee shall monitor for groundwater levels, seepage volume, TDS, pH, general minerals, and total metals. The Licensee shall also monitor for additional constituents identified by the Deputy Director as part of approval of the Long Term Groundwater Quality Monitoring Plan. All water quality monitoring shall comply with requirements set forth in Code of Federal Regulation, title 40, section 136. Groundwater monitoring shall be conducted for the supply wells, seepage interceptor wells, vertical and horizontal monitoring wells, and neighboring wells to determine whether groundwater quality is being adversely impacted by Project operations. Groundwater monitoring shall commence prior to starting Project construction and be conducted quarterly thereafter until three years after the initial reservoir fill. Three years after initial reservoir fill, the Licensee may request approval from the Deputy Director to modify the frequency of groundwater monitoring to no less than annually. The Licensee shall provide supporting data and information to support any request to decrease the frequency of groundwater monitoring.

Groundwater data shall be provided to the Deputy Director within 60 days after each sampling event and annually, by March 1, in a summary report. The annual summary report shall provide: the status of groundwater; changes or trends in groundwater quality or levels when compared with previous years; and any recommendations for modification to the groundwater sampling program, including the need for new wells, or changes in sampling methods, sampling frequency or constituents sampled. Monitoring results shall be submitted electronically as required by Condition 11.

The Licensee shall maintain water quality in the reservoirs at approximately the same salinity and pH as the source groundwater.

The Licensee shall maintain existing groundwater conditions in compliance with the Colorado River Basin Plan. The Licensee shall comply with the Colorado River Regional Water Board's goal to maintain the existing water quality of all non-degraded high quality groundwater basins. Seepage and potential discharges from the Project are prohibited to cause or contribute to further degradation of groundwater quality or aquifer properties in the Chuckwalla Valley Groundwater Basin. The Deputy Director will assess and may require modification of the seepage interceptor well network, groundwater monitoring, and/or Project operations to ensure protection of groundwater resources.

Seepage Management

Following completion of the Phase I and Phase II Site Investigations described in Condition 1, and before final Project design, the Licensee shall submit a Seepage Management Plan to the Deputy Director for approval. Within 90 days of receiving the Seepage Management Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Seepage Management Plan. The Deputy Director may require modifications as part of approval. The seepage control measures identified in the approved Seepage Management Plan must be in place prior to filling the reservoirs.

The Seepage Management Plan shall include identification of zones where seepage is anticipated from the Upper and Lower Reservoirs, criteria for evaluating seepage management strategies, corrective actions to address potential liner failures due to seismicity, and an implementation strategy to minimize seepage to the greatest extent feasible. The Licensee shall evaluate the effectiveness of various methods to control seepage and to mitigate the effects of seepage as part of the Seepage Management Plan.

The Seepage Management Plan shall evaluate the compatibility of the Project with operation of the proposed Landfill, CRA, the Eagle Mountain Mine, and other adjacent proposed projects. The Licensee shall conduct a detailed reconnaissance of the reservoir basins and connecting tunnel to identify zones where seepage would be expected to occur. These areas may have faults, fissures and cracks in the bedrock, and zones that have direct connection to the alluvial deposits of the Chuckwalla Valley. In the event that the proposed Landfill is permitted and constructed south of the Upper Reservoir, the Project shall be operated such that it will not cause pumped groundwater or seepage to encounter the proposed Landfill's liner and maintain the minimum separation distance requirements set forth in Title 27 of the California Code of Regulations (Cal. Code Regs., tit. 27 § 20240).

Deputy Director approval of the Seepage Management Plan shall establish updated seepage volumes, if necessary. The Seepage Management Plan shall include an adaptive management strategy that identifies measures to control seepage if monitoring indicates that further seepage controls are necessary to maintain the seepage volumes established by the Deputy Director (part of Phase I and Phase II Site Investigations), ensure separation from the proposed Landfill, or prevent impacts to the CRA.

The Seepage Management Plan’s adaptive management strategy shall address, at a minimum, the following contingencies:

- Discovery of reservoir seepage water in the monitoring wells beyond the interceptor wells (operation of the interceptor well network requires modification);
- Discovery of an increase in seepage volume (liner failure);
- Discovery of changes in local groundwater quality that the Deputy Director determines could be associated with Project operations;
- Unexpected or mandated shut-down of interceptor wells; and
- Unexpected cessation of Project power generation extending longer than three days.

The Seepage Management Plan must identify corrective actions to eliminate reservoir seepage or fully recover seepage should monitoring indicate that operation of the Project is contributing to groundwater quality degradation. The Seepage Management Plan shall also include operation strategies aimed at seepage control when potential electrical power failures render the seepage interceptor wells inoperable.

The Seepage Management Plan shall include a detailed reconnaissance of the proposed reservoir sites. The Seepage Management Plan shall evaluate the Project site for seepage potential, identify seepage control measures and mechanisms to evaluate and assess seepage impacts, and establish performance objectives for seepage. Following the initial Deputy Director approval, the Seepage Management Plan shall be reviewed and updated by the Licensee no less than every two years. As part of the update, the Licensee shall summarize existing data, evaluate the effectiveness of the groundwater monitoring and seepage control methods, and make recommendations for future seepage management. Operation of the Project shall be compatible with surrounding projects and their permitting requirements. The updated Seepage Management Plan shall include a detailed evaluation of compatibility between the Project and surrounding projects that have been approved by federal, state, or local agencies. The updated Seepage Management Plan shall be submitted to the Deputy Director by February 15 of each reporting year for approval. Within 90 days of receiving the updated Seepage Management Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the updated Seepage Management Plan. The Licensee shall implement the approved updated Seepage Management Plan within 60 days of Deputy Director approval.

The Licensee shall conduct monitoring for seepage over the life of the Project. All monitoring conducted as part of the Seepage Management Plan shall be reported quarterly to the State Water Board and annually, by March 1, in a summary report. If necessary, the Deputy Director will prescribe operational changes to reduce the potential for uplift forces and hydrocompaction that could affect existing and planned facilities (e.g., the CRA and the proposed Landfill) and impacts to groundwater levels and quality. Reservoir and connecting tunnel seepage water quality must not degrade existing groundwater quality.

The Licensee shall limit seepage from the two Project reservoirs and connecting tunnel to the maximum extent possible, and shall not exceed the estimated average seepage volume determined in the Phase I and Phase II Site Investigations Reports unless approved by the Deputy Director. The Licensee shall use fine tailing liners, as described in section 2.2.3, and other seepage control measures identified in the Seepage Management Plan.

Seepage interceptor wells shall be operated to maintain target groundwater levels listed in Table 3.3-9 of the Final EIR, or as approved by the Deputy Director in the Pre-Construction and Long Term Groundwater Level Monitoring Plans (Condition 5), in areas where subsidence and hydrocompaction could potentially occur and adversely impact the CRA or other infrastructure. Groundwater levels monitored near the CRA shall be submitted annually, by March 1, to the Metropolitan Water District of Southern California (the owner of the CRA) for concurrence that operation of the Project will not exceed the maximum allowable movement of the CRA infrastructure. Groundwater level data can be used in updating and revising groundwater recharge and perennial yield estimates in the Chuckwalla Valley Groundwater Basin as new information is collected, analyzed, and reported. The Licensee shall submit the groundwater level data required by this water quality certification electronically in a format accepted by the State Water Board as described in Condition 11 of this water quality certification. The monitoring data and reports shall be made available to the public and all interested parties, including FERC and BLM.

The seepage interceptor well network shall return the recovered seepage to the reservoirs. To confirm that the seepage interceptor wells are working as designed, at a minimum, groundwater level and quality monitoring shall be conducted in the following areas:

- Upgradient and downgradient wells of reservoirs;
- At the brine ponds;
- Near the proposed Landfill;
- At residential and municipal production wells within a one-mile radius of the Central Project Area (if allowed by well owner) to ensure safe drinking water; and
- At the Project's seepage interceptor wells and monitoring wells, including monitoring wells near the CRA.

Groundwater level monitoring shall be conducted as required by Condition 5 of this water quality certification

All groundwater mitigation measures contained in the Final EIR and all monitoring and reporting required by the MMRP are hereby incorporated as conditions of this water quality certification.

CONDITION 8. WATER TREATMENT, WASTE MANAGEMENT, STORAGE, AND DISPOSAL

The Licensee shall comply with all state and local regulations for disposal of the water treatment waste. Prior to Project construction, the Licensee shall submit a Water Treatment, Waste Management, Storage, and Disposal Plan to the Deputy Director for review and approval. Within 120 days of receiving the Water Treatment, Waste Management, Storage, and Disposal Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Water Treatment, Waste Management, Storage, and

Disposal Plan. The Deputy Director may require modifications as part of the approval. Project construction shall not begin until the Water Treatment, Waste Management, Storage, and Disposal Plan is approved by the Deputy Director. The Licensee shall implement the Water Treatment, Waste Management, Storage, and Disposal Plan upon approval by the Deputy Director.

If, during the Phase I or Phase II Site Investigations, or at any time during the license period, it is determined that brine ponds are infeasible or the Licensee identifies a more effective, efficient or economical method of waste management, the Licensee may propose an alternate waste storage and disposal strategy. Any proposed waste management strategies will require approval from the Deputy Director prior to implementation and, if not already described in the Final EIR, will require additional environmental analysis under CEQA.

Brine ponds shall be managed as Class II surface impoundments, and brine pond operations must comply with all requirements for operation of Class II surface impoundments (California Code of Regulations, title 27, division 2, chapter 3, subchapter 3, article 1 – Class II Surface Impoundments). The brine ponds shall be constructed with double liners and a leachate control system following California Code of Regulations Title 27 requirements.

At a minimum, the Water Treatment, Waste Management, Storage, and Disposal Plan shall include the following:

- Description of how waste will be managed, stored, and disposed of in compliance with all applicable federal and state laws and local ordinances;
- Identification of the treatment technologies to be used to address constituents of concern identified during the Phase I and Phase II Site Investigations, if any;
- Full characterization of the anticipated waste stream(s) resulting from treatment;
- Disposal plan for brine salts if properties qualify them as hazardous waste
- Identification of the waste management methodology to be used (e.g., on-site long-term storage of liquid waste);
- Proposed method of waste storage (e.g., brine ponds);
- Anticipated duration of on-site waste storage;
- Proposed method of waste disposal;
- A schedule of implementation that includes operations and maintenance;
- Documentation of consultation with staffs from CDFW and USFWS during plan development to address wildlife concerns; and
- Documentation of consultation with staff from the Colorado River Regional Water Board to address compliance with California regulations (e.g., requirements for operation of a Class II surface impoundment, etc.).

CONDITION 9. CONTINGENCY PLAN

Final engineering cannot be completed until the Licensee obtains full access to the Project site and completes the Phase I and Phase II Site Investigations identified in the Final EIR and Condition 1 of this water quality certification, including relevant mitigation measures. A Contingency Plan shall be designed to cover actions the Licensee must take if it is determined that, based on Project operations, degradation of the underlying groundwater is occurring. The

Project's Contingency Plan shall include and be integrated with the relevant portions of the Project description and mitigation measures, including all specified performance standards. The Contingency Plan must cover how the Licensee will modify Project operations, or cease operations, if a threat to groundwater quality is encountered that cannot be adequately addressed through existing or additional operational mechanisms, as well as how groundwater will be restored to pre-Project conditions.

Prior to initiating the filling of the reservoirs, the Licensee shall submit a Contingency Plan to the Deputy Director for review and approval. Within 120 days of receiving the Contingency Plan, the Deputy Director will either approve, deny, request additional information, require modifications, or provide the Licensee with an update on the time necessary for State Water Board staff to complete review of the Contingency Plan. As part of Contingency Plan approval, the Deputy Director may require the Licensee to provide financial assurances necessary to implement the Contingency Plan and ensure restoration of groundwater to pre-Project conditions.

The following conditions also apply to the Project in order to protect water quality standards over the term of the Project's license and any annual extensions.

CONDITION 10 A copy of this water quality certification shall be provided to the contractor and all subcontractors conducting the work, and copies shall remain in their possession at the Project site. The Licensee shall be responsible for work conducted by its contractor or subcontractors.

CONDITION 11 Unless otherwise specified in this water quality certification or at the request of the State Water Board, data and/or reports must be submitted electronically in a format accepted by the State Water Board to facilitate the incorporation of this information into public reports and the State Water Board's water quality database systems in compliance with California Water Code section 13167.

CONDITION 12 Notwithstanding any more specific requirements in the conditions in this water quality certification, no construction shall commence until all necessary federal, state and local approvals are obtained.

CONDITION 13 The State Water Board reserves the authority to modify the conditions of this water quality certification to incorporate load allocations developed in a total maximum daily load approved by the State Water Board.

CONDITION 14 Notwithstanding any more specific conditions in this water quality certification, the Project shall be operated in a manner consistent with all applicable basin plans and policies for water quality control adopted or approved pursuant to the Porter Cologne Water Quality Act or section 303 of the Clean Water Act.

CONDITION 15 Project construction and operations shall not cause non-compliance of any federal, state, or local permit and/or license for permitted or existing neighboring projects.

CONDITION 16 The authorization to operate the Project pursuant to this water quality certification is conditioned upon payment of all applicable fees for review and processing of the application for water quality certification and administering the State's water quality certification program, including but not limited to the timely payment of any annual fees or similar charges that may be imposed by future statutes or regulations for the State's reasonable costs of a program to monitor and oversee compliance with conditions of water quality certification.

CONDITION 17 This water quality certification does not authorize any act which results in the take of a threatened or endangered species or any act which is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish & Game Code §§ 2050-2097) or the federal Endangered Species Act (16 U.S.C. §§ 1531 - 1544). If a take will result from any act authorized under this water quality certification or water rights held by the Licensee, the Licensee shall obtain authorization for incidental take prior to any construction or operation of the Project. The Licensee shall be responsible for meeting all requirements of the state and federal Endangered Species Acts for the Project authorized under this water quality certification.

CONDITION 18 In the event of any violation or threatened violation of the conditions of this water quality certification, the violation or threatened violation shall be subject to any remedies, penalties, processes or sanctions as provided for under any State or federal law. For the purposes of section 401(d) of the Clean Water Act, the applicability of any State law authorizing remedies, penalties, processes or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this water quality certification.

CONDITION 19 This water quality certification is not intended and shall not be construed to apply to issuance of any FERC license or FERC license amendment other than the FERC license specifically identified in the Licensee's application for water quality certification.

CONDITION 20 The Licensee must submit any change to the Project, including Project operations, which would have a significant or material effect on the findings, conclusions, or conditions of this certification, to the Deputy Director for prior review and written approval. The Deputy Director may require additional CEQA analysis associated with the change. If such a change would also require submission to FERC, the change must first be approved by the Deputy Director.

CONDITION 21 In response to a suspected violation of any condition of this water quality certification, the State Water Board may require the holder of any federal permit or license subject to this water quality certification to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs of reports, shall bear a reasonable relationship to the need for reports and the benefits to be obtained from the reports (California Water Code, §§ 1051, 13165, 13267 and 13383). The State Water Board may add to or modify the conditions of this certification as appropriate to ensure compliance.

CONDITION 22 In response to any violation of the conditions of this water quality certification, the State Water Board may add to or modify the conditions of this water quality certification as appropriate to ensure compliance in the future.

CONDITION 23 This water quality certification is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to Water Code section 13330 and California Code of Regulations, title 23, division 3, chapter 28, article 6 (commencing with section 3867).

CONDITION 24 The State Water Board reserves the authority to add to or modify the conditions of this water quality certification: (1) if monitoring results indicate that continued operation of the Project could violate water quality objectives or impair the beneficial uses of the Chuckwalla Valley Groundwater Basin; or (2) to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.

CONDITION 25 Upon request, the Licensee shall provide State Water Board staff access to the Project site to document compliance with this water quality certification.

CONDITION 26 The State Water Board shall provide notice and an opportunity to be heard in exercising its authority to add or modify any of the conditions of this water quality certification.

CONDITION 27 Future changes in climate projected to occur during the license term may significantly alter the baseline assumptions used to develop the conditions in this water quality certification. The State Water Board reserves authority to modify or add conditions in this water quality certification to require additional monitoring and/or other measures, as needed, to verify that Project operations meet water quality objectives and protect beneficial uses.

CONDITION 28 The Deputy Director or State Water Board's approval authority includes the authority to withhold approval or to require modification of a proposal or plan prior to approval. The State Water Board may take enforcement action if the Licensee fails to provide or implement a required plan in a timely manner.

CONDITION 29 This water quality certification requires compliance with all applicable requirements of the Colorado River Basin Plan. The Licensee must notify the Deputy Director and the Executive Officer within 24 hours of any unauthorized discharge to surface waters.

CONDITION 30 Activities associated with operation or maintenance of the Project that threaten or potentially threaten water quality shall be subject to further review by the State Water Board and Colorado River Regional Water Board.

CONDITION 31 The State Water Board reserves authority to modify this water quality certification if monitoring results indicate that construction or operation of the Project would cause a violation of water quality objectives or impair the beneficial uses of the affected groundwater basins.

CONDITION 32 Deviation from any of the conditions of this water quality certification shall be reported immediately to the State Water Board and Colorado River Regional Water Board.

<u>CONDITION 33</u> Notwithstanding any more specific condition in this certification, the Licensee must comply with the mitigation, monitoring, and reporting requirements in the MMRP.

<u>CONDITION 34</u> Any requirement in this water quality certification that refers to an agency whose authorities and responsibilities are transferred to or subsumed by another state or federal agency, shall apply equally to the successor agency.

<u>CONDITION 35</u> The Deputy Director shall be notified when approval is sought from another agency for a plan, action, or report related to this Project.

Thomas Howard
Thomas Howard
Executive Director

Date 7/15/13

Attachment A Project Area Maps
Attachment B Mitigation Monitoring and Reporting Plan
Attachment C CEQA Findings and Statement of Overriding Considerations

8.0 References

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Exhibit B

Standard Review Form
Draft Environmental Impact Report Eagle Crest Energy Pumped Storage

Reviewer's Name: __Joshua Tree National Park__________ **Reviewer's Organization**: _National Park Service___

Reviewer's email address: ____________________________ **Reviewer's Telephone numbers**: ________________

Primary Disciplinary Area (e.g., ecology, land use planning, regulatory oversight): ____________________________

Section or Chapter Number and Date of Reviewed Document: __October 4, 2010_______________________________

DEIR Section	Page/Line	Comment/Suggested Revision	Action
		Evaluation of conformance with applicable groundwater LORS is lacking. Section 3.3.1 of the draft EIR presents discussion about the Federal, State, and local laws, ordinances, regulations, and standards (LORS) applicable to the proposed Project. Little or no discussion is presented elsewhere in Section 3.3 on whether or not the Project, as proposed, will conform to these LORS. Only a blanket statement in the first sentence of Section 3.3.1 is provided that the Project will conform to the LORS outlined in the section. Presumably, where impacts are predicted and mitigation measures are proposed to correct or offset these impacts, it is likely the result of not conforming to one or more of the LORS. Further discussion is needed to make this link so that the reader can see that in cases where the Project will not conform to a particular LORS, an acceptable mitigation measure will be implemented that brings this impact into conformance. With respect to State Water Resources Control Board Policy Resolution No. 88-63, which designates all groundwater and surface waters of the State as potential sources of drinking water worthy of protection for current or future beneficial uses, none of the policy exceptions (a, b, c or d) presented in Section 3.3.1.2 appears to apply to the groundwater that will be used by the	

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		applicant for this project. Yet, there will be an estimated annual consumptive evaporative loss of approximately 1,763 afy (or 82,900 acre-feet over the Project life) of drinking-quality water from the two project reservoirs. Given the SWRCB's existing policy (refer to Resolution No. 75-58) of limiting the use of scarce supplies of inland water resources for evaporative cooling of power plants in order to assure proper future allocations of inland waters considering all other beneficial uses, how does the SWRCB rectify the apparent policy inconsistency of allowing significant evaporative losses to occur for the pumped storage energy project under Resolution No. 88-63, while discouraging comparable evaporative losses from occurring for other energy projects in the valley such as wet-cooled solar energy projects under Resolution No. 75-58? There is little or no recognition or discussion presented in the draft EIR on this very important issue, let alone any discussion on possible mitigation measures that might significantly reduce these evaporative losses. Unless this policy inconsistency is corrected by the SWRCB and/or addressed through mitigation measures, this potentially opens a loophole that could be exploited by this Project and other proposed groundwater pumped storage energy projects in the state. This policy inconsistency should be addressed before any permit is granted for this Project.	
		Groundwater storage depletion estimates are under-estimated due to an unreasonably high water balance. The NPS appreciates the applicant's effort to re-evaluate their water balance estimates and subsequent analysis of individual and cumulative impacts to groundwater storage in the basin resulting from their Project and other reasonably foreseeable projects. After reviewing the revised water balance analysis, the NPS is still concerned that the analysis grossly over-estimates the amount of natural recharge coming into the Chuckwalla Valley, Pinto Valley and Orocopia Valley and therefore, under-estimates the amount of groundwater storage depletion that will occur. Our concern is based on the following primary lines of evidence:	

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		• The follow-up literature review has neglected considering the results from a recent USGS Scientific Investigations Report 2004-5267 prepared for the nearby Joshua Tree area that may be more applicable to the study area than the Fenner Basin studies cited by the applicant. The Joshua Tree area study utilized multiple analysis methods, which indicated that present-day groundwater recharge in this region of the Mojave Desert is very limited, and that nearly all of the water being removed from the basins in this region is likely coming from depletion of existing groundwater storage. The NPS believes the results of this study should be extrapolated to the study area instead of the Fenner Basin studies. • In their recoverable water estimate study (Section 12.4, Attachment F), the applicant summarily dismisses the validity of the modified Maxey-Eakin Method recharge estimates (600 to 3,100 afy) for the study area basins because the estimates are not in-line with higher recharge estimates from other methods utilized in the presumably analogous Fenner Basin. When the NPS applied a range of recharge coefficients derived from the results of the distributed parameter watershed modeling effort in the USGS Scientific Investigations Report 2004-5267 to the Project study area basins, a total recharge estimate ranging from 3,300 to 6,000 afy resulted, providing support to the upper range of the modified Maxey-Eakin Method estimates. • The applicant's water balance analysis suggesting an excess of inflow over outflow is NOT supported by the water level records in the study area. The available water level evidence largely points to a steady decline of water levels over the period of record, indicating that outflow has exceeded inflow to the study area and that depletion of groundwater storage likely has been occurring for many years. The applicant has even contradicted their own analysis with the recognition that water level trends in the study area suggest a steady annual decline of about 0.1 feet, while conversely predicting with their	

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		water balance analysis that groundwater storage (and water levels) will increase over the life of the Project. • The lower recharge estimates of 3,300 to 6,000 afy proposed by the NPS appear to be supported by the declining water level trends in the study area. Evaluation of the declining water level trend in the Pinto Valley by the NPS indicates that this decline can be partially explained by the lower estimates of recharge for this valley and the depletion of groundwater storage in the valley by Kaiser pumping from 1950-1985. These lines of evidence will be discussed in more detail in specific comments provided for Sections 3.3 and 5.3, and selected supporting technical memoranda contained in Section 12.4.	
		Insufficient synthesis of information from supporting technical memoranda. While it is fine to refer the reader to more detailed information contained in the supporting technical memoranda, the challenge is to synthesize and distill the important concepts, results and study conclusions into the main body of EIR document so that the public can begin to understand the complexities involved in the analyses and the conclusions drawn from these technical information sources. By referring the reader to the technical memoranda and glossing over the discussion of this information in the main body of the draft EIR, the reader is often faced with a search for the supporting information. This hampers the reader's comprehension of the discussion. As a result, several sections lack an adequate summary of the supporting information needed to understand the evaluation. This is particularly evident in the Section 5.3, the cumulative effects discussion for the groundwater resources in the Project area. This section makes no use of supporting figures and is unusually short and redundant given the importance of the topic.	

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3.3.2		The section on the environmental setting for the study area is missing a discussion on the climate setting. Please provide a discussion on the climate records of the study area basins, including tabulations of temperature extremes (daily and monthly), precipitation extremes (monthly and annual), and estimated evaporation rates (monthly) for climatic stations in the vicinity of the project study area. This information is important in understanding the potential amount of recharge to these basins, as well as evaporative losses from the Project reservoirs.	
3.3.2		The section on the environmental setting for the study area is missing a tabulation and discussion on the existing water balance for the study area. While Sections 3.2.8 through 3.2.10 provide a discussion of the elements leading to a water balance, the EIR needs a baseline water balance table to illustrate the amount of recharge and discharge to and from the groundwater flow system.	
3.3.2.3 & Figure 3.3-4	3.3-6 & 3.3-7	In the paragraph extending from page 3.3-6 to 3.3-7, the applicant contends that the Colorado River cannot recharge the Chuckwalla Valley Groundwater Basin due to changing subsurface geologic conditions that exist in the region where the Chuckwalla Valley transitions into the Palo Verde Mesa Valley. The basis for this conclusion cannot be ascertained from the subsurface interpretation provided in geologic cross-section A-A' (Figure 3.3-4). The decision to lump the Pleistocene non-marine sediments (Bouse Formation?) and Quaternary alluvium into one unit (Qc) on the cross-section masks the subsurface conditions that are said to prevail. Additionally, there is no well on the cross-section in the Palo Verde Mesa Valley that supports the interpretation that has been presented. Please provide a more detailed cross-section in this transitional area of both basins that substantiates the interpretation of the subsurface conditions presented in the discussion. If it exists, please provide a water level for the well located in the	

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		Hayfield/Orocopia Valley presented in cross-section A-A'. Lack of a groundwater level at this well location suggests a groundwater divide is present in this area of Orocopia Valley. Is this the case?	
3.3.2.5	3.3-9	Reference is made to the various wells with water level records that were evaluated in the draft EIR and discussion is presented on selected wells. Please provide a table that summarizes the water level information for all of the wells in the study area that have water level measurements. This will provide more transparency to the discussion as it is difficult to determine the water level measurements due to the scale utilized in the hydrographs that have been presented. Additionally, reference is made to Figure 3.3-2, which shows the location of the wells that are discussed. No wells are labeled on this figure, making it impossible for the reader to know where any well is located in the study area. Please label all wells in this figure that have a water level record.	
3.3.2.5	3.3-9	Throughout the discussion on water level trends, it is hard to discern whether or not the wells of interest were being pumped during the different periods of record noted in the discussion. Please clarify whether the various wells were pumping during the period of record or whether they were inactive and acted as monitoring wells. This information could be accommodated in the table that has been suggested in the previous comment. The water level discussion is more strongly supported if these wells were effectively acting as monitoring wells instead of pumping wells.	
3.3.2.5	3.3-9	The discussion on water levels focuses on selected wells in the basin while excluding other wells that may have sufficient water level data capable of allowing additional interpretations of long-term water level trends in the study area. Recent draft EIS's for the Palen Solar Power Project and the Genesis Solar Energy Project in Chuckwalla Valley presented additional hydrographs of wells that appear to indicate a long-term decline in water levels is	

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		occurring in parts of the study area that are more distant from the historic pumping centers that occurred in the Desert Center area. This includes well 4/17-6C1, located north of the Palen Dry Lake area, and wells 5/17-19Q1 and 5/17-33N1, located south of the Palen Dry Lake area. It is recommended that the water level data for these wells (and others with sufficient records) be evaluated and included in the discussion. If hydrographs are presented, please use scales that allow the reader to see the magnitude of the water level change that has occurred. Declining water levels in the valley are an indication that natural recharge may be much lower than is proposed and that depletion of groundwater storage may be occurring. This is why it is important to be transparent in presenting all of the water level data.	
3.3.2.5	3.3-9	The discussion in the third paragraph on this page focuses on a water level recovery of about 100 feet in the Desert Center area from 1986 to 2002, and 2007 data that indicate water levels are still about 17 feet lower than the static water level in 1980 before heavy pumping began. The 2007 residual drawdown levels are partially explained by drawdown created by current reduced pumping in the area. The discussion should be revised to recognize that some of this residual decline is likely the result of groundwater storage depletion occurring from historic agricultural pumping and earlier pumping by Kaiser. Given that current agricultural pumping is approximately 3 times lower than it was in 1986, some of the water level decline could be explained by depletion of groundwater storage in the aquifer. Additionally, please provide the 2007 water level data (in Figure 3.3-7 and in the table requested earlier) confirming that water levels in this area remain 17 feet below the 1980 static water level. Evidence for groundwater storage depletion in Chuckwalla Valley exists in the information presented in Figure 3.3-7, and Table 3.3-7 of the draft EIR and Table 8 in Section 12.4 (Revised Groundwater Supply Pumping Effects) of the draft EIR. Figure 3.3-7 shows that the water level in well 5S/16E-7P1	

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		(and 5S/16E-7P2) between the early 1950s and 2000 (about 47 years) has dropped about 30 feet due to pumping in the valley. When heavy agricultural pumping had started in 1981, the water level in this well had already dropped about 12 feet from the 1950s static water level as a result of Kaiser pumping in the upper Chuckwalla Valley (and Pinto Valley). From 1965-1980, about 57,534 acre-feet of groundwater had been pumped from the upper Chuckwalla Valley (see Table 8, Section 12.4). Table 3.3-7 indicates that from 1981-1986, an additional 109,998 acre-feet of groundwater was pumped from the valley. Together, about 167,532 acre-feet of groundwater was removed from storage between 1965 and 1986. If the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer is reliable, as much as 11 feet of the observed 30-foot drop (167,532 ac-ft / 15,000 ac-ft/ft = 11.2 ft.) could be explained by the amount of groundwater removed from storage in the upper Chuckwalla Valley / Desert Center area, assuming a low recharge rate for Chuckwalla Valley. The remainder of the 30-foot decline is likely a reflection of additional storage depletion and the drawdown related to the pumping in the valley after 1986.	
3.3.2.5	3.3-9 & 3.3-10	In the paragraph extending from page 3.3-9 to 3.3-10, the applicant contends that pumping by Kaiser in the Pinto Valley and upper Chuckwalla Valley lowered water levels in the Pinto Valley by 15 feet and that the water level has recovered to about 7 feet below its static level in 1960. It is further maintained that the water level recovery is being slowed in part by pumping effects related to current pumping occurring in the Desert Center area. The discussion should be revised to recognize that much of this residual decline could be explained as a result of groundwater storage depletion occurring from the earlier pumping by Kaiser in the Pinto Valley and upper Chuckwalla Valley. Evidence for storage depletion in Pinto Valley exists in the Kaiser pumping	

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		information presented in Figures 4 and 8, and Table 8 of Section 12.4 (Revised Groundwater Supply Pumping Effects) of the draft EIR. Figure 8 shows that the amount of drawdown due to the combined Kaiser pumping in both valleys was more than 20 feet, when starting from the initial water level measurement of about 930 feet msl measured in 1954. Table 8 shows that from 1948 to 1984 (37 years), an estimated total of 137,196 acre-feet of groundwater was pumped from wells in the Pinto Valley, while 63,434 acre-feet of groundwater was pumped from the upper Chuckwalla Valley. If the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer is reliable, as much as 9 feet of the 20 foot drop (137,196 ac-ft / 15,000 ac-ft/ft = 9.1 ft.) could be explained by the amount of groundwater removed from storage in the Pinto Valley, assuming a low recharge rate for Pinto Valley. As shown in Figure 8, with the advent of Kaiser pumping in the upper Chuckwalla Valley from 1965-1981, additional drawdown of water levels in Pinto Valley occurred, most likely as a result of well interference effects between the two Kaiser pumping centers. This additional pumping and drawdown most likely increased the storage depletion occurring in the Pinto Valley during this period. Furthermore, inspection of Figure 4 reveals that between 1984 and 2007, once Kaiser pumping had ceased (1984-85) and agricultural pumping near Desert Center was significantly reduced after 1986, the water level in the Pinto Valley well 3S/15E-4J1 only rose about 3 feet in 23 years. By 2007, the water level in this well is about 13 feet below the 1954 static water level, providing a strong indication that a significant amount of groundwater has been removed from storage and that recharge rates in Pinto Valley and the study area are likely much lower than the rates proposed by the applicant. The NPS agrees it is also likely that the water level recovery is being partially offset by current pumping that is occurring in the Desert Center area.	

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3.3.2.7	3.3-10	Please provide more details on the parameter estimates that were used to derive the groundwater storage volume for the Chuckwalla Valley Groundwater Basin. The storage volume presumably required an estimate of the saturated volume (i.e., saturated area x saturated thickness x drainable porosity) of the sediments in the basin. In addition, please provide an estimate of the groundwater storage volume for the Pinto Valley and Orocopia Valley, as existing, Project and reasonably foreseeable project pumping have the potential to affect groundwater levels and storage volumes in these basins as well. Finally, the statement that the applicant's storage volume estimate of 10,000,000 acre-feet is similar to DWR's 1979 estimate (15,000,000 acre-feet) is incorrect. The estimate is closer to DWR's 1975 estimate (9,100,000). Please correct this statement.	
3.3.2.8	3.3-11 & 3.3-12	In the paragraph that extends from page 3.3-11 to 3.3-12, the statement is made that annual pumping at the two prisons is expected to be reduced from 2,100 afy to 1,500 afy by 2011. If this is true, then the wastewater recharge estimate of 800 afy should be reduced proportionately (approximately 29%) to reflect the lower amount of wastewater that will be produced, and therefore, recharged back to the aquifer. The wastewater recharge estimate after 2011 remains unchanged in the water balance estimates presented in Section 12.4 and should be changed to reflect a proportional decrease in the production of wastewater after 2011.	
3.3.2.9		The title of this section leads the reader to believe that the discussion will focus on the recharge sources to the basin and the perennial yield estimate of the basin. However, there is no definition or discussion provided on the perennial yield of the basin. Please update the current discussion to address this deficiency. The concept of perennial yield is very important with respect to the amount of groundwater development these basins can support. A widely accepted	

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		definition of perennial yield in California is "*the maximum quantity of usable water from a groundwater aquifer that can be economically withdrawn and consumed each year for an indefinite period of time without developing an overdraft condition*." This definition is consistent with the "safe yield" concept which implies that in order to avoid an overdraft condition, the perennial yield cannot exceed the natural recharge occurring within that basin and ultimately is limited to the maximum amount of natural discharge occurring within that basin that can be utilized for beneficial use. In order to avoid overdraft conditions from occurring in regional groundwater systems that are comprised of several hydrologically connected basins, it is important to maintain the amount of through-flow (i.e., subsurface inflow and outflow) occurring between these basins, otherwise, water levels and groundwater storage will decrease over time and affect senior water users in these interconnected basins.	
3.3.2.9	3.3-12	In the last paragraph on page 3.3-12, the applicant states a literature search was conducted to find a representative method to estimate the amount of recharge occurring in the basins contained in the study area. The literature search only seems to focus on one basin, the Fenner Basin. In comments submitted in early 2010 by the NPS in response to FERC's request for additional study requests, we identified a 2004 study conducted by the USGS in the Joshua Tree (town) area that may have as much, if not more relevance to estimating recharge to the proposed project area basins. The 2004 USGS study included several basins that are located immediately west-northwest of Pinto Valley, where multiple analysis methods were used, including instrumented boreholes, geochemical sampling, distributed-parameter watershed modeling and numerical groundwater flow modeling, to estimate the recharge in these basins. The results of this study (USGS Scientific Investigations Report 2004-5267) provide compelling evidence indicating that present-day groundwater recharge for basins in this region of the Mojave Desert is very limited, and that nearly all of the water being removed from the	

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		basins in this region is likely coming from depletion of existing groundwater storage. However, no mention is made that this study was even considered in the literature search. Why was this study not taken under consideration with respect to identifying a representative method for estimating recharge rates in the project area basins? The results from the 2004 USGS study noted the following key observations and conclusions: • Sources of groundwater inflow (recharge) to the study basins were limited to infiltration of channelized stormflow runoff, groundwater underflow from neighboring basins and septage infiltration. • Physical and geochemical data collected away from stream channels show that direct areal infiltration of precipitation to depths below the root zone and subsequent groundwater recharge did not occur in the Joshua Tree area. • Oxygen-18 and deuterium data indicated that winter precipitation is the predominant source of groundwater recharge. • Tritium data indicated that little or no recharge has reached the water table since 1952. • Carbon-14 data indicated that the uncorrected groundwater ages ranged from 32,300 to 2,700 years before present, suggesting that groundwater stored in Mojave Desert basins are of ancient origin. • Results of the distributed-parameter watershed model indicated most of the recharge in the region likely occurs during anomalously wet periods, or even isolated occurrences of extreme storms, that are separated by relatively long (multi-year to multi-decade) periods of negligible recharge. • Numerical modeling results indicated that 99 percent of the cumulative volume of groundwater pumped from the study area basins (41,930 acre-feet out of a total of 42,210 acre-feet) between 1958 and 2001 was removed from groundwater storage, explaining the 35-foot	

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		decline in measured groundwater levels in the basins. Based on these observations and conclusions, the results of the 2004 USGS study should be extrapolated to the study area instead of extrapolating the results of the Fenner Basin study methodologies.	
3.3.2.9	3.3-13	In the first paragraph on page 3.3-13, the applicant identified two of the analytical methods used in the Fenner Basin that could be used to estimate the recharge in the Chuckwalla Groundwater Basin using available data. Please explain the basis for choosing the Maxey-Eakin method and the Metropolitan Water District Review Panel method from all of the Fenner Basin methods to estimate the recharge for the Chuckwalla Groundwater Basin.	
3.3.2.9	3.3-13	In the discussion about applying the Maxey-Eakin method and the MWD Review Panel method to the Chuckwalla Groundwater Basin, the applicant states that because the Maxey-Eakin method produced a significantly lower recharge estimate (600 to 3,100 afy) when compared to the MWD Review Panel method or other Fenner Basin study methods, the Maxey-Eakin method results were discounted as substantially under-estimating the recharge for the Chuckwalla Groundwater Basin. However, the Maxey-Eakin method results for both basins (Fenner and Chuckwalla) were in relative agreement with each other (see Figure 2, Attachment F, Section 12.4). Discounting these results because they don't agree with the higher estimates predicted by the other methods (including the MWD Review Panel method) is biasing the recharge analysis toward a higher recharge estimate. This ultimately has the effect of over-estimating the recharge and, therefore, dampening the effects of the Project pumping in the water balance analysis that is presented later by the applicant. If the results of the 2004 USGS Joshua Tree area study (USGS Scientific Investigations Report 2004-5267) had been taken into consideration and	

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		extrapolated to estimating the recharge rates for the Chuckwalla Groundwater Basin, one finds that the lower recharge estimates predicted by the Maxey-Eakin method are supported by other analysis methods that have been applied nearby. When the NPS applied a range of recharge coefficients, derived from the results of the distributed parameter watershed modeling conducted under the 2004 USGS study, to the Project study area basins, a total recharge estimate ranging from 3,300 to 6,000 afy resulted, providing support to the upper range of the applicant's modified Maxey-Eakin Method estimates. The NPS's recharge coefficients were derived by taking the total annual recharge estimates for the whole Joshua Tree study area (1,090 acre-feet) and the basins located west of the Pinto Valley (sub-basin CM18, 244 acre-feet) presented in Table 12 of the 2004 study, and dividing them by their respective basin areas (159,801 acres and 64,994 acres) presented in Table 7 of the 2004 study. This produced recharge coefficients of 0.0068 ac-ft/acre and 0.0038 ac-ft/acre, respectively. When these recharge coefficients are applied to the basin areas for the Chuckwalla Valley (604,000 acres), Pinto Valley (183,000 acres), and Orocopia Valley (96,500 acres), basin recharge estimates ranged from 4,100 to 2,270 acre-feet for the Chuckwalla Valley, 1,250 to 690 acre-feet for Pinto Valley, and 660 to 360 acre-feet for Orocopia Valley. The total recharge estimate for all three basins ranged from 6,000 to 3,300 acre-feet using this extrapolation method. The lower end of this range represents a recharge volume that might be expected if a recharge rate (coefficient) similar to that estimated for the basins located west of Pinto Valley was applied to the proposed Project basins. These basins are very similar to Pinto Valley in elevation and proximity, and therefore provide a reasonable analogous model for extrapolating recharge estimates to the proposed project basins. It should be noted that the NPS's recharge estimates above may be over-estimated based on conclusions presented by the USGS in their 2004 study. The USGS cautioned that the simulated total annual streamflow recharge is 2	

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		to 10 times greater than the measured total annual streamflow recharge, indicating that the recharge values estimated using the distributed-parameter watershed model may be high by a factor of 2 to 10. If true, the estimated total annual recharge to the Chuckwalla Valley, Pinto Valley, and Orocopia Valley may range from 3,000 to 300 acre-feet, which is nearly identical to the range the applicant predicted for the Project basins using the Maxey-Eakin method (600 to 3,100 acre-feet).	
3.3.2.9	3.3-13	In the discussion on the results of the MWD Review Panel method, it was stated that the estimation of recharge was accomplished using the local precipitation-elevation curve for the Fenner Basin and recharge infiltration percentages of 3%, 5% and 7%. This method produced total annual recharge estimates for the three proposed project basins ranging from 7,600 to 17,700 acre-feet, with a mean of 12,700 acre-feet. Examination of Figure 3 in Attachment F (Recoverable Water Estimates) of Section 12.4 shows three precipitation-elevation curves that can be used in this method: a local curve (Fenner Valley), a regional curve (region undefined), and a Western Mojave Desert curve. Given the Chuckwalla Groundwater Basin is generally situated in the western Mojave Desert, why was the Western Mojave Desert curve not used in the calculations? It is apparent from Figure 3 that use of the local Fenner Basin curve in the calculations may be biasing the recharge estimates upward. No meteorological information has been presented in the draft EIR for the Chuckwalla Groundwater Basin that supports using the Fenner Basin local precipitation-elevation curve. Given the lack of such supporting information, it is more appropriate (conservative) to use the Western Mojave Desert curve in the calculations. Use of this curve would result in lower total annual recharge estimates for the three proposed Project basins ranging from 5,500 to 12,800 acre-feet, with a mean of 9,100 acre-feet. The lower end of this revised range is in congruence with the upper range of the NPS's proposed	

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		recharge estimates (6,000 to 3,300 acre-feet).	
Missing Section	3.3-15	The Environmental Setting discussion is missing a summarization and discussion on the existing water balance in the Project area. While individual discussions have been provided on the inflow and outflow elements that go into a water balance, an additional section should be created that illustrates in tabular form the different inflow and outflow estimates that comprise the water balance. This would provide more transparency to the reader in understanding the static water balance conditions and how these conditions change when Project pumping and foreseeable project pumping is imposed. The NPS recommends creating this new section as Section 3.3.2.11 and renumber the Water Quality section as 3.2.2.12.	
3.3.3.2	3.3-19	In the discussion on Thresholds of Significance, the NPS recommends that the SWRCB better define the thresholds and significance criteria used to evaluate individual and cumulative impacts to groundwater resources in the Chuckwalla Valley groundwater basin. For example, in threshold (b) on page 3.3-19, does this criterion apply to individual and cumulative impacts, and how is "*substantial depletion*" and "*substantial interference*" to be interpreted from one project to another? Similar threshold descriptions have been used recently in draft EIS documents for some of the solar energy projects in the Chuckwalla Valley. Is substantial depletion or substantial interference defined differently for the pumped storage project as compared to these solar energy projects? Terms like substantial, significant, and considerable, unless defined quantitatively (i.e., with numerical limits or bounds), are open to broad and inconsistent interpretation, which leads to confusion.	
3.3.3.3.1	3.3-20	The discussion on seepage neglects to address potential water quality (i.e., acid mine drainage) concerns that might arise with the infilling and subsequent seepage of water from the two project reservoirs. Based on a preliminary review of the final license application and applicant-prepared	

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		EIS, a previous NPS request for additional study, and review of the current draft EIR, additional geochemical sampling studies are needed to confirm the potential impacts to regional water quality resulting from possible generation of acid mine drainage associated with seepage from the storage reservoirs. The applicant should conduct additional leachate analyses on the native bedrock beneath the two reservoirs and on the tailings material that is proposed to be used as liner material for the reservoirs. Reliance on analytical results from leachate testing on just five rock/tailings samples collected and conducted over fifteen years ago provides a minimal level of comfort, especially when the applicant admits that they cannot confirm some of the earlier analytical results. The NPS requests that additional geochemical sampling be conducted to confirm the validity of earlier leachate testing results so that the NPS and residents in the valley can be assured that the potential threat of acid mine drainage associated with the pumped storage project is low as the applicant claims. At a minimum, the applicant should conduct a review of comparable analytical methods in use today to assess whether a newer, more precise analytical method(s) has superseded the 1954 analytical methodology that was utilized originally. Whether or not a newer methodology exists, we believe the leachate analyses should be repeated on a statistically significant number of rock/tailings samples using the most appropriate and precise method for analyzing acid mine drainage potential of rock and soil samples. The NPS was confused by FERC's response to our original study request. FERC stated that acid mine drainage (AMD) leachate testing does not fully address the long-term potential production of acidic runoff and other natural environmental factors, and is therefore inadequate for assessing the potential for AMD. Yet, this is exactly what the applicant is relying on in the supporting documents accompanying their application. The NPS requested that the Commission further clarify their response so that we could better understand the Commission's reasoning for not adopting this portion of our	

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		study request, but we are unaware that further clarification has been provided. In a December 1994 technical document on acid mine drainage prediction (EPA530-R-94-036), the Environmental Protection Agency (EPA) describes several industry-recognized static and kinetic tests that can be used for determining the AMD leachate potential at a mine site. Based on the descriptions of the different tests provided in EPA's technical document, the Commission's response to our study request seemed to suggest that kinetic tests may be needed to fully address the AMD potential. Additionally, the applicant indicated in their response letter to the NPS's study request that they plan on conducting additional rock testing and laboratory analysis (type unspecified) during the two year design phase <u>following</u> licensing to address this issue. EPA's technical document notes that researchers agree that sampling and testing should be <u>concurrent</u> with resource evaluation and site planning. It is the NPS's contention that additional static and/or kinetic testing of AMD generating potential be explicitly defined and conducted on the tailings and mine rock located at the Project site in preparation of the EIR/EIS and final licensing and NOT after the EIR/EIS and licensing are completed, as proposed by the applicant. The expectation that the Project will be leak-proof is never certain, even with the application of the best available mitigation technology. Iron sulfide is one of the most common AMD-generating minerals found in metal mining sites. The necessity for utilizing fine, possibly iron sulfide-bearing tailings material to create an impervious layer has been proposed to minimize seepage loss in the reservoirs. However, as noted in EPA's technical document (EPA530-R-94-036), the finest particles expose more surface area to oxidation (and AMD generation potential), for example from leaking oxygenated reservoir water. The necessity for additional testing for potential AMD release should be of paramount concern during the EIR/EIS process.	

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3.3.3.3.2	3.3-20	As noted in an earlier comment, the title of this section leads the reader to believe that the discussion will focus on the perennial yield of the basin. However, no definition or discussion about the perennial yield of the basin has been provided. How are you defining perennial yield? Please update the current discussion to address this deficiency. The primary topic of discussion in this section seems to be focusing on effects to the prevailing water balance of the basin and associated depletion of groundwater storage. Consideration should be given to renaming the section to align with the primary topic of discussion.	
3.3.3.3.2	3.3-20	The discussion in the last paragraph on this page indicates that historic pumping in the basin between 1981 and 1986 exceeded the perennial yield of 12,700 acre-feet, which resulted in a cumulative reduction in groundwater storage of 36,200 acre-feet. The NPS contends the impact to groundwater storage during this period (and throughout the period of record) has been significantly under-estimated due to the over-estimation of the perennial yield (i.e., recharge) by the applicant. As stated in several earlier comments, the method used by the applicant to estimate the amount of recharge occurring in the three project area basins biased the estimate upward and that other analysis methods used in the region by the USGS indicate a significantly lower recharge rate for these basins. When the NPS substituted a conservative, annual average inflow estimate (i.e., perennial yield) of 3,000 acre-feet for all three basins into Table 3.3-7, this resulted in an estimated cumulative groundwater storage depletion of about 94,400 acre-feet during this 6-year period. The substitute average inflow was estimated by taking one-half of the upper range of the annual recharge (6,000 – 3,300 acre-feet) the NPS estimated using the recharge coefficients derived from the distributed-parameter watershed modeling results presented in the 2004 USGS study near Joshua Tree. This inflow estimate is consistent with the USGS's cautioning that recharge values	

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		derived from the distributed-parameter watershed model may be over-estimated by a factor of 2 to 10. Figure 3.3-7 shows that the water level in well 5S/16E-7P1 (and 5S/16E-7P2) between 1981 and 2000 (about 20 years) dropped about 17 feet, primarily due to the heavy pumping in the valley between 1981 and 1986. If the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer is reliable, as much as 6 feet of the observed 17-foot drop (94,400 ac-ft / 15,000 ac-ft/ft = 6.3 ft.) could be explained by the amount of groundwater removed from storage between 1981 and 1986, using the NPS's lower average inflow rate of 3,000 acre-feet for Chuckwalla Valley. The remainder of the 17-foot decline is likely a reflection of additional storage depletion and the drawdown related to the reduced pumping in the valley following 1986.	
3.3.3.3.2 & 3.3.3.3.3	3.3-21 to 3.3-23	The NPS disagrees with several aspects of the water balance analysis and discussion presented by the applicant on pages 3.3-21 and 3.3-22. First, a start date of 2008 (already two years in the past) only has the purpose of inflating the cumulative storage estimate in the water balance prior to the beginning of Project pumping for construction purposes in 2012 (see water balance presented in Table 14, Section 12.4 – Revised Groundwater Supply Pumping Effects). From 2008-2011, the applicant's water balance produces a cumulative water storage increase of 12,000 acre-feet before project pumping even begins. This cushion of 12,000 acre-feet helps to dampen the Project's pumping effects once pumping starts up. The applicant has provided no legitimate basis for starting the water balance in 2008. Since the Project may not be given approval any sooner than 2011, the water balance should be revised to begin in 2011 or 2012. Second, as noted in previous comments, the applicant's method of estimating the total natural recharge and inflow for the Chuckwalla Valley, Pinto Valley	

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		and Orocopia Valley has biased the estimate upward and that other analysis methods used in the region by the USGS indicate a significantly lower recharge rate for these basins. As a result, the applicant has under-estimated the potential impact to groundwater storage in the Chuckwalla Valley that may result from the pumped storage project. The NPS is providing Tables 1 - 5 as additional evidence that the applicant has over-estimated the annual recharge to the basin and under-estimated the effects of Project pumping on groundwater storage in the basin. Table 1 is a preliminary water balance prepared by the NPS for the period 1948 – 2007. The water balance tries to account for all pumping that was occurring in the Chuckwalla Valley during this period, and incorporates the applicant's estimate of total annual recharge (12,700 acre-feet) for the three Project basins. Estimates for the various pumping sources were gleaned from the various tables presented by the applicant in the draft EIR and associated technical memoranda. In the case of agricultural pumping from 1987-1995, the NPS used an equal weighting approach to approximate the large yearly decline in pumping that was suggested during these years. For the years 1996-2007, this weighting approach was not used as agricultural pumping was in a steadier range The purpose of this table is to evaluate whether the applicant's proposed recharge rates are consistent with the historic water level record for well 5S/16E-7P1 & 7P2 (see Figure 4, Section 12.4). It should be noted that the applicant did not present and discuss such an analysis in the draft EIR, but are strongly encouraged to do so. The preliminary results indicate that by 2007, a cumulative increase in storage of about <u>267,000</u> acre-feet would have occurred if the applicant's recharge estimate is correct. Using the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer, this would equate to a potential water level rise of about <u>18</u> feet (267,000 acre-feet / 15,000 acre-feet/foot) or about 0.3 feet per year throughout the basin. This upward trend is counter to the declining historic water level trend shown in	

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		Figure 4 (Section 12.4), in which groundwater levels in the Desert Center area have fallen nearly 40 feet between 1952 and 2007 (approximately -0.68 feet/year) at this well. This contradiction in trends suggests the applicant's recharge estimate is too high. Table 2 is the same preliminary water balance for the period 1948 – 2007, with the NPS's lower total annual recharge estimate of 3,000 acre-feet substituted for the applicant's proposed recharge rate. The purpose of this table is to evaluate whether the NPS's lower recharge rates are consistent with the historic water level record for wells 5S/16E-7P1 & 7P2 (see Figure 4, Section 12.4). The preliminary results indicate that by 2007 a cumulative depletion in storage of about **314,000** acre-feet would have occurred if the NPS's recharge estimate is correct. Using the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer, this would equate to a potential water level decline of about **21** feet (314,000 acre-feet / 15,000 acre-feet/foot) or about -0.35 feet per year throughout the basin. This downward trend is consistent with the declining historic water level trends shown in Figure 4 (Section 12.4), in which groundwater levels in the Desert Center area have fallen nearly 40 feet between 1952 and 2007 (approximately -0.68 feet/year). The difference in the water level declines suggested in Table 2 and Figure 4 (21 feet vs. 40 feet, respectively) over this period further suggests that the total average annual recharge to these basins may be less than the NPS's conservative estimate of 3,000 acre-feet. Table 3 is a reconstruction of the applicant's current water balance including existing pumping, excluding Project pumping and foreseeable project pumping, and using the applicant's estimate of total annual recharge (12,700 acre-feet) for the three basins. The purpose of this table is to evaluate the baseline cumulative effects to groundwater storage if the Project and other foreseeable projects <u>are not</u> allowed to proceed and all other existing pumping	

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		in the valley continues as described by the applicant under the applicant's higher recharge conditions. It should be noted that the applicant did not present and discuss such an analysis in the draft EIR but are strongly encouraged to do so. To be consistent with the applicant's water balance analysis, the NPS maintained a start date of 2008 for Tables 3 - 6. The results indicate that by 2060 (the end of the permit period for the Project), groundwater storage might be expected to increase by approximately 183,000 acre-feet under existing pumping conditions. Using the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer, this would equate to a potential water level rise of about 12 feet (183,000 acre-feet / 15,000 acre-feet/foot) or about 0.23 feet per year throughout the basin. This trend reversal is counter to the declining water level trends shown in Figure 4 (Section 12.4 of the draft EIR), which indicates groundwater levels in the Desert Center area have fallen nearly 40 feet between 1952 and 2007 (approximately 0.-68 feet/year). During this earlier period, historic annual groundwater pumping volumes [2,344 to 4,177 afy for Kaiser pumping (1965-1981), and 3,078 to 7,140 afy for agricultural/domestic pumping (1987-2007)] were usually less than the applicant's current pumping volume estimate (10,200 acre-feet) in their water balance analysis, with the exception of a few years (e.g., 1981-1986 which ranged from 12,553 to 21,996 afy). This projected trend reversal is also counter to the applicant's statement in the draft EIR (page 3.3-25) that projections indicate water levels in the basin appear to be falling about 0.1 feet per year due to local pumping. It is the NPS's contention that groundwater storage should continue to decrease and not increase in the future, as would have been the prediction using the applicant's estimate of average annual recharge (12,700 acre-feet) for the three basins in a baseline water balance analysis. If the applicant had conducted this water balance using their recharge estimate, they also would have seen that the predicted 12-foot rise of water levels throughout this 50-year period would be counter to	

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		the 4-foot drop in water levels they predicted for the same scenario using their analytical model. Table 4 is a reconstruction of the applicant's current water balance including existing pumping, excluding Project pumping or foreseeable project pumping, and using the NPS's lower estimate of total annual recharge (3,000 acre-feet) for the three basins. The purpose of this table is to evaluate the baseline cumulative effects to groundwater storage if the Project and other foreseeable projects <u>are not</u> allowed to proceed and all other existing pumping in the valley continues as described by the applicant under <u>lower</u> recharge conditions. The results indicate that by 2060 (53 years later), groundwater storage may decrease by approximately **330,000** acre-feet. Using the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer, this would equate to a potential water level decline of about **22** feet (330,000 acre-feet / 15,000 acre-feet/foot) or about -0.4 feet per year throughout the basin. The decline in groundwater storage and water levels suggested by the results in Table 4 are consistent with an expected continuation of the declining water level trends observed between 1952 and 2007 (see Figure 4, Section 12.4), in which groundwater levels in the Desert Center area have fallen nearly 40 feet (approximately -0.68 feet/year) over this period. The difference in the water level declines indicated in Table 4 and Figure 4 (22 feet vs. 40 feet, respectively) over a similar period again suggests that the total average annual recharge to these basins may be less than the NPS's conservative estimate of 3,000 acre-feet. Table 5 is a reconstruction of the applicant's water balance including existing pumping and Project pumping, excluding foreseeable project pumping, and using the NPS's lower estimate of average annual recharge (3,000 acre-feet) for the three basins. The purpose of this table is to evaluate the cumulative effects to groundwater storage if the Project <u>is</u> allowed to proceed and all	

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		other existing pumping in the valley continues as described by the applicant under lower recharge conditions. The results indicate that by 2060, groundwater storage may decrease by approximately **440,000** acre-feet. Using the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer, this would equate to a potential water level decline of about **29** feet (440,000 acre-feet / 15,000 acre-feet/foot) or about -0.55 feet per year throughout the basin. This is significantly different from the applicant's estimated increase in groundwater storage (74,000 acre-feet) and water level rise (5 feet) over this same period of time (see Section 3.3.3.3.3, Table 3.3-8). Additionally, comparing the difference in cumulative groundwater storage results in Tables 4 and 5 indicates that Project pumping could directly result in a 7-foot decline in water levels around the basin during the Project life. In summary, use of the applicant's total average annual recharge estimate of 12,700 afy results in a significant under-estimation of the potential effects of project pumping on groundwater storage in the basin. The applicant's recharge estimate and water balance analysis is not supported by the historic water level trends provided in the draft EIR. Conversely, the NPS's contention that the total average annual recharge to these basins (3,000 acre-feet or less) is much lower than the applicant's estimate appears to be supported by the NPS's revised water balance analyses, and the historic pumping volumes and resulting water level trends provided in the draft EIR.	
3.3.3.3.5		The discussion on the modeling results is lacking a summary discussion of the type of model that was used and why it was chosen, the input parameters that are required (hydraulic conductivity, transmissivity, storage coefficient, recharge, discharge rates, etc.), the parameter values used in the model, the modeling runs performed, and the limitations of the model results. This would help the reader to better understand the modeling effort and the results without having to dig deeper into Section 12.4 or the associated technical	

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		memoranda. At times, some of this information is presented but is incomplete. Please provide a better summarization of this information in the discussion in Section 3.3.3.3.5.	
3.3.3.3.5	3.3-25	The discussion in the first full paragraph on page 3.3-25 makes reference to "maximum historic drawdown" in several of the valleys, but no numerical values are provided. Please extract these values from Section 12.4 and summarize them in Section 3.3.3.3.5 for each of the valleys and areas of interest, so that the reader can better understand what the modeling results mean. With respect to the maximum historic drawdown of 15 feet for the Pinto Valley, the NPS requests changing this value to 8 feet. Based on the historic drawdown information presented in Figure 8 of Section 12.4 for the Pinto Valley well 3S/15E-4J1, the applicant postulated that 8 feet of the total historical drawdown of 15 feet in this well was attributable to additional Kaiser pumping that occurred after 1965 in the upper Chuckwalla Valley. This pumping occurred in conjunction with Kaiser pumping in the Pinto Valley that began in the late 1940's and continued through the early 1980's. Since heavy pumping has ceased in the Pinto Valley, it is more appropriate to use 8 feet as the maximum historic drawdown value for Pinto Valley, which is directly attributable to pumping effects emanating from the Chuckwalla Valley. Project pumping will occur only in the Chuckwalla Valley so drawdown in Pinto Valley that can be directly related to historic pumping in the Chuckwalla Valley should be the measure. The NPS further contends that the revised value of 8 feet may be on the high side, as some of the additional drawdown that occurred after 1965 in this well probably represents well interference effects that resulted from the coalescence and deepening of the cones of depression created by the Kaiser pumping centers in both valleys.	
3.3.3.3.9	3.3-28	The NPS recommends the discussion under the heading labeled	

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		Environmental Impact Assessment Summary be designated as a new section (Section 3.3.3.3.10). This seems like a logical topical break from the initial discussion under Section 3.3.3.3.9 (*Potential Impacts to Water Quality*) presented on pages 3.3-27 and 3.3-28.	
3.3.3.3.9	3.3-28 & 3.3-29	The NPS strongly disagrees with the conclusions presented for threshold item (b) as to whether or not the Project would *substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level*. In several previous comments, the NPS has provided compelling evidence that: • The applicant has over-estimated the amount of recharge to the Chuckwalla Valley. Reputable scientific information exists indicating the amount of recharge is most likely significantly lower than the applicant's estimate and that groundwater from basins in the region is being withdrawn almost exclusively from groundwater storage. • Groundwater storage depletion has been occurring in the Chuckwalla Valley for years as a result of past/existing pumping exceeding the significantly lower annual recharge occurring in the area. This contention is supported by the historic water level trends provided by the applicant in the draft EIR. • Pumping effects from the applicant's proposed Project will likely add to the deficit in the aquifer volume already occurring by further depleting the aquifer volume an estimated <u>440,000</u> acre-feet and lowering the local groundwater table by an estimated <u>7</u> feet during the life of the Project. • The applicant's claim of a net increase in aquifer volume and a projected rise in the local groundwater table of 5 feet is not supported by the declining water level records in the valley. Over the last 50+ years, past/existing pumping in the upper valley has resulted in a 40-foot lowering of the water table in this area, presumably under the	

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		same recharge conditions argued by the applicant. However, in the next 50 years during the life of the project, the depletion of aquifer volume will inexplicably reverse itself and increase by 74,000 acre-feet and water levels will rise by 5 feet. How is this possible when the existing and project pumping volume will be similar to if not higher than most of the historical pumping volumes? Based on this evidence, the potential impact to the basin overdraft from the proposed Project pumping should be considered ***significant*** as it will continue to contribute to groundwater storage depletion and declining water levels already occurring in the basin. The NPS does agree with the applicant's conclusion that in combination with pumping for all reasonably foreseeable projects, basin overdraft is likely to occur over the life of the project, and that the project would contribute to a *significant adverse cumulative effect*. However, the applicant's cumulative overdraft estimate contributing to a 9-foot decline in water levels is under-estimated for the same reasons noted above, and may be closer to a 40-foot decline.	
3.3.3.3.9	3.3-29	The NPS disagrees with the conclusions presented for threshold item (c) as to whether or not the Project would *cause local groundwater level reductions that affect local residents and businesses dependent upon overlying wells*. Based on the lines of evidence presented in preceding comments, water level declines will likely occur and may be significant enough to adversely affect some local residents and businesses that rely on groundwater wells as a water source. Therefore the impact from the proposed Project should be considered *significant*. Instead of basin water levels rising 5 feet during the Project's life as the applicant claims, basin water levels may decline about 7 feet in response to a continuation of existing pumping and Project pumping. The NPS does agree with the applicant's conclusion that in combination with pumping for all reasonably foreseeable projects, basin overdraft and a decline in basin water levels are likely to occur over the life of the Project, and that	

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		the Project would contribute to a *significant adverse cumulative effect*. However, the applicant's cumulative overdraft estimate contributing to a 9-foot decline in water levels is under-estimated for the same reasons noted in the preceding comment, and may be closer to a 40-foot decline.	
3.3.3.3.9	3.3-29 to 3.3-31	What is the purpose of providing the impact assessment discussions on Impacts 3.3-1 through 3.3-7 immediately following the discussion on the four currently defined thresholds of significance? Some of this discussion (e.g., Impacts 3.3-1 and 3.3-2) is redundant with some of the discussions related to the thresholds (e.g., b and c). If these are significant impacts to assess, then shouldn't they be considered for inclusion as additional thresholds of significance and discussed under that umbrella? The NPS would recommend including Impacts 3.3-3 through 3.3-7 with the existing thresholds of significance and eliminating Impacts 3.3-1 and 3.3-2, since this discussion has already been addressed. Keep discussions on applicable monitoring and mitigation measures that may be applied to each threshold of significance, as this allows the reader to see how some of the expected impacts will be offset.	
3.3.4.1		The NPS requests including all mitigation measure(s) that can be implemented to significantly reduce the evaporative losses that will occur from the surfaces of the two storage reservoirs. Such measures might help to reduce the amount of replacement water that would be needed annually which might help to mitigate groundwater storage depletion and water level declines in the valley related to the proposed Project. The applicant estimates there will be an annual consumptive evaporative loss of approximately 1,763 afy (or 82,900 acre-feet over the Project life) of drinking-quality water from the two project reservoirs. Yet, there is little or no recognition or discussion presented in the draft EIR on this very important issue, let alone any discussion on possible mitigation measures that might significantly reduce these evaporative losses.	

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		Given the SWRCB's existing policy (refer to Resolution No. 75-58) of limiting the use of scarce supplies of inland water resources for evaporative cooling of power plants in order to assure proper future allocations of inland waters, the same consideration should be given to the pumped storage project to reducing evaporative losses as is given to evaluating wet-cooled solar energy projects that have been recently proposed in the Mojave Desert region of southern California. A good example is the Genesis Solar Project located in eastern Chuckwalla Valley, which was originally proposed as a wet-cooled plant estimated to require about 1,650 afy of groundwater for evaporative cooling needs. As part of approving its operating permit, this solar project has been receiving much pressure by the State of California to institute mitigation measures (e.g., dry-cooling technology) to reduce the amount of drinking-quality groundwater needed for the project. If the applicant cannot propose a workable mitigation measure to address this same concern, then the evaporative loss from the reservoirs should be considered an *unavoidable, adverse impact* to the groundwater resources in the basin and the SWRCB and FERC should consider denying the operating permit for the proposed pumped storage project.	
3.3.4.3		As noted in an earlier comment, the NPS requests that additional geochemical sampling be conducted <u>concurrent</u> with resource evaluation and site planning to confirm the validity of earlier leachate testing results so that the NPS and residents in the valley can be assured that the potential threat of acid mine drainage associated with the pumped storage project is low as the applicant claims. The applicant has indicated in their response letter to the NPS's earlier study request that they plan on conducting additional rock testing and laboratory analysis (type unspecified) during the two year design phase <u>following</u> licensing to address this issue. Assuming the applicant will be allowed to proceed as planned and this additional rock testing and analysis indicates a high potential for generating acid mine drainage, what mitigation measures are proposed to address this possible water quality concern?	

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5.5.3	5-20	In the second paragraph on page 5-20, how does the applicant arrive at the conclusion that "pumping by the cumulative solar project and the proposed landfill will add about 5 feet of additional drawdown to the areas of the basin where water is being pumped"? This conclusion is stated without any supporting information provided. Please expand the discussion to provide more details that support this conclusion. If more detailed information is available elsewhere in the draft EIR, please note where it can be found, but also extract a summary of this information and provide it in Section 5.5.3. In general, the discussion in Section 5.5.3 is short on details given the importance of the subject matter (cumulative effects).	
5.5.3	5-20	In the fifth paragraph on page 5-20, reference is made to Table 5-5, which "*demonstrates the results of the groundwater balance and potential effects of groundwater pumping on groundwater storage over the life of the Project with the landfill and solar projects*." Please correct the results in Table 5-5 as the results are identical to the results previously presented in Table 3.3-8 (see pages 3.3-22 and 3.3-23).	
5.5.3	5-20 & 5-21	The NPS disagrees with several of the applicant's statements concerning the magnitude of the cumulative pumping effects that will result over the life of the Project. As noted in previous comments, the applicant's method of estimating the total natural recharge and inflow for the Chuckwalla Valley, Pinto Valley and Orocopia Valley has biased the estimate upward and that other analysis methods used in the region by the USGS indicate a significantly lower recharge rate for these basins. As a result, the applicant has under-estimated the potential cumulative effects to groundwater storage and water level declines in the Chuckwalla Valley that may result from the pumped storage project and other foreseeable projects in the basin. The NPS is providing Table 6 as additional evidence that the applicant has under-estimated the effects of cumulative pumping on groundwater storage and the	

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		associated water level decline in the basin. Table 6 is a reconstruction of the applicant's cumulative effects water balance including existing pumping, Project pumping and foreseeable project pumping, using the NPS's lower estimate of average annual recharge (3,000 acre-feet) for the three basins. The purpose of this table is to evaluate the cumulative effects to groundwater storage if the proposed Project and the other foreseeable projects are allowed to proceed, and all other existing pumping in the valley continues as described by the applicant under the NPS's proposed <u>lower</u> recharge conditions. The results indicate that cumulative pumping may exceed recharge by 16,000 to 20,000 afy during the reservoir filling period (2014-2017) and by about 9,200 to 14,400 afy during the remainder of the Project life (2018-2060). By the end of the Project (2060), groundwater storage may decrease by approximately **602,000** acre-feet. Using the applicant's storage estimate of approximately 15,000 acre-feet of water for each foot of saturated thickness for the basin-fill aquifer, this would equate to a potential water level decline of about **40** feet (602,000 acre-feet / 15,000 acre-feet/foot) or about -0.76 feet per year throughout the basin. This future annual rate of decline is greater than the NPS's estimated annual rate of decline of -0.68 feet per year for historical pumping from 1952-2007. The NPS's storage depletion estimate represents approximately a <u>6.6% decline</u> of the estimated 9,100,000 acre-feet in storage. This is significantly different from the applicant's estimated maximum decrease in groundwater storage (95,300 acre-feet in 2046) and corresponding water level decline (9 feet) over this same period of time. It should also be noted that the applicant's estimate of a 9-foot decline appears to be incorrect, as it is not consistent with the decline predicted by their maximum storage depletion estimate (i.e., 95,300 acre-feet / 15,000 acre-feet/foot = 6.3 feet). Furthermore, the NPS's results indicate that depletion of groundwater storage is likely to continue long after the life of the Project. Table 6 indicates that by	

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		the year 2100, the cumulative storage depletion may be on the order of **862,000** acre-feet, due to the assumed continuation of existing pumping in the valley and resulting depletion of groundwater storage. This represents a 9.5% depletion in groundwater storage and an estimated water level decline of over **57** feet (862,000 acre-feet / 15,000 acre-feet/foot = 57.5 feet) around the basin. The applicant's claim that the basin will recover to pre-Project levels by 2094 cannot be substantiated by the historically declining water level trends observed in the valley, which strongly suggest much lower recharge conditions exist than those proposed by the applicant. Additional pumping from the proposed Project and other foreseeable projects will only exacerbate the depletion of groundwater storage and decline in water levels in the valley. Based on the results of the NPS's revised water balance analysis, the cumulative effect of reasonably foreseeable projects on groundwater levels in the valley may result in an additional decline of 11 feet during the life of the Project. This is more than double the decline estimated by the applicant. Finally, in the second to last sentence in the last paragraph on page 5-20, reference is incorrectly made to Table 3-11. Please check this citation as it is believed the applicant meant to reference Table 3.3-7.	
5.5.3	5-21	The second paragraph on page 5-21 should be removed as it is redundant to the discussion already presented on page 5-20.	
12.4	5 & 6	In the discussion on the analytical model setup, please provide more information on the model itself including the commercial name of the model if it has one, and the input parameters that are required to run the model (e.g., hydraulic conductivity, transmissivity, storage coefficient, aquifer thickness, hydraulic gradient, recharge, maximum contribution from adjacent well, etc.). Are recharge and the hydraulic gradient of the aquifer input parameters to the model and if not, what effects does this have on the model results? Do the	

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		input parameters for image wells mimic the pumping centroid wells? Providing additional discussion on the relevancy of each input parameter to estimating the drawdown effects in the model will allow the lay-reader to better understand how the model operates. Additionally, please provide a discussion on the limitations of the model results given the nature of the model. Why was this analytical model chosen over other publically- or commercially-available analytical models or the development of a simplified numerical groundwater model that could test the validity of the applicant's recharge estimates?	
12.4	7	In the discussion on modeling the Historic Pumping in Upper Chuckwalla Valley on page 7, the NPS requests some discussion clarification on the following concerns it has with the modeling effort: • Did the pumping simulation only account for Kaiser pumping that occurred in the vicinity of the Kaiser centroid well in the upper Chuckwalla Valley or was Kaiser pumping in Pinto Valley also simulated at this centroid well? From the discussion, it is unclear whether or not the applicant was simulating all of the 1965-1981 Kaiser pumping occurring in both valleys, or just the Kaiser pumping occurring in the upper Chuckwalla Valley. Reference is made to Table 8 which describes all Kaiser pumping occurring in both valleys, which leads the reader to believe all of the pumping is being simulated. Please clarify this in the discussion so that the reader is not confused on which pumping is being simulated. • What did this modeling exercise accomplish other than being able to simulate (i.e. calibrate to?) the 8-foot drawdown that occurred in the Pinto Valley well 3S/15E-4J1 from 1965-1981 and to estimate the amount of drawdown beneath the CRA at OW10? The simulation model is different from the Historic Pumping in Desert Center Area simulation model (i.e., the final model) used to simulate Project water supply pumping impacts, as the input parameter estimates (K, b, S and	

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		T) for the Desert Center Area model are different from the Upper Chuckwalla Valley model. If the Desert Center simulation model is going to be used to predict Project-related drawdown near the mouth of Pinto Valley, then what was the purpose of conducting the upper Chuckwalla Valley pumping simulation?	
12.4	7 & 8	In the discussion on modeling the Historic Pumping in the Desert Center Area on pages 7 and 8, the NPS requests some discussion clarification on the following concerns it has with the modeling effort: • For the Desert Center model to be reliable in simulating Project-related drawdown in the upper Chuckwalla Valley and Pinto Valley, shouldn't it also be calibrated to the historic drawdown occurring in the Pinto Valley well 3S/15E-4J1 from the 1965-1981 Kaiser pumping in the upper Chuckwalla Valley? It seems that a simulation period from 1965-2007 might have provided better calibration results for the Pinto Valley well 3S/15E-4J1. The Kaiser pumping that was occurring from 1965-1984 is dismissed from the simulation, but this pumping obviously had an influence on water levels in the upper Chuckwalla Valley and Pinto Valley before and after heavy agricultural pumping began. Please provide more discussion on why the Kaiser pumping in the valley was not factored into the simulation. • Did the 27-year pumping simulation described in the last paragraph on page 7 include only agricultural and domestic pumping or did it also include Kaiser pumping occurring in the valley? The discussion seems to suggest that only agricultural and domestic pumping was accounted for based on the references to Tables 10 and 11 in the preceding paragraph. However, examination of Table 9 indicates that from 1981-1986, Kaiser pumping in the Chuckwalla Valley was similar in magnitude to the non-agricultural pumping (i.e., other pumping) that was included in the simulation. Exclusion of this pumping from the simulation may affect the calibration results.	

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		Please clarify this issue in the discussion so that the reader is clear as to what pumping was used in the simulation. • How did the applicant interpolate the different pumping rates for the time periods 1986-1992, 1992-1996, 1996-2005, and 2005-2007 in the 27-year simulation? There is no mention in the discussion describing how agricultural and the other types of pumping were apportioned during these time periods. Table 11 only gives specific pumping rates for 1986, 1992, 1996, 2005 and 2007. Please clarify this issue in the discussion and revise Table 11 to clearly denote what annual pumping rates were used in the simulation for all the types of pumping that were known to be occurring from 1981-2007. • What are the other input parameter values that were used in the 27-year simulation? The discussion only notes what hydraulic conductivity (K) values were used in the simulation, but no mention is made of the values used for saturated thickness (b), transmissivity (T), storage coefficient (S), or other parameters that are necessary. Based on the discussion presented on page 4 about the aquifer hydraulic characteristics for the Desert Center area and the subsequent discussion on pages 8 and 9 about the project water supply pumping simulations, one assumes a saturated thickness of 300 feet, a transmissivity of approximately 224,000 to 280,000 gpd/ft, and a storage coefficient of 0.05 might have been used. Please clarify this issue in the discussion so that the reader is clear as to what input parameter values were used in the simulation. • What is the basis and/or relevance of using the 1960 static water level for the Pinto Valley well to affect a better fit between the modeled drawdown and the actual drawdown for this well? In actuality, this 1960 water level was solely influenced by Kaiser pumping occurring in the Pinto Valley and not by any pumping in the Chuckwalla Valley that can be substantiated. This arbitrary substitution of a 1960 static water level (925 feet MSL) for a 1981 static water level (910 feet	

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		MSL) appears to be a contrivance by the applicant to make the reader believe the model calibration is better than it actually is in predicting the drawdown effects in the vicinity of the Pinto Valley well. Instead, could the poor match between modeled and actual drawdown at this well be related to the omission of 1965-1984 Kaiser pumping from the simulation and/or the inherent weakness of the analytical model to accurately replicate water level recovery?	
12.4	8	In the discussion on page 8 concerning the sensitivity analysis that was performed by the applicant, the discussion only addresses the sensitivity of the modeling results to variable hydraulic conductivity (K) conditions. The sensitivity analysis is incomplete, as it fails to address the sensitivity of the model results to the other important input parameters saturated thickness (b) and storage coefficient (S). Given that the analytical model solves for the Theis non-equilibrium well function, the transmissivity (T) and storage coefficient (S) are the two most important factors that can affect the drawdown predicted by the analytical model. Transmissivity, which equals the hydraulic conductivity (K) times the saturated thickness of the aquifer (b), affects the shape of the resulting drawdown cone. The storage coefficient affects the amplitude of the drawdown – the lower the storage coefficient, the greater the drawdown. Therefore, the sensitivity of the model calibration results to a reasonable range of hydraulic conductivity, saturated thickness and storage coefficient values should be evaluated and discussed in more detail to better inform the reader as to their relative impact on the modeling results due to the uncertainty in estimating the average value of each parameter. Conducting the sensitivity analysis in this manner will help to constrain the average input parameter values and model results. In turn, this allows for the most reasonable model calibration results, as well as the most reasonable drawdown estimates when simulating the impacts from Project water supply	

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		pumping and foreseeable project pumping.	
12.4	8 & 9	In the discussion on the Project Water Supply Pumping Simulation results on pages 8 and 9, the NPS requests some discussion clarification on the following concerns it has with the modeling effort: • Was other existing pumping in the valley that was accounted for in the applicant's water balance analysis incorporated into the analytical model simulation? The only reference in the discussion to the pumping that was modeled is the projected pumping for the proposed pumped storage project. If other existing pumping is included in the simulation, please revise the discussion to indicate this is the case and provide supporting information describing the centroid well locations from which the pumping occurred and the annual pumping volumes involved with these other existing pumping sources. • How much does the applicant estimate that their centroid well modeling approach is either over-estimating or under-estimating the amount of drawdown occurring in the model area? In the discussion in the last paragraph of this sub-section, it is noted that while the use of a centroid well is an accepted modeling approach, it may locally over-predict the drawdown at the pumping well and under-estimate the affected area. Please provide additional discussion and information that potentially quantifies this uncertainty at the various monitoring points of concern (e.g., OW-18, OW-15, etc.). It seems that if the applicant ran additional simulations trying to reproduce the historic pumping results in the upper Chuckwalla Valley and in the Desert Center area and compare the results with your original model calibration simulation results in these same areas, you might be able to quantify the over- or under-estimation of drawdown at these points.	
12.4	10	The applicant's statement in the last sentence preceding the sub-section titled Existing Pumping should either be removed or revised to indicate that the	

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		current trend in water levels clearly indicates that water levels in the valley have been declining over the last 50 years, most likely due to pumping exceeding the perennial yield of the basin during this period. In several previous comments, the NPS has provided compelling evidence that this condition has prevailed in the valley and that groundwater storage is likely being depleted.	
12.4	10 & 11	Please correct Figure 23 showing the simulation results for the Pinto Valley simulation well (OW-18) to reflect a maximum historic drawdown of 8 feet instead of 15 feet. An 8-foot historic drawdown is more reflective of the historic impact that pumping in the Chuckwalla Valley has had on water levels in the Pinto Valley, as previously noted by the applicant (see also Figures 7 and 8 and related discussion in Section 12.4). The maximum historic Chuckwalla Valley pumping impact is more pertinent to the potential Project pumping impacts on Pinto Valley water levels, as existing, Project and all reasonably foreseeable pumping will occur solely in the Chuckwalla Valley. The 15-foot historic drawdown currently cited is the result of combined Kaiser pumping that occurred in Pinto Valley (1948-1981) and the upper Chuckwalla Valley (1965-1981) prior to the start-up of agricultural pumping in 1981. As a result of this correction, the discussion related to Figures 21-24 under the sub-section titled Existing Pumping should be revised to indicate that continuation of existing pumping in the Chuckwalla Valley over the next 50 years could result in drawdown that may likely exceed the 8-foot historic drawdown level in the Pinto Valley (OW-18). Additionally, in Figures 23 and 24, please change the type and color of the symbol used for the actual water level measurements for Well 3S/15E-4J1 and Well 5S/16E-7P1, 7P2, respectively. The actual water levels in these wells are represented by a symbol similar in shape and color that is used to represent the simulated water level for the Existing + Project Pumping scenario. As a result, it makes it difficult to distinguish between simulated vs.	

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		actual water levels where these two are in close proximity to each other.	
12.4	11	In the discussion under the sub-section titled Existing Pumping with Project Pumping, please correct the discussion to reflect that after 50 years of combined existing pumping and Project pumping, the model results predict that drawdown will exceed the maximum historic drawdown level of 8 feet for the Pinto Valley (OW-18) by about 5 feet. The applicant is incorrectly portraying the maximum historic drawdown of Pinto Valley water levels that are related to historic pumping in the Chuckwalla Valley (see previous comment). Additionally, an incorrect reference to Figure 13 is made in the second paragraph of this sub-section and should be corrected to Figure 19.	
12.4	11 & 12	In the discussion under the sub-section titled Existing Pumping, Project and Proposed Pumping, please correct the discussion to reflect that after 50 years of combined existing pumping and Project pumping, the model results predict that drawdown will exceed the maximum historic drawdown level of 8 feet for the Pinto Valley (OW-18) by about 8 feet. The applicant is incorrectly portraying the maximum historic drawdown of Pinto Valley water levels that are related to historic pumping in the Chuckwalla Valley.	
12.4	12	In the discussion presented in the sub-section titled Post Project Groundwater Levels, reference is made in the second paragraph of this sub-section to a proposed estimate of the annual recharge to the basin by the National Park Service of 9,800 afy. The NPS requests that the discussion for the final EIR be modified to recognize that this was a preliminary estimate and the NPS has since proposed a reduced estimate for recharge of 3,000 afy or possibly lower, based on the extrapolation of results from a recent USGS study (USGS Scientific Investigations Report 2004-5267) conducted in the near vicinity of the Chuckwalla Groundwater Basin.	

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12.4	12	In the discussion presented in the sub-section titled Post Project Groundwater Levels, the NPS disagrees with the discussion presented in the third and fourth paragraphs of this sub-section and recommends the water balance analysis and associated discussion be revised to reflect the strong likelihood that the water balance for the basin is much less than the applicant is currently proposing. In previous NPS comments concerning the discussions presented in Sections 3.3.3.3.2, 3.3.3.3.3 and 5.5.3 of the draft EIR, the NPS presented and discussed several alternative water balance calculations (see Tables 1 - 6 attached to the NPS's comments to the draft EIR) that suggest the water balance analyses conducted by the applicant are over-estimating the amount of recharge to the basin and, therefore, are under-estimating the Project-related impacts and the cumulative impacts to the groundwater storage and water levels in the basin. In all six cases, the NPS contends the water balance for the basin has been and will continue to be in deficit, as a result of existing and future groundwater pumping exceeding the recharge for the basin. In particular, Table 6 presents the NPS's alternative cumulative effects water balance to the applicant's currently proposed cumulative effects water balance presented in Tables 14 and 15. The NPS's water balance indicates that cumulative pumping in the valley will exceed recharge by 16,000 to 20,000 afy during the reservoir filling period (2014-2017) and by about 9,200 to 14,400 afy during the remainder of the Project life (2018-2060). By the end of the Project (2060), groundwater storage may decrease by approximately 602,000 acre-feet. This storage depletion estimate represents approximately a 6.6% decline of the estimated 9,100,000 acre-feet in storage. This is significantly different from the applicant's estimated maximum decrease in groundwater storage (95,300 acre-feet in 2046). Furthermore, the NPS's results indicate that depletion of groundwater storage is likely to continue long after the life of the Project. Table 6 indicates that by	

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		2100, the cumulative storage depletion may be on the order of 862,000 acre-feet, primarily due to the assumed continuation of existing pumping in the valley after the Project shuts down. This represents a 9.5% depletion in groundwater storage in the basin since the start-up of the Project. The applicant's claim that the basin will recover to pre-project levels by 2094 cannot be substantiated by the historically declining water level trends in the valley resulting from past and existing pumping, which strongly suggest much lower recharge conditions exist than those proposed by the applicant. Additional pumping from the proposed Project and other foreseeable projects will only exacerbate the depletion of groundwater storage and decline in water levels in the valley that has been going on for years.	
12.4	13 - 16	In the discussion under the section titled Conclusions on pages 13-16, the NPS requests some discussion clarification on the following concerns it has with the conclusions drawn from the modeling effort: • The discussion in the first and second paragraphs talks about the favorable calibration results obtained after simulating the 27-year historic agricultural pumping simulation near Desert Center and after simulating the 17-year historic Kaiser pumping in the upper Chuckwalla Valley. The two simulations used different sets of model inputs (i.e. are two different models), each representing the different hydraulic conditions/ characteristics occurring in the two areas. How different would the calibration results for the 17-year Kaiser pumping simulation be if the 27-year agricultural pumping model had been used? Since the 27-year agricultural pumping model was adopted by the applicant for subsequent use in estimating Project-related pumping impacts, it is possible that the Project-related impacts to water levels in the upper Chuckwalla Valley and Pinto Valley are mischaracterized. While this model calibrated favorably to the water level response observed in wells 5S/16E-7P1 & 7P2 that resulted from the 27-year historic agricultural pumping, the applicant never used this	

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		model to also calibrate to the water level response observed in well 3S/15E-4J1 that resulted from the 17-year historic Kaiser pumping. If the applicant had done this, they might have a better sense of whether the predicted drawdown at OW-18 (Pinto Valley) resulting from Project-related pumping is over-estimated or under-estimated. Similarly, why wasn't one model with one set of input parameters representing the average hydraulic conditions/ characteristics (i.e., average K, b, and S) between the two areas ever considered for calibration to the actual water level responses observed in wells 5S/16E-7P1 & 7P2, and well 3S/15E-4J1? Since the analytical model approach cannot simulate variable hydrologic conditions within the modeled area, such an approach might have been another acceptable way of estimating the average drawdown impacts that could be expected. • In the summary table on page 14, please revise the maximum actual drawdown for OW-18 to 8 feet instead of 15 feet, and modify the discussion accordingly to reflect this change. As noted in an earlier comment, evaluation of the effects of Project-related pumping and cumulative pumping in the Chuckwalla Valley on Pinto Valley water levels should be measured by the historical maximum drawdown in Pinto Valley that was created solely by historic pumping in the Chuckwalla Valley, which is estimated to be 8 feet. Additionally, it is unclear from the discussion as to what the values in the right-most column represent. Are these the drawdown values obtained during the calibration simulations or during the Project-related simulations? • In the first full paragraph on page 15, please revise the discussion to reflect that water level declines due to a continuation of existing pumping into the future will also exceed the historic maximum drawdown of 8 feet in the Pinto Valley. • Please revise the summary table on page 15 as it is very confusing to the reader. The column heading in the current table leads the reader to	

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		believe the values listed in fourth column are derived from the difference of the values listed in the second and third columns, Closer examination reveals this not to be the case. If this is a summary of the information presented in Figures 21-24, which it appears to be, please change the values in the third column to reflect the total drawdown values shown in these figures that result since the start of the simulation (1981). In this case the revised values for the third column for simulation wells OW03, OW15, OW18 and CWdc (two values) would be approximately 22, 16, 16, and 90 (0 to 7 years) and 50 (7 to 50 years), respectively. The reader can then see that the values reported for each well in the fourth column are the result of taking the difference between the values reported in the second and third columns for each well. In addition to this suggested change, please change the value for OW03 in the second column from 12 to 15 to be consistent with the maximum historic drawdown previously reported for this well. Finally, please change the values for OW18 in the second column from 15 to 8 and in the fourth column from 1 to 8 to be consistent with the NPS's previous comment about changing the historic maximum drawdown for the Pinto Valley. • The NPS disagrees with the conclusions drawn by the applicant in the last paragraph of the Conclusions section. As noted in several earlier comments, the NPS believes the applicant's water balance analyses need to be revised to reflect the strong likelihood that the water balance for the basin is much less than the applicant is currently proposing. The NPS presents several revised versions of the applicant's water balance (Tables 1- 6) for consideration, which indicate that depletion of groundwater storage has been occurring, is likely to occur throughout the life of the Project and continue long after the life of the Project, thus refuting the applicant's claim that the basin will recover to pre-project levels by 2094. The NPS's concerns about the likelihood of a significantly lower recharge rate to the basin	

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		need to be taken seriously and factored into the evaluation of potential impacts to groundwater storage and water levels that might occur in the basin as a result of the Project, and the ability of the basin to recover from these effects after cessation of the Project.	
12.4	Tables 12 & 14	The annual water use value for aquaculture in the Desert Center Area presented in Table 12 (215 afy) is different from the water use value for aquaculture presented in Table 14 (599 afy). Please rectify this inconsistency and adjust the water balance or analytical modeling results and associated discussion accordingly. Additionally, why wasn't the pumping from the two prisons, accounted for in Table 12 and the analytical modeling? All pumping that was used in the water balance analysis should be accounted for in the analytical modeling if the water balance results are to be used in support of the analytical modeling results.	

To add addition boxes, press tab.

Exhibit C

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

California Desert District
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Moreno Valley, CA 92553-9046
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In Reply Refer to:
CACA50946 - P
LLCAD01500

April 10, 2013

Mr. Oscar Biondi
State Water Resources Control Board
Division of Water Rights
P.O. Box 2000
Sacramento, CA 95812-2000
obiondi@waterboards.ca.gov

RE: COMMENTS ON DRAFT FINAL WATER QUALITY CERTIFICATION FOR THE EAGLE MOUNTAIN PUMPED STORAGE PROJECT, FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 13123

Dear Mr. Biondi,

As the State Water Resources Control Board (Board) is aware, the BLM is initiating the environmental review process for a right-of-way request in response to an application filed by Eagle Crest Energy Company. The BLM has already approved, or is in the process of evaluating, a number of renewable energy projects in the Chuckwalla Valley that identifies demands for groundwater in this basin. Given this increased demand, and the potential uncertainty associated with existing information and modeling efforts, the BLM in concert with a number of research organizations, including the U.S. Geological Survey, Lawrence Berkeley National Laboratory (in conjunction with Pennsylvania State University), Argonne National Laboratory, and the National Resource Conservation Service, has initiated a number of groundwater investigations that are beginning to produce reliable information that may influence our collective current understanding of the groundwater system. BLM appreciates the opportunity to comment on the Draft Final Water Quality Certification for the Eagle Mountain Pumped Storage Project (Eagle Mountain Project) and encourages the Board to seriously consider the suggested revisions to Condition 5. Our recommendations build upon the Board's use of adaptive management measures that call for project operation changes to address findings from new information and reduce uncertainty.

INTRODUCTION

New information, along with new analysis, has been and is being developed to better understand the issues of water supply in the Chuckwalla Valley Groundwater Basin (Chuckwalla Basin). At present, the Bureau of Land Management (BLM) has identified considerable uncertainty regarding groundwater recharge estimates and potential impacts to the Colorado River from proposed groundwater pumping in support of the Eagle Mountain Pumped Storage Project (Eagle Mountain Project). Given new information, this uncertainty is compounded by reliance on preliminary analysis such as is provided in the *Eagle Mountain Pumped Storage Project – Revised Groundwater Supply Pumping Effects* technical memorandum produced by GEI Consultants, Inc. in 2009. There is a potential for overdraft conditions to occur within the Chuckwalla Basin. There is also the potential for impacts to occur to Colorado River flows. The BLM and the approved or proposed projects within the BLM-designated Riverside East Solar Energy Zone could suffer serious harm from overproduction of groundwater in this area. The BLM suggests that the State Water Resources Control Board (Water Board) consider re-evaluation of these groundwater issues and make changes to Condition 5. GROUNDWATER SUPPLY that would diminish that potential for harm and help remove some of the existing uncertainty.

BLM Investigations

A focal point for solar energy expansion in southern California is the Riverside East SEZ, proposed in the recently published Solar Programmatic Final EIS (BLM/DOE, 2012). This document categorizes Federal lands near the Interstate 10 corridor in southern California as suitable for development of renewable energy. The SEZ consists of lands extending from near Desert Center, CA to near Blythe, CA. Most of these lands are within the Chuckwalla Basin, with the balance being located in the Palo Verde Mesa Groundwater Basin, adjacent to the Colorado River and its floodplain in this area, called the Palo Verde Valley.

The BLM is currently developing programs to better understand the impacts that projects located within the Riverside East SEZ may have on local groundwater resources. One of these efforts is a pilot monitoring project, under the Solar Programmatic EIS, using landscape scale indicators of resource condition. Argonne National Laboratory is part of this effort and has conducted preliminary modeling to better understand water resources in the Chuckwalla Basin. This model corroborates the idea that the basin in currently in groundwater overdraft condition, while projections of groundwater consumption from solar development are as much as about 15,000 afy. Another related program is focused on an assessment of renewable energy project impacts on groundwater in the Chuckwalla Basin. This is a joint effort involving input and activities from Lawrence Berkeley National Laboratory (Lawrence Berkeley) along with its partner

Pennsylvania State University (Penn State), the U.S. Geological Survey (USGS), and the National Resource Conservation Service (NRCS). The objectives of this program include developing baseline water level data, better quantifying the perennial yield of the basin, identifying water level trends, and documenting any hydrologic impacts that development may have. The principal tasks are to 1) compile currently available information and oversee a groundwater monitoring network, 2) develop an easily accessible database as a repository for all existing and future information collected, 3) develop a robust numerical groundwater flow and water balance model of the basin, and 4) meld these components into a land management tool that will readily inform Federal decision makers in addressing proposed development in arid regions of the country. Preliminary information from both of these studies points to an increasing uncertainty in confidence of earlier work.

Current and planned activities in the Chuckwalla Basin are aimed at reducing the abundant uncertainty presently surrounding the issues of recharge and groundwater production impacts. The BLM is presently compiling monitoring data from various sources including project specific monitoring and production wells, a deep BLM monitoring well, a shallow vadose zone well, and climate stations throughout the valley. Lawrence Berkeley is presently focusing on compiling existing information. The NRCS has installed two Soil Climate Air Network (SCAN) stations within the Chuckwalla Basin and is monitoring data collection from these stations. Lawrence Berkeley in collaboration with Pennsylvania State University is developing a numeric groundwater flow and water balance model that will incorporate surface and near surface indicators of impacts to water use. Future plans include additional vadose zone wells in and around developing projects, monitoring of representative wells in the basin, additional BLM monitoring wells (if needed), a preliminary investigation report, an interim investigation report that includes preliminary modeling results, and a 3 year investigation report detailing all efforts and results identified to date. These endeavors will address the issues of impacts to the Colorado River and impacts to the basin aquifer. In developing a monitoring network, database, and model, a practical tool for land management will be adapted for application to desert basins throughout southern California.

DISCUSSION

Overview

The BLM recently published its Final Solar Programmatic Environmental Impact Statement (EIS) (BLM/DOE, 2012), which identifies the Riverside East Solar Energy Zone (SEZ), that includes most of the Chuckwalla Basin and some areas just outside and to the east. Federally managed land makes up about 80% of the land within the Chuckwalla Basin. There are presently two utility scale renewable energy projects being constructed within the Chuckwalla Basin portion of this SEZ and two electrical substations to serve expected development. At least nine additional authorized and proposed projects involving Federal lands in the Chuckwalla Basin are currently being evaluated by the BLM (Figure 1). California's Groundwater Bulletin 118 (CA-DWR, 2003) identified this basin as having insufficient information available to adequately determine recharge, outflow, or a safe yield for groundwater development.

Chuckwalla Basin

Water Issues

The problem of estimating aquifer inflow and outflow in basins of the arid southwest is a challenging one (Flint et al, 2004). There are often few perennial surface flows to gage and differences in rainfall are controlled by many variables. Precipitation can vary greatly by elevation and orographic effects, as evidenced by "rain shadows" cast by high mountainous regions. High seasonal temperatures and evapotranspiration (ET) are significant factors in desert regions. Researchers in the arid southwest have developed several quantitative methods to arrive at reasonable recharge estimates. These include the chloride-mass balance method (Dettinger, 1989), the Maxey-Eakin method [original and modified methods] (Maxey and Eakin, 1950; Avon and Durbin, 1994; Harrill and Prudic, 1998), the USGS's distributed parameter water models (INFILv3, or BCM) (Hevesi et al, 2003) that uses a daily water balance, and the USGS MODFLOW model used to verify recharge estimates (Harbaugh, et al, 2000).

The California Department of Water Resources (CA-DWR, 2003) recognized in Bulletin 118, update 2003, that there was inadequate data to provide an estimate of the Chuckwalla Basin's water budget or water use. Since then, there has been considerable effort put forward in trying to understand the information that is available. A number of new groundwater wells have also been drilled since 2003, and solar energy development in the Chuckwalla Basin is currently in full swing. Even with all of this activity, much uncertainty still persists about the Chuckwalla Basin's recharge, perennial yield, and the water budget. It is critical to groundwater supplies and dependent resources that this uncertainty be reduced to the greatest degree possible.

Colorado River Impacts

The BLM is concerned about potential down-gradient and downstream impacts to the Colorado River from groundwater production out of the Chuckwalla Basin. Colorado River-dependent resources and authorized users might be affected by groundwater pumping from within the basin. There is currently no existing monitoring or tracking tool in place for the Chuckwalla Basin to identify the extent of this potential and theoretically possible impact.

The Chuckwalla Basin is hydrologically connected to the Colorado River (Metzger and Loeltz, 1973; Wilson and Owen-Joyce, 1994; Owen-Joyce et al, 2000; Wiele et al, 2008). Water from the Colorado River was last adjudicated by the U.S. Supreme Court in 2006 under the Consolidated Decree (Supreme Court, 2006). Among the actions upheld is language directing the USGS to identify waters drawn from the mainstream of the Colorado River by underground pumping. The USGS developed the “accounting-surface” methodology to accomplish this in the 1990s (Wilson and Owen-Joyce, 1994; Owen-Joyce et al, 2000). This method was updated in 2008 (Wiele et al, 2008) and, while proposed as a rule by the Bureau of Reclamation, the method has not yet been codified into Federal regulations. To clarify, this does not mean that there is no impact to the waters of the Colorado River, but means that there is not a formal legal definition in place to identify Colorado River waters drawn from the mainstream by underground pumping. Work has also been done by the USGS to quantify potential impacts to the river using a superposition model (Leake et al, 2008). This analysis suggests water well production pumping in the vicinity of Desert Center could deplete Colorado River water flow by nearly 1% over 100 years. The depletion of river water could be up to about 50% if the pumping center is located nearer the interface with the Palo Verde Mesa Groundwater Basin, further east in the Chuckwalla Basin and closer to the river. The depletion differences, relative to pumping center in this study, are particularly important when looking at cumulative impacts within the basin. The potential for impact to the Colorado River is not “negligible” and could have an effect on downstream water users. Information developed by the USGS research in these papers (see citations above) points to the following three conclusions:

1. Colorado River water can be consumed by pumping within the Chuckwalla Basin – a methodology has been identified to account for river water directly consumed through groundwater pumping,

2. Colorado River water is hydrologically connected to the Chuckwalla Basin – groundwater below an elevation of about 238 feet amsl (between 238 feet amsl and 240 feet amsl) would be directly replaced by river water if pumped from the aquifer, and

3. Chuckwalla Basin groundwater above about 238 feet amsl would flow into the Colorado River, unless otherwise diverted – groundwater within the Chuckwalla Basin is identified as being tributary to the Colorado River.

Groundwater contributions from the Chuckwalla Basin into the Colorado River have been estimated to be a minimum of about 400 acre feet per year (afy) (CA-DWR, 1979; Metzger and Loeltz, 1973). Other estimates range upward to just under 1,200 afy (Engineering Science, 1990, cited in BLM, 2010). Any reduction in actual groundwater outflow could be expected to have some degree of impact on the Colorado River flow volume and water users that are down gradient from the area of Blythe, CA.

Water Supply Issues and New Information

Previously published estimates of groundwater recharge, used by the BLM in the Chuckwalla Basin to evaluate project impacts on both Federal and private land, may overestimate basin recharge. Managing lands using an overestimate of the perennial yield could risk creating basin overdraft conditions, or exacerbating overdraft conditions if they already exist. Underestimating perennial yield might increase capital costs for renewable energy development by creating an unnecessary requirement for additional infrastructure, water supply, or planning in order to provide an adequate supply. In either case, having confidence in calculated estimates of perennial yield, and related volumes, is necessary for a thorough assessment of impacts. The BLM is striving to better understand this complex issue using new information and analysis.

In 1992, the BLM, along with Riverside County, published an estimate of recharge for part of the Chuckwalla Basin of about 5,600 afy (Eagle Crest Energy as cited in BLM, 2010). More recently, the BLM has published estimates of recharge for the Chuckwalla Basin in several EIS documents. The Desert Sunlight, Genesis Solar, and Palen Solar Final EISs all present 12,088 afy as the expected recharge rate into the basin (BLM, 2010; BLM, 2011a; BLM, 2011b). The Draft EIS for Desert Harvest Solar (BLM, 2012) found that 12,948 afy is the expected recharge rate. Each of these projects uses a volume of 3,500 afy as the combined underflow from the Orocopia and Pinto Basins. The Federal Energy Regulatory Commission (FERC) published a range of values for basin recharge, from 9,600 afy to 15,000 afy, in its Eagle Mountain Project Final EIS (FERC, 2012). This range of volumes appears to be largely compatible with the earlier published values; however its application has been somewhat uneven. Documents prepared for Eagle Mountain by GEI Consultants, Inc. use a recharge value of 12,700 afy in calculations involving water balance (GEI, 2009). In contrast, the analysis for the Genesis Solar Energy Project (BLM, 2010) established a comparable range of possible recharge, but used the most conservative endpoint in the range of values derived (8,588 afy) for calculations of perennial yield.

Ongoing and evolving review of the issue of water recharge into the Chuckwalla Basin suggests that the analyses published in the recent Final EISs may have overestimated the annual recharge of the aquifer within the basin, as shown in Table 2. The National Park Service (NPS) have re-stimulated BLM's analysis and helped identify new information supporting a recharge estimate that may be as low as 3,000 to 6,000 afy. This would be more in line with BLM's earlier estimate of 5,600 afy. This two- to four-fold difference in recharge estimates (3,000 afy as compared to 12,700 afy) potentially leads to extremely different conclusions. The focus of the NPS comments on the Chuckwalla basin is the estimate of recharge developed for Eagle Mountain in the FERC Final EIS (FERC, 2012) and the California Water Board's Draft Environmental Impact Report (EIR) (Water Board, 2010) (Gary Karst, 2012b). These environmental review documents and their associated citations (including the GEI Consultants, Inc. Technical Memoranda, GEI, 2009) are central references in each of the recent BLM EIS publications. It is interesting to note that the upper end of the range of the NPS recharge values (6,000 afy) is less than the lower end of the range the Eagle Mountain Final EIS determined was the total available yield (9,600 afy). In their comparative water balance analyses, the NPS demonstrated that using the two different recharge estimates, resulted in an annual groundwater storage surplus of approximately +2,900 af when using the higher value and an annual storage deficit of about -6,800 af when using the smaller value. This disparity in results represents a difference between plentiful water resources or damaging overdraft conditions and is too large to dismiss without further consideration.

The Eagle Mountain Final EIS (FERC, 2012) and the California Water Board's Draft EIR (Water Board, 2010), both reference the GEI Consultants Technical Memorandum (GEI, 2009) as the basis for their central technical analysis of this issue. The Technical Memorandum discusses two methods of calculating the basin recharge: the widely used Maxey-Eakin method and a "Los Angeles Metropolitan Water District Review Panel" (MWD) method cited in a study of the Fenner Basin, north of the Chuckwalla Basin. The MWD method appears to pick a consensus among select professionals, but is not well explained in any of these documents. The Maxey-Eakin method is well recognized as a useful quantitative tool for initial estimations of recharge in basins of the desert southwest (Maxey and Eakin, 1950; Avon and Durbin, 1994; Hevesi et al., 2003). The Eagle Mountain Final EIS (FERC, 2012) reports that the Maxey-Eakin method produced a recharge range of about 600 afy to 3,100 afy, but this value was discarded as being unrealistically low. The MWD method reached a much higher range of values and was embraced. This may appear to be arbitrary, capricious, and unwarranted.

Research by the USGS in the basins around the town of Joshua Tree, CA (Nishikawa et al, 2004) studied the issue of recharge in that area. This study included instrumented boreholes (infiltrometers) to measure vadose zone recharge; a distributed-parameter watershed model (INFILv3) to estimate recharge, and a calibrated groundwater flow model (MODFLOW-2000) that found 99% of historic pumping has been produced from storage. The NPS cites this work to draw conclusions about recharge in the Pinto Basin. The basins of the USGS study area are roughly adjacent to the Chuckwalla Basin and within the same orographic province, so precipitation conditions are likely comparable. In extrapolating this work to the Pinto Basin, the Orocopia Basin, and the Chuckwalla Basin, the NPS estimated a combined uncorrected recharge of about 6,026 afy. The NPS settled on a range of groundwater recharge of 3,013 afy to 6,026 afy as a reasonable initial estimate of recharge to the Chuckwalla Basin, as shown in the comparison chart below (see Table 2). It is significant to note that the upper end of the range of computed values reported for the Maxey-Eakin method in the Eagle Mountain Final EIS, overlap the values suggested by the NPS.

As part of their technical review and analysis of the Eagle Mountain water balance results, the NPS constructed comparative water balances for the Chuckwalla Basin during the previous 60 years of historical pumping in the basin, using the Eagle Mountain recharge estimate (12,700 afy) and the NPS's extrapolated lower recharge estimate (3,013 afy). These historical water balances were constructed using information published in the Eagle Mountain Final EIS (FERC, 2012) and the Water Board EIR (Water Board, 2010) (See Figure 1). The purpose was to see what the historical effects on aquifer storage volume and equivalent changes to basin-wide water levels were during this period, and whether or not the results were consistent with available water level trends in the basin during this period. The results using the Eagle Mountain recharge estimate indicated that aquifer storage volume should have increased during this period by about +267,000 af, which roughly equates to an average water level rise of +18 feet across the basin. Conversely, the results using the NPS recharge estimate indicated that aquifer storage volume should have *decreased* during this period by about -314,000 af, which roughly equates to an average water level decline of -21 feet across the basin. Comparison of the estimated annual, basin-wide changes in water levels for both sets of results against available historical water level data for the basin suggests the results using the NPS's lower recharge estimate are consistent with what appeared to be a general condition of declining water levels in much of the basin. The NPS's historical water balance analysis suggests that (1) recharge of 12,700 afy for the Chuckwalla Basin may be greater than actual recharge and (2) the Chuckwalla Basin overall may have been experiencing overdraft conditions for several decades. (Karst, 2012b)

Table 2: Comparison of Basin Recharge Estimates for Chuckwalla and Tributary Basins

Basin	**NPS Extrapolation (afy)**	**Eagle Mountain Final EIS / Water Board EIR* (afy)**
Chuckwalla Valley Groundwater Basin	2,060 – 4,120	6,125
Pinto Valley Groundwater Basin	624 – 1,248	5,875
Orocopia Groundwater Basin	329 - 658	700
Total Chuckwalla Basin Recharge (from inflow and precipitation)	**3,013 – 6,026**	**12,700**

* The range of values determined was approximately 9,600 afy to about 15,000 afy. The single values presented were generally used in calculations.

The NPS also used information contained in the Eagle Mountain documents concerning historic pumping volumes and water level recovery measurements from a well in the Pinto Basin (Well

3S/15E-4J1) to help verify its extrapolated recharge estimate for the Pinto Basin (Karst, 2012b). Historic drawdown of the Pinto Basin aquifer at that well was estimated to be -17.2 feet when pumping to supply the Kaiser mining operations ceased. Recovery of the water level in this well was approximately 3.6 feet during the 23 years since pumping in the basin stopped. Based on the NPS's calculations, the volume of recharged water represented by the water level recovery during this period equates to an estimated annual basin recharge rate of 1,238 afy, which is within the range calculated for the Pinto Basin by the NPS's extrapolation method (see Table 2). The close agreement of this recharge estimate with the NPS's extrapolation method recharge estimate for the Pinto Basin lends support to the NPS's recharge estimates for each of these three basins.

The low natural discharge that has been identified from the Chuckwalla Basin also supports a lower recharge rate than has been published to date. Identified known natural discharge from the Chuckwalla Basin is estimated between 750 afy and 1,550 afy: this includes ET discharge from Palen Dry Lake at about 350 afy and groundwater outflow into the Palo Verde Mesa Groundwater Basin at between 400 afy and 1,200 afy. The NPS's historic water balance analysis, using Eagle Mountain Final EIS recharge estimates, indicates an increase in storage of about 267,000 af should have occurred over the 60- year historical pumping period (FERC, 2012). If correct, this equates to an annual storage gain of about 4,450 afy, which should have been reflected in raising water levels in the basin, increased discharge by ET, and/or increased subsurface outflow from the basin. None of these three indicators is evident in the basin based on the best available information. This analysis further supports the idea that the higher recharge estimates (12,000 afy to 13,000 afy) may not be justified.

New isotopic data recently published as part of the USGS Groundwater Ambient Monitoring and Assessment (GAMA) study (Mathany et al, 2012) suggests that the groundwater in the Chuckwalla Basin and surrounding study area basins is relatively old. Preliminary unpublished estimates (Wright, 2012) of an uncorrected carbon-14 age date for water from a well near Desert Center (western Chuckwalla Basin) under the GAMA study indicates the water to be over 15,000 years old. Similarly, preliminary results for a well near the Chuckwalla State Prison (eastern Chuckwalla Basin) indicated an uncorrected carbon-14 age of more than 28,000 years. Based on the USGS's preliminary results for all of the basins in the GAMA study area, the average uncorrected carbon-14 age for groundwater in these basins (a total of 26) is about 11,000 years old. Furthermore, preliminary tritium age-dating results from the GAMA study for these same two sampling sites in the Chuckwalla Basin and elsewhere in the GAMA study area indicated very little modern-day recharge is occurring in the Chuckwalla Basin or in most of the other study area basins. The implication of this is important since it suggests that very little recharge is getting into the basin on a "human" time scale. This further indicates that water currently being produced for beneficial use is largely coming from storage and will not be readily replaced. This conclusion concurs with findings of the USGS study near the town of Joshua Tree, CA

(Nishikawa et al, 2004), where their numerical groundwater modeling results indicated that almost all of the water being produced for beneficial use comes from storage. Water in arid basins of southern California may not be a renewable resource.

The NPS's recent recharge re-evaluation and historical water balance analyses for the Chuckwalla Basin, coupled with other supporting lines of analysis, provides strong evidence that annual recharge to the Chuckwalla Basin may be much lower than the recharge estimates proposed in earlier published State and Federal environmental documents. As a result of these analyses, interim values should be adopted that better represent current understanding of perennial yield in the Chuckwalla Basin (see Table 3). As demonstrated by the NPS, inflow from the Orocopia and the Pinto Basins is likely less than the volumes used in earlier calculations. Additional confidence should be given to these lower volumes and, to decrease uncertainty, they should be incorporated into our current understanding of conditions in this area.

Table 3: Proposed Range of Basin Recharge Estimates for the Chuckwalla and Tributary Basins

Basin	Recharge (afy)
Chuckwalla Valley Groundwater Basin*	2,060 – 6,125
Pinto Valley Groundwater Basin**	624 – 1,248
Orocopia Groundwater Basin**	329 – 658
Total Chuckwalla Basin Recharge (from inflow, return flow, and precipitation)	**3,013 – 8,031**

* From Water Board, 2010; FERC, 2012; BLM, 2010.
** From the National Park Service analysis (Karst, 2012b).

Recharge into the Chuckwalla Basin is more complex than in its two tributary basins. There may not be sufficient justification to change the currently used range of recharge estimates that apply directly to the Chuckwalla Basin (not including underflow). Table 3 lists the range of estimates that are presently consistent with available data. Using published estimates for the Chuckwalla Basin and using the Pinto and Orocopia Basin estimates suggested by the NPS, the expected total maximum recharge to the Chuckwalla Basin is 8,031 afy. In support of this lower bound, the new value is very close to and consistent with the conservative calculations made in the Genesis Solar Energy Project Final EIS (BLM, 2010) and an average for this range of 3,013 afy to 8,031 afy, is almost the same as the BLM estimate published in 1992 of 5,600 afy. It is clear that information will evolve and increase our understanding of the groundwater flow in this system.

The ongoing study, described below, will help inform this understanding and increase confidence in the growing body of work being done here.

Estimated use and outflow from the basin ranges from about 9,000 afy to about 12,000 afy (BLM, 2010; BLM, 2011a; BLM, 2011b; FERC, 2012). Since existing outflow estimates exceed the maximum recharge being proposed, it is expected that the Chuckwalla Basin may be experiencing groundwater overdraft conditions to some degree. Future environmental documents should address the groundwater supply issues identified here for the Chuckwalla Basin and other arid basins of southern California. The BLM supports analysis and discussion of perennial yield that presents a full range of possible outcomes and consequences, so that State and Federal agencies can fully meet requirements of the California Environmental Quality Act and the National Environmental Policy Act.

Conclusion

Utility scale renewable energy development is rapidly becoming an important component of the nation's energy production portfolio. This growth is particularly noticeable in the deserts of southern California where many projects have been approved or are being considered. Each of these projects carries with it a water demand that varies with the specific technology involved and its application. Where water is scarce, even small demands may have noticeable impacts. Water demand within the Riverside East SEZ is expected to range between a high of about 14,829 afy to a low of about 672 afy (Greer, et al, 2013). These volumes are equivalent to most or all of the groundwater outflow from the Chuckwalla Basin into the Palo Verde Mesa Groundwater Basin and into the Colorado River. The projections made in Greer, et al do not include the potential for the Eagle Mountain Project to further deplete groundwater resources. There is a real risk of harm to the BLM, its management goals in the Chuckwalla Basin, and renewable energy proponents. There is a real risk of harm to authorized users of Colorado River water.

In a case study of the Chuckwalla Basin, understanding of the perennial yield is evolving and there continues to be uncertainty. At the heart of this issue is the estimation of groundwater recharge within the basin, which has tremendous importance to existing users of the local aquifer and the nearby Colorado River. New information and analysis suggests that adjustments in the calculated underflow from the Pinto and Orocopia Basins should be made. In making those adjustments, the proposed range of total recharge adds up to less than the current estimates of groundwater production from within the Chuckwalla Basin. Application of these revised values to the water balance calculation indicates the basin may be in overdraft. If nothing else was done, use of the conservative end of a range of values would be prudent. Consideration of this analysis, at the very least, demonstrates greater uncertainty and risk in adhering to earlier, preliminary studies.

In an effort to further define impacts from solar development in arid landscapes, the BLM has initiated several studies. One is a large scale view of the Chuckwalla Basin in conjunction with Argonne National Laboratory. The other is a more focused study in cooperation with Lawrence Berkeley and Penn State, the USGS, and the NRCS to better understand conditions surrounding solar energy development in the Chuckwalla Basin. This work will help better define perennial yield, other current aquifer conditions, and potential impacts within the basin and to the adjoining Colorado River. Some of the tools developed under these efforts could be applied in other similar basins across southern California and to assist decision makers as they process and review future development projects.

There is significant uncertainty regarding basin recharge rates and other parameters of the Chuckwalla Basin's water balance, as documented above, including the relationship between pumping rates and aquifer drawdown. The current pumping thresholds referenced in Condition 5 may maintain or exacerbate that uncertainty. Historic pumping data may be incomplete for wells in the Chuckwalla Basin. There are no monitoring wells currently listed in the vicinity of the three Project supply wells to be used for the Eagle Mountain Project. Impacts of the proposed project on groundwater will be part of the cumulative impacts generated by multiple users in the Chuckwalla Basin. Those cumulative impacts, whatever their magnitude, will likely impact expected flows in the Colorado River.

RECOMMENDATIONS

1. The BLM recommends that the Water Board, or an appropriate third party, re-evaluate and quantify the potential for impacts to flows in the Colorado River from groundwater pumping currently proposed within the Chuckwalla Basin. This effort should use best available science on this issue, for example, Leake, et al's 2008 Superposition Model. This exercise would greatly enhance the ability of the Water Board to fully evaluate potential impacts to the Colorado River.

2. The BLM recommends that the Water Board, or an appropriate third party, re-evaluate their analysis of groundwater recharge and perennial yield in the Chuckwalla Basin in light of the uncertainties discussed above. The BLM recommends the use of either the proposed interim range of 3,013 afy to 8,031 afy for recharge, or the use of the more conservative endpoint of the range developed in the Eagle Mountain Project (Federal Energy Regulatory Commission) EIS / Water Board EIR of about 9,600 afy. This exercise would greatly enhance the ability of the Water Board to fully evaluate potential impacts to groundwater resources in the Chuckwalla Basin.

3. The BLM recommends that the Water Board will consider making the following changes (in red and bold) to Condition 5. GROUNDWATER SUPPLY, from the Draft Final Water Quality Certification. Inclusion of this language will remove ambiguity and provide clear guidelines to limit overdraft damage to the aquifer should it be occur.

At a minimum, the monitoring plan shall be prepared to meet the following objectives and include the following provisions:

- *Confirm that Project pumping is maintained at levels that are at or below the range of historic pumping as presented in the Groundwater Supply Pumping Effects technical memorandum (GEI, 2009a).* **Maximum allowable drawdown below static water level shall not exceed 60 feet at any Project supply well. Maximum allowable drawdown below static water level shall not exceed 10 feet at any well within 1 ½ miles of a Project supply well. Water level shall be monitored hourly at all Project supply and monitor wells and data from this monitoring shall be reported quarterly.** *The Licensee shall track the pumping rate and duration associated with the Project supply wells and report the amount of water extracted quarterly. The groundwater monitoring network shall consist of both existing and new wells to assess changes in groundwater levels at: the Project supply wells; beneath the CRA in the upper Chuckwalla Valley Groundwater Basin and Orocopia Valley; at the mouth of Pinto Basin; and in areas east of the Project supply wells.* **At least one monitor well will be constructed for each Project supply well, will be located approximately 1 ½ miles to the east, and generally down gradient from the supply well. Monitor well location will require review and approval of the Deputy Director of the BLM and the Board.** *Wells shall be monitored quarterly for ~~groundwater level,~~ water quality~~,~~ and the amount of water extracted.*

- **The Licensee shall provide an annual report to the Board detailing both project and cumulative impacts to groundwater resources in the Chuckwalla Basin. This annual report will calculate a water balance and perennial yield for the Chuckwalla Basin, as defined by the California Department of Water Resources (CA-DWR, 2003), and shall be reviewed and approved by the Deputy Director of the BLM prior to submission to the Board.**

{THE BALANCE OF CONDITION 5 UNCHANGED}

If there are any questions regarding these comments, please contact Frank McMenimen, Project Manager (760-833-7150, fmcmenimen@blm.gov) or Peter Godfrey, Hydrologist (951-697-5385, pgodfrey@blm.gov).

Sincerely,

/s/ Teresa A. Raml

Teresa A. Raml
District Manager

cc Federal Energy Regulatory Commission
John Kalish, Field Manager, BLM Palm Springs / South Coast Field Office

Enclosures
REFERENCES
Figure 1
Figure 2

REFERENCES

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Figure 1: Approximate Location of the Chuckwalla Valley Groundwater Basin and Proposed Renewable Energy Projects on Federal Lands

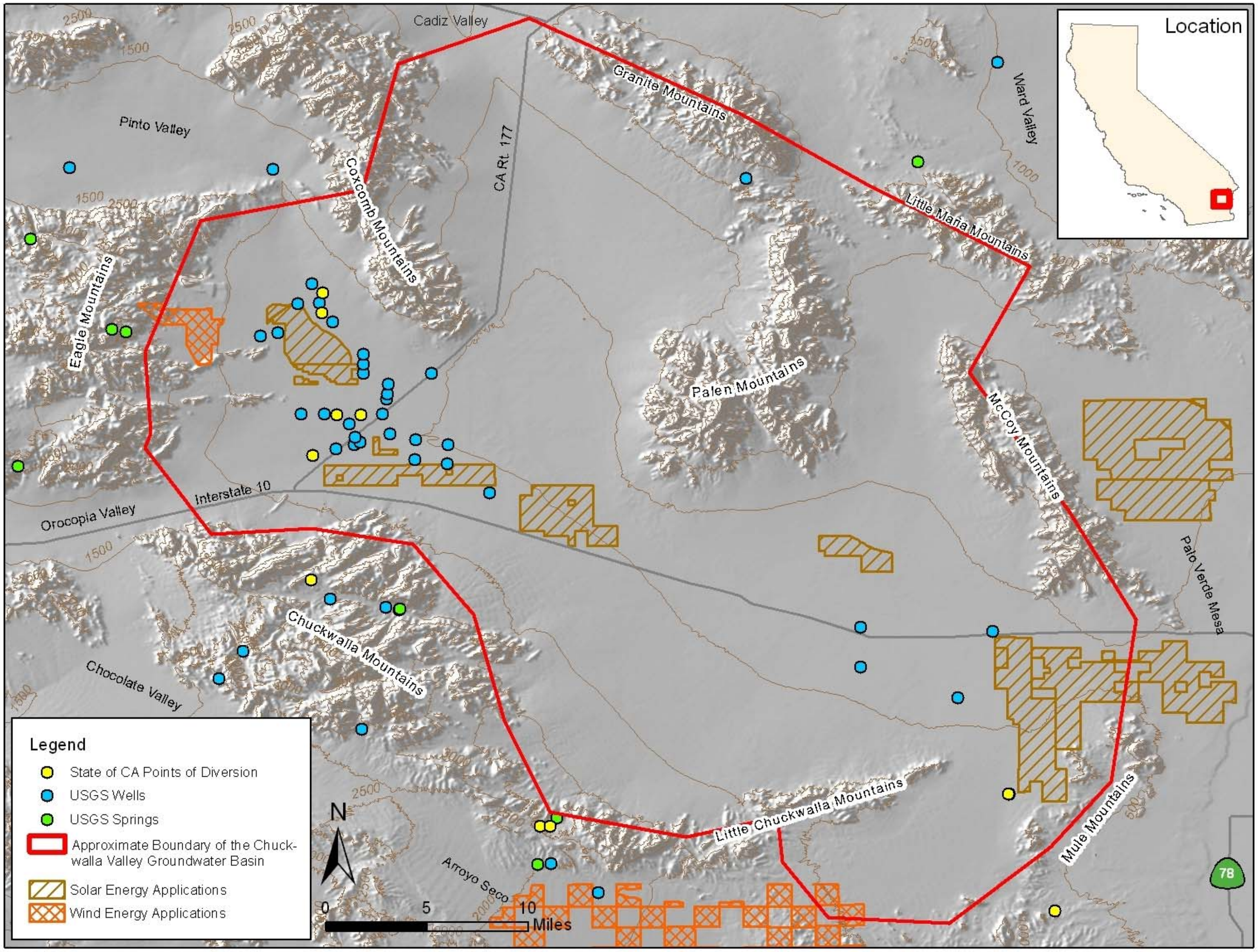


Figure 2: Chuckwalla Basin Historic Water Levels as presented by Gary Karst, National Park Service to the Nevada Water Resources Association 2012 Annual Conference (used with permission, data from: Water Board, 2010; FERC, 2012)

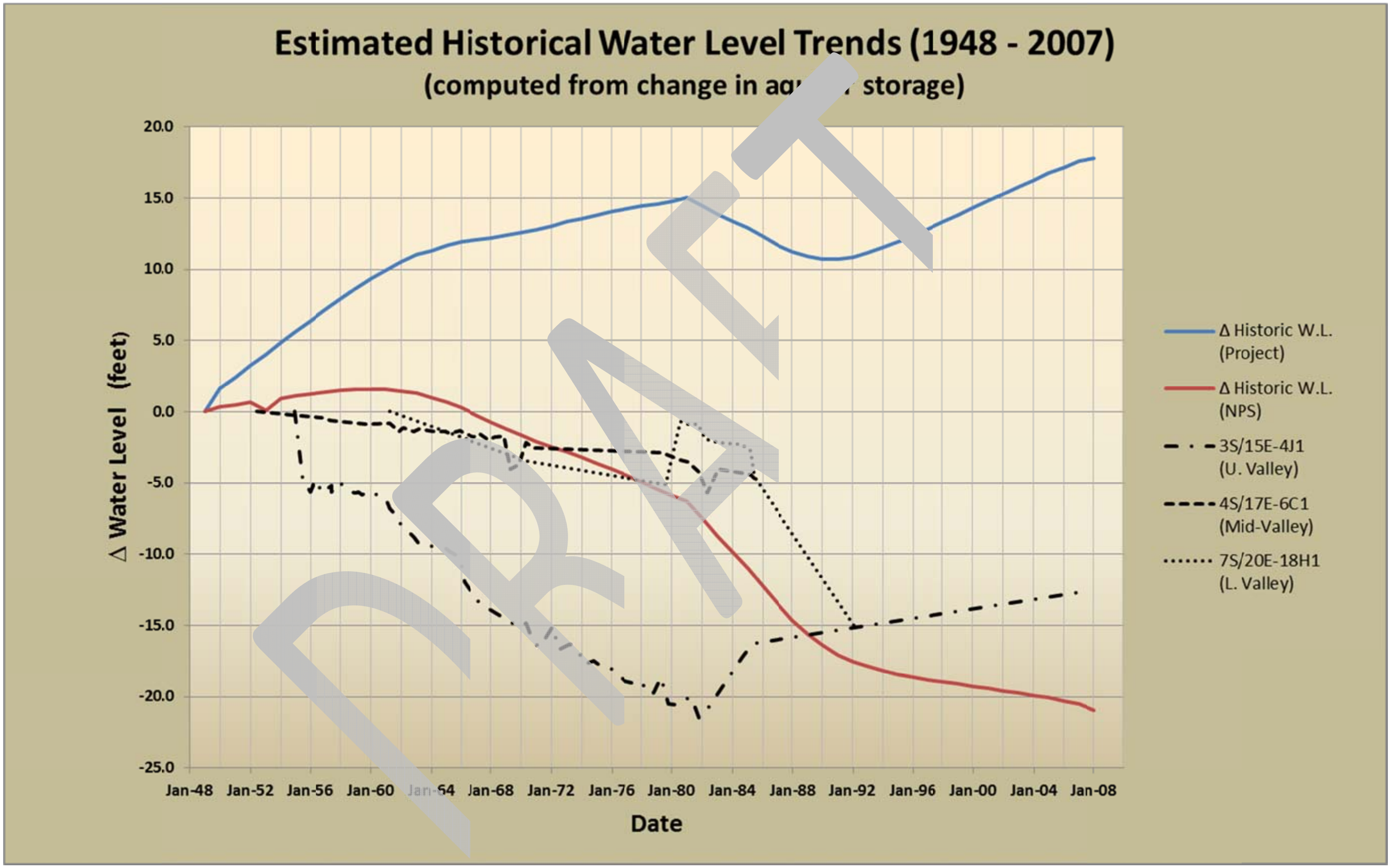


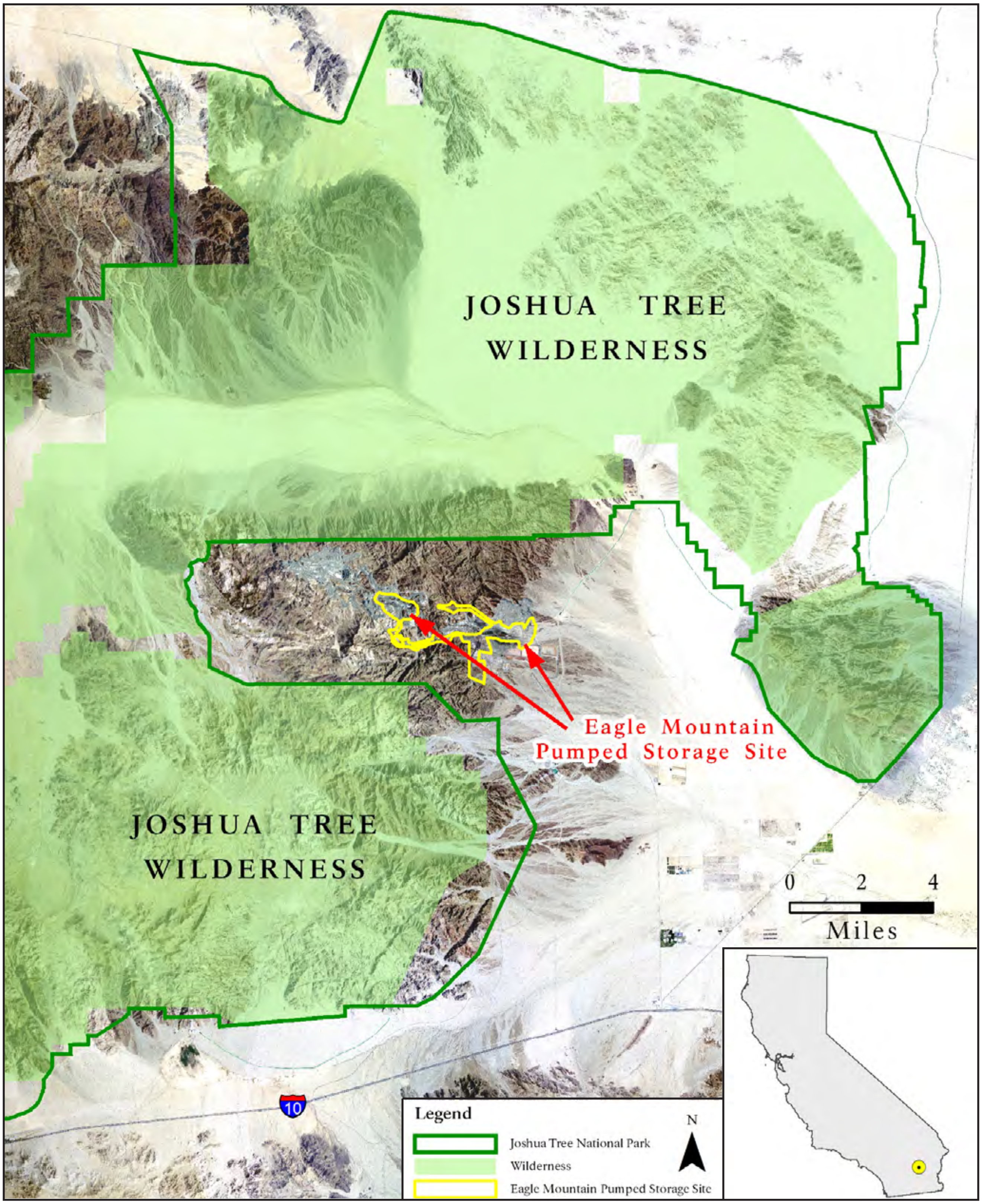
Exhibit D

National Park Service
U.S. Department of the Interior

Joshua Tree National Park

Impacts of the Eagle Mountain Pumped Storage Project

Interpretation of Existing Science, July 2013



Thus, approximately 178,000 acres (75%) of the prime desert tortoise habitat within Joshua Tree National Park would likely be adversely affected.

An artificial lake system will inevitably promote exotic plant invasion and spread.

The USGS report (Mathany et al. 2012) prepared for the California State Water Board clearly indicates no modern recharge has occurred in the Chuckwalla Basin.

On June 23, 2009, Eagle Crest Energy Company (ECE) filed an application for a license from Federal Energy Regulatory Commission (FERC) seeking permission to construct the Eagle Mountain Pumped Storage Project (PSP). The project would consist of a pumped storage hydroelectric facility, utilizing groundwater to fill two water storage reservoirs in abandoned mine pits at the former Eagle Mountain Mine. The project also involves the construction of numerous tunnels, a spillway, a 15-mile buried water pipeline, a 13-mile 500-kV transmission line, numerous roads, and support and administrative structures. The project would generate 1,300 MW of electrical power per day. However, the facility would require 1,600 MW per day to operate, resulting in a 300 MW daily net loss of energy.

The project would be constructed on about 1,059 acres of public land managed by the Bureau of Land Management (BLM) and on 1,162 acres of private land owned by Kaiser Ventures, LLC. Presumably, the privately owned land could be acquired through eminent domain under the Federal Power Act.

Due to the lack of physical access to the site during the preparation of the Draft and Final Environment Impact Statement (EIS), full analysis of the direct and indirect adverse effects to Joshua Tree National Park were not adequately evaluated. The park has requested that FERC and ECE complete a full and adequate supplemental environmental review once access is granted.

The impacts to Joshua Tree National Park are expected to be complex, cumulative, direct, and indirect. However, this summary review of existing science considers only the artificial lake system promoting exotic plant spread, acid mine drainage, overdraft of aquifers, and the increased predation pressure from the common raven on the federally listed desert tortoise.

Predation of Desert Tortoise

Ravens are a known predator of desert tortoise and preferentially utilize anthropogenic resources (Boarman 1995). In 1995, a study at Edwards Air Force Base documented raven abundance and usage of anthropogenic sites by studying tagged ravens (Boarman 1995). This study found that, on average, tagged ravens were recaptured 6.39 km away from human subsidies with the maximum travelled distance of 31 km to utilize resources outside of the site.

Joshua Tree National Park has estimated the potential impacts to desert tortoise from the PSP by extrapolating the findings from Boarman's 1995 raven data in conjunction with a robust habitat model (Maxent) developed by United States Geologic Survey (USGS) (Nussear et al. 2009). A Geographic Information System analysis using these data produced a map showing the extent of tortoise habitat that could be negatively impacted by increased raven predation associated with an artificial lake ecosystem (see map). It has been estimated that artificial lakes and associated anthropogenic resources at Eagle Mountain would potentially affect nearly 330,000 acres of prime desert tortoise habitat within 31 km of the site. Approximately 178,000 acres (75%) of prime desert tortoise habitat within Joshua Tree National Park would likely be adversely affected. Approximately 152,000 acres of prime desert tortoise habitat outside the park would also be adversely affected.

The number of tortoises in Joshua Tree National Park has decreased significantly in the past two decades. Surveys estimate a desert tortoise population range from 29-31/km^2 in 1978 (Barrow 1979), to 67/km^2 in 1991–96 (Freilich et al. 2000), to an average of only 3/km^2 since 2007 (USFWS 2012). With an average tortoise density of 3/km^2, an artificial lake and associated anthropogenic resources at Eagle Mountain could lead to adversely impacting approximately 2,160 desert tortoise in Joshua Tree National Park.

The park contains some of the most protected desert tortoise habitat found in the Mojave Desert. Park tortoises are relatively free of many stressors, including habitat fragmentation, habitat loss, ORV/OHV use, large-scale development, feral dogs, and other common and detrimental anthropogenic influences. Increased predation from ravens (whose population would be concentrated by the infrastructure and water at the site) on this already depressed population could be devastating to the wildlife preservation directive of the National Park Service (NPS). Combined with the cumulative impacts to desert tortoise from large-scale renewable energy developments occurring just outside of park boundaries near the proposed PSP site, it is important to place additional emphasis on the preservation of park lands that are highly protected for the desert tortoise.

...there are potentially significant but currently uncalculated impacts related to the level of acid rock drainage production, the amount of reservoir seepage, the ability to adequately treat acid drainage and control seepage, and the effects on bats and other sensitive species that may use the proposed reservoir and associated evaporation ponds.

Exotic Plant Spread

Scientific literature on invasive plants in North American deserts suggests that any alteration of the hydrologic regime favors invasive plants over native riparian vegetation (Friedman, Auble et al. 2005; Merritt and Poff 2010). An artificial lake system will inevitably promote exotic plant invasion and spread. Considering the proximity of the proposed PSP site at Eagle Mountain Mine to Joshua Tree National Park, this project is likely to become a propagule source for invasive plants, such as *Tamarisk sp.,* and chronically promote the spread of exotic plants into the park. Additionally, the availability of water at each mine pit creates a previously unrealized niche for a number of unknown invasive plants that threaten the biodiversity of the park.

Groundwater Depletion

Another major concern relates to groundwater usage and the potential for overdraft of the aquifer. Attempts to quantify basin recharge have been based on literature dating back to the early 1960s. On January 28, 2013, the California State Water Resources Control Board (SWRCB) released a draft of the Final Environmental Impact Report for the project. In the draft, the SWRCB dismissed NPS comments relating to an "overestimate of recharge" within the basin. The SWRCB claims that recharge is sufficient for the proposed project and it will not lead to an overdraft condition in the Chuckwalla Basin. However, a recent USGS study in cooperation with the same SWRCB and the California Groundwater Ambient Monitoring and Assessment Program seems to refute the SWRCB's earlier supposition.

The USGS report (Mathany et al. 2012) prepared for SWRCB clearly indicates no modern recharge has occurred in the Chuckwalla Basin. The aforementioned conclusion is based on Carbon-14 and Tritium values used to date groundwater. This new data has served as the impetus for a new study involving BLM, Lawrence Berkley National Laboratory, Pennsylvania State University, and USGS to assess the effects of large-scale renewable energy projects on the Chuckwalla Valley groundwater basin. The study is based on the development of a groundwater monitoring network, a database, modeling, and model testing. Some preliminary results may be available at the end of 2013.

Acid Mine Drainage

Pyrite, one of the minerals described in the geologic map for the Eagle Mountain Mine, is the most common of the sulfide mineral group and is known for producing acid mine drainage. Joshua Tree National Park agrees with the Environmental Protection Agency that there are potentially significant, but currently uncalculated, impacts related to the level of acid rock drainage production, the amount of reservoir seepage, the ability to adequately treat acid drainage and control seepage, and the effects on bats and other sensitive species that may use the proposed reservoirs and associated evaporation ponds. In conclusion, the Final EIS developed by FERC does not address the decommissioning of the project at the end of its 50-year lifespan. There is no description or plan for the treatment of the 17,500 acre-feet of potentially hazardous acidified waste water that will remain after the 50-year lifespan of the project.

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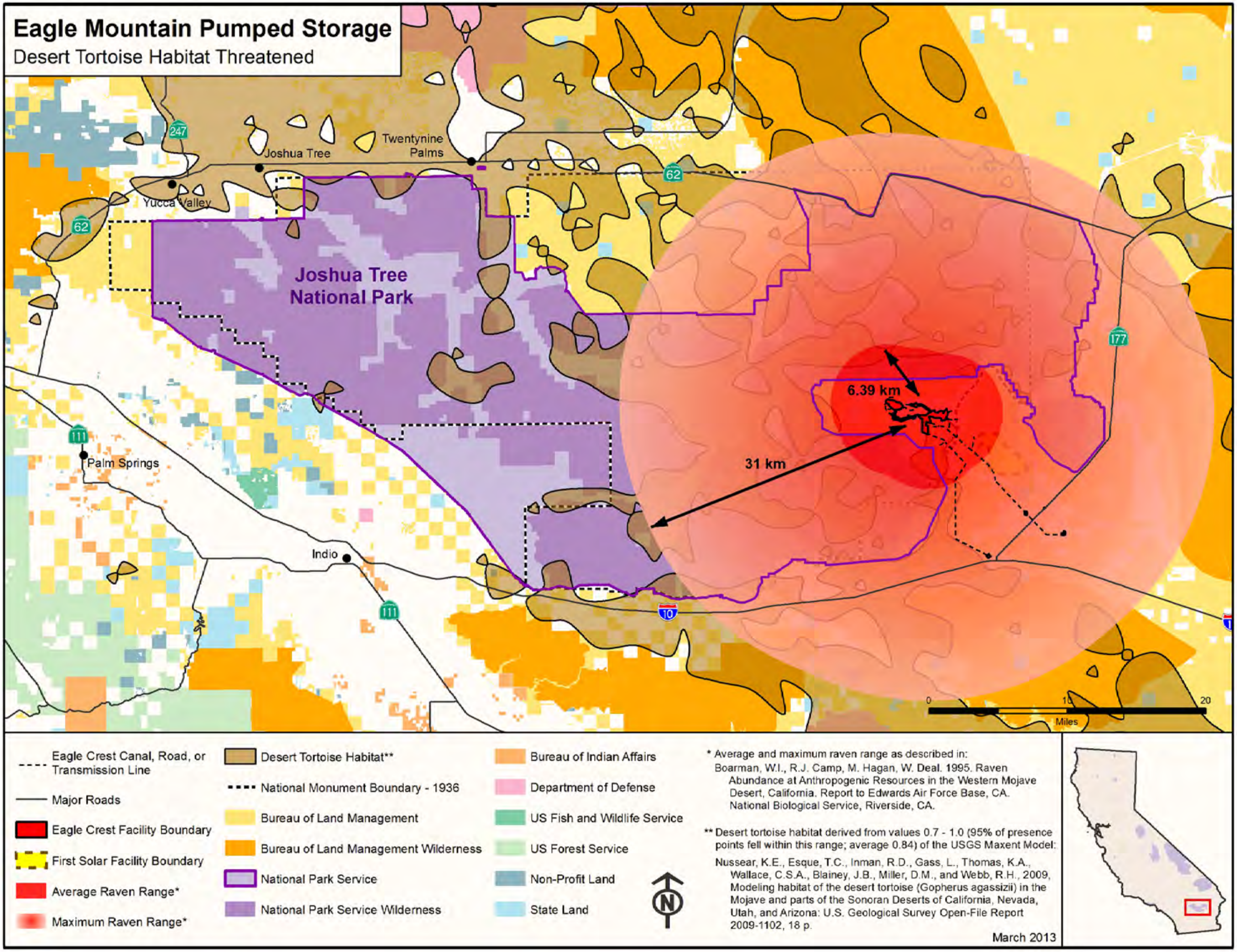
Eagle Mountain Pumped Storage
Desert Tortoise Habitat Threatened
Joshua Tree
National Park
Twentynine
Palms
Joshua Tree
Yucca Valley
Palm Springs
Indio
247
62
111
10
177
6.39 km
31 km
0
10
20
Miles
Eagle Crest Canal, Road, or Transmission Line
Major Roads
Eagle Crest Facility Boundary
First Solar Facility Boundary
Average Raven Range*
Maximum Raven Range*
Desert Tortoise Habitat**
National Monument Boundary - 1936
Bureau of Land Management
Bureau of Land Management Wilderness
National Park Service
National Park Service Wilderness
Bureau of Indian Affairs
Department of Defense
US Fish and Wildlife Service
US Forest Service
Non-Profit Land
State Land
N
* Average and maximum raven range as described in:
Boarman, W.I., R.J. Camp, M. Hagan, W. Deal. 1995. Raven Abundance at Anthropogenic Resources in the Western Mojave Desert, California. Report to Edwards Air Force Base, CA. National Biological Service, Riverside, CA.
** Desert tortoise habitat derived from values 0.7 - 1.0 (95% of presence points fell within this range; average 0.84) of the USGS Maxent Model:
Nussear, K.E., Esque, T.C., Inman, R.D., Gass, L., Thomas, K.A., Wallace, C.S.A., Blainey, J.B., Miller, D.M., and Webb, R.H., 2009, Modeling habitat of the desert tortoise (Gopherus agassizii) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona: U.S. Geological Survey Open-File Report 2009-1102, 18 p.
March 2013

Exhibit E

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August 13, 2013

Via U.S. Mail

Thomas Howard, Executive Director
State Water Resources Control Board
1001 "I" Street
P.O. Box 2815
Sacramento, California 95812-2815

Request for Preparation of Record of Proceedings in Connection with Petition for Reconsideration of Section 401 Certification for Eagle Mountain Pumped Storage Hydroelectric Project, FERC Project No. 13123

Dear Mr. Howard:

In accordance with section 3867(d)(9) of title 23 of the California Code of Regulations, on behalf of Petitioners National Parks Conservation Association and San Bernardino Valley Audubon Society, we request that the State Water Resources Control Board prepare the staff record of proceedings for the Clean Water Act section 401 certification for the Eagle Mountain Pumped Storage Hydroelectric Project, Federal Energy Regulatory Commission Project Number 13123, issued by the State Board on July 15, 2013. Pursuant to the regulations, the record should include any tape record or transcript of any pertinent hearings, if available.

Please let me know if you have any questions about this request.

Sincerely yours,

Debbie Sivas

Deborah A. Sivas
Attorneys for Petitioners