

2.2.1 Federal

**TABLE 2-1
FEDERAL AGENCIES SUBMITTING COMMENTS**

Commenter	Date of Comment	Signatory and Title
US Department of Interior Bureau of Land Management <i>California State Office</i>	02/13/2012	James G. Kenna Director
US Department of Interior Bureau of Reclamation <i>Lower Colorado Regional Office Resources Management Office</i>	02/02/2012	Valerie E. Thomas Chief
US Department of Interior National Park Service <i>Mojave National Preserve</i>	02/13/2012	Stephanie R. Dubois Superintendent
US Marine Corps <i>Marine Air Ground Task Force Training Command Marine Corps Air Ground Combat Center</i>	03/19/2012	Colonel J.P. Granata Assistant Chief of Staff G-4



United States Department of the Interior
BUREAU OF LAND MANAGEMENT

California State Office
2800 Cottage Way, W1623
Sacramento, CA 95825
www.blm.gov/ca

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In Reply Refer to:
2800 (CA-930)P

FEB 1 3 2012

John J. Schatz, General Manager
Santa Margarita Water District
26111 Antonia Parkway
Rancho Santa Margarita, California 92688

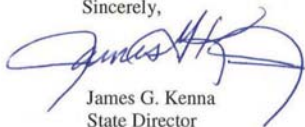
Re: Comment on Draft Environmental Impact Report (DEIR) for Cadiz, LLC's (Cadiz) Cadiz Valley
Water Conservation, Recovery, and Storage Project (Cadiz Project)

Dear Mr. Schatz:

The Bureau of Land Management (BLM) is writing in response to the above referenced DEIR and is requesting additional information related to the Cadiz Project. In the DEIR for this project, released December 6, 2011, a new pipeline has been proposed to connect wells located on property controlled by Cadiz to the Colorado River Aqueduct across BLM-managed lands. The layout of this pipeline is shown to occur exclusively within the Arizona & California Railroad Company's (ARZC's) existing railroad right-of-way (ROW) authorized under the Act of March 3, 1875 (the "1875 Act"). Section 2.3.2 of the DEIR provides an overview of Cadiz's lease with the ARZC related to the Cadiz Project. According to section 2.3.2, the lease agreement permits the ARZC to use water from the Cadiz Project for certain purposes. It also analyzes the relationship between those activities and railroad operations in light of a recent opinion issued by the Solicitor of the Department of the Interior (DOI).

Because the route of the proposed pipeline crosses BLM-managed land, the BLM needs to assess if the proposed facilities would require BLM authorization or if the proposed pipeline is within the scope of the existing railroad ROW as outlined in BLM Instruction Memorandum IM-2012-038 and DOI Solicitor Opinion M-37025, both of which are enclosed. To support this assessment please provide to BLM a copy of the project plan considered in the DEIR, a copy of the referenced 99-year lease agreement between Cadiz and the ARZC, and any documents or plans related to the ARZC's uses of Project water. Once the requested documents are received and reviewed by the BLM, a meeting can be arranged to discuss this project. Please provide these documents no later than 30 days from receipt of this letter.

Sincerely,


James G. Kenna
State Director

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Enclosures (2):
BLM Instruction Memorandum IM-2012-038
DOI Solicitor Opinion M-37025

cc: John Giles, President and CEO, RailAmerica, Inc.
Keith Brackpool, Chairman, Cadiz, LLC
Scott Slater, Attorney, Brownstein, Hyatt, Farber & Schreck

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U.S. DEPARTMENT OF THE INTERIOR **BUREAU OF LAND MANAGEMENT**
National

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240
<http://www.blm.gov/>
December 2, 2011

In Reply Refer To:
2800/2880 (350) P

EMS TRANSMISSION 12/20/2011
Instruction Memorandum No. 2012-038
Expires: 09/30/2013

To: All Field Office Officials

From: Assistant Director, Minerals and Realty Management

Subject: Interim Guidance Relating to the Scope of a Railroad's Authority to Approve Uses within Railroad Rights-of-Way Granted under the Act of March 3, 1875

Purpose: The purpose of this Instruction Memorandum (IM) is to provide interim guidance in light of the release of Solicitor's Opinion M-37025 on November 4, 2011, which withdraws those portions of Solicitor's Opinion M-36964 relating to the scope of a railroad's authority to undertake or authorize uses within railroad rights of way (ROW) under the Act of March 3, 1875 (1875 Act). Additional guidance that will address proposed and existing uses on public lands within 1875 Act ROWs will be developed and issued shortly.

Policy/Action: Based on a review of Opinion M-36964, *Proposed Installation of MCI Fiber Optic Communications Line within Southern Pacific Transportation Co.'s Railroad Right-of-Way* of January 5, 1989 (the 1989 Opinion), the Solicitor recently issued a new Opinion, M-37025, that withdraws that part of the 1989 Opinion addressing a railroad's authority to undertake or authorize activities within railroad ROWs granted pursuant to the 1875 Act.[1] A copy of Opinion M-37025 is attached.

Opinion M-37025 concludes that the findings in the 1989 Opinion regarding the 1875 Act are erroneous because a railroad's authority to undertake or authorize activities within an 1875 Act ROW is limited to those activities that derive from or further a railroad purpose. Determining whether a particular activity derives from or furthers a railroad purpose requires a case-by-case evaluation. The guidance below broadly describes how such evaluations for uses proposed within 1875 Act railroad ROWs should be conducted.

Uses Proposed Within 1875 Act Railroad ROWs

The Bureau of Land Management (BLM) retains authority over proposed uses within 1875 Act ROWs across BLM-managed public lands which do not derive from or further a railroad purpose. Therefore, proponents of uses within an 1875 Act ROW that are not derived from or in furtherance of a railroad purpose will need authorization from the BLM.[2] Most, if not all, of such authorizations would fall under Title V of the Federal Land Policy and Management Act or Section 28 of the Mineral Leasing Act.

Thus, in those situations where a use is proposed within an 1875 Act ROW located on public lands, the BLM must first evaluate whether a railroad purpose will be served by the proposed use. To assist in that evaluation, the BLM will, among other things, solicit the input of the railroad holding the subject 1875 Act ROW. The BLM will additionally consider the following: 1) courts have interpreted "railroad purpose" to include activities incidental to train operations that also have a separate commercial purpose as being within the railroad's authority to undertake or authorize;[3] and 2) a railroad has the exclusive right to utilize the entirety of its ROW for the purposes of operating a railroad. Therefore, any activity undertaken or authorized by a railroad cannot otherwise interfere with railroad operations.

- If the BLM concludes that a railroad purpose would be served by the proposed use, then no further action would be required by the agency.

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- If, however, the BLM concludes that the proposed activity does not derive from or further a railroad purpose, the proponent of the proposed use would have to submit an application to the BLM that would be processed in accordance with applicable laws, regulations and agency policies. Applications processed for uses within 1875 Act ROWs will be subject to the same fees and requirements that would be normally required for such use of public lands under applicable laws, regulations and policies, including but not limited to, cost recovery fees (processing and monitoring), rental fees and bonding requirements. As noted above, approval of any such use by the BLM within an 1875 Act ROW across BLM-managed public lands will require coordination with the railroad ROW holder to ensure such uses do not interfere with railroad operations.

State Offices should contact the Washington Office, Branch of Rights-of-Way (WO-350), for assistance with evaluating whether activities proposed within an 1875 Act ROW located on BLM-managed public lands derive from or further a railroad purpose, and therefore do not require authorization from the BLM.

Subsequent Guidance

Additional guidance will be issued addressing the evaluation of both proposed and existing uses within 1875 Act ROWs located on BLM-managed public lands.

To assist in developing this guidance, all State and Field Offices should conduct an in-office assessment of the BLM records by ensuring ROWs authorized under the 1875 Act are accurately recorded in LR2000 to facilitate WO-350 retrieval of records and identify the following, if known:

- 1) The types of existing facilities (water pipeline, fiber optic lines, power lines, etc.), names of the facility owners, and related BLM serial numbers (both for facility and railroad), within 1875 Act ROWs located on public lands;
- 2) Any proposed facilities and proponent names, within 1875 Act ROWs located on public lands; and
- 3) Any other relevant information that could inform the future policy.

For the identification of proposed facilities and proponent names, State and Field offices should rely on recent inquiries or other publicly available information, such as phone calls received, public meeting notices, or newspaper articles.

The results of the in-office assessments should be compiled by each State Office and a single response for each state transmitted to Lucas Lucero, Branch Chief, Rights-of-Way, in the Washington Office of the BLM no later than 90 days after the issuance of this IM.

Timeframe: This information and interim guidance is effective immediately.

Budget Impact: There is expected to be a minor budget impact, depending on the number of proposals that need to be evaluated for railroad use and the amount of work involved with information gathering related to existing uses of 1875 Act ROWs.

Background: On January 5, 1989, the Solicitor issued Opinion M-36964 which, among other things, concluded that railroads possessed "what is tantamount to a fee interest in [their] 1875 Act rights of way" allowing them to undertake or authorize any activities within these ROWs regardless of purpose. As a result of further review of the 1875 Act and applicable judicial decisions, the Solicitor issued Opinion M-37025 on November 4, 2011 withdrawing that part of Opinion M-36964 concerning ROW issued under the 1875 Act. As Opinion M-37025 explains, railroad companies have the authority to undertake or authorize activities within an 1875 Act ROW if those activities derive from or further a railroad purpose, while the BLM is responsible for authorizing activities that do not serve any railroad purpose.

Manual/Handbook Sections Affected: This IM transmits interim policy that amends and will be incorporated into the BLM Right-of-Way Manual Series 2800/2880 during the next revision.

Coordination: This IM was developed in consultation with WO-100 and coordinated with the Solicitor's Office and affected State Offices.

Contacts: If you have questions or need additional information, please contact me at 202-208-4201, or your staff may contact Kim Berns, Division Chief, Lands, Realty and Cadastral Survey (WO-350) at 202-912-7350; Lucas Lucero, Branch Chief, Rights-of-Way at 202-912-7324; or Beth Ransel, Linear ROW &

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Master Agreements Lead at 202-912-7213.

Signed by:
Timothy Spisak
Acting, Assistant Director
Minerals and Realty Management

Authenticated by:
Robert M. Williams
Division of IRM Governance, WO-560

2 Attachments

- 1 - Solicitor's Opinion M-37025 (13 pp)
- 2 - Q&As Pertaining to M-37025 (3 pp)

- [1] Opinion M-37025 does not modify the findings of the 1989 Opinion relating to railroad ROWs issued under other railroad ROW statutes.
[2] Uses proposed within an 1875 Act ROW cannot interfere with a railroad's use of its ROW.
[3] An example might include a telephone line that is located within an 1875 Act ROW that provides both station communication and general commercial use.

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United States Department of the Interior

OFFICE OF THE SOLICITOR
Washington, D.C. 20240

NOV - 4 2011

IN REPLY REFER TO:

M-37025

Memorandum

To: Secretary
Assistant Secretary for Land and Minerals Management
Assistant Secretary for Water and Science
Director, Bureau of Land Management

From: Solicitor

Subject: Partial Withdrawal of M-36964--*Proposed Installation of MCI Fiber Optic Communications Line Within Southern Pacific Transportation Co.'s Railroad Right-of-Way*

This memorandum addresses the scope of a railroad's authority to authorize activities within a right-of-way ("ROW") granted pursuant to the General Railroad Right-of-Way Act of March 3, 1875, 18 Stat. 482 ("1875 Act"). This issue was most recently addressed in Solicitor's Opinion M-36964--*Proposed Installation of MCI Fiber Optic Communications Line Within Southern Pacific Transportation Co.'s Railroad Right-of-Way*, 96 I.D. 439 (1989) ("Opinion M-36964")--which opined upon what approvals, if any, a telecommunications company must obtain from the Bureau of Land Management ("BLM") in order to install a fiber optic communications line and associated facilities within existing railroad ROWs granted pursuant to: (i) the Act of July 27, 1866, 14 Stat. 292; (ii) the Act of March 3, 1871, 16 Stat. 573; and (iii) the 1875 Act. While addressing that specific question, Opinion M-36964 also opined more generally about a railroad's authority to authorize activities within those ROWs.

Our review of Opinion M-36964 responds to (1) criticisms of the 1875 Act portion of Opinion M-36964 by a federal District Court in *Home on the Range v. AT&T Corporation*, 386 F. Supp. 2d 999 (D. Ind. 2005), and (2) concerns raised in connection with a proposal by Cadiz, Inc., to construct the Cadiz Water Conservation & Storage Project ("Cadiz Project"), which includes the construction of a 42-mile water conveyance pipeline in the Mojave Desert within the Arizona & California Railroad Company's ("ARZC") 1875 Act ROW.¹ The Acting Assistant Secretary, Water and Science, relied on Opinion M-36964 in 2009 to conclude that the ARZC "may allow others to use [its 1875 Act] ROW for any purpose without the involvement of the

¹ See also Cong. Research Service, "Property Rights Related to Railroad Rights of Way Granted to Arizona & California Railroad Company," at 3-4 (Jun. 17, 2009) (questioning Opinion M-36964's conclusions regarding the scope of a railroad's authority within an 1875 Act ROW).

BLM and that no federal authorization or analysis would be required for the construction of the [Cadiz Project's] pipeline" within ARZC's ROW across BLM-administered lands.²

For the reasons set forth below, this memorandum withdraws the guidance provided by Opinion M-36964 as it relates to a railroad's rights within an 1875 Act ROW based on our findings that:

- Opinion M-36964's conclusions with respect to the activities that a railroad may undertake, or authorize others to undertake, within an 1875 Act ROW are not consistent with the Act, the relevant legislative history, prior interpretations of the Act, or the established rule that railroad ROW grants are liberally construed in favor of the purposes for which they were enacted, but otherwise are subject to the general rule that any ambiguities in grants of lands from the public domain are to be resolved in favor of the Federal government; and
- Within an 1875 Act ROW, a railroad's authority to undertake or authorize activities is limited to those activities that derive from or further a railroad purpose, which allows a railroad to undertake, or authorize others to undertake, activities that have both railroad and commercial purposes, but does not permit a railroad to authorize activities that bear no relationship to the construction or operation of a railroad.³

I. BACKGROUND

A. The 1875 Act

A railroad ROW is a unique property right; it is "a very substantial thing," that has "the attributes of the fee, perpetuity and exclusive use and possession." *Western Union Telegraph Co. v. Pennsylvania R.R.*, 195 U.S. 540, 570 (1904) (internal citations omitted).⁴ Railroad ROW grants were created by Congress beginning in the 1850s to encourage railroad construction and, by extension, the settlement of the west. *Great Northern Ry. Co. v. United States*, 315 U.S. 262, 273 (1942). The nature of individual ROW grants, however, is not uniform and depends upon the specific statute authorizing a particular grant. Initially, Congressional policy was to provide lavish grants of lands from the public domain; however, by 1872 this policy "incurred great public disfavor" causing Congress to provide more limited grants to facilitate railroad construction. *Id.* at 273-74. The 1875 Act provides in pertinent part:

Sec. 1. That the right of way through the public lands of the United States is hereby granted to any railroad company duly organized under the laws of any

² The Acting Assistant Secretary's conclusion was contained in a letter, dated January 13, 2009, which responded to a letter from Senator Feinstein of California inquiring about what federal approvals or environmental analyses would be necessary to allow the construction, operation and maintenance of the Cadiz Project. On June 30, 2009, Senator Feinstein requested that the Department review Opinion M-36964.

³ Neither this memorandum nor Opinion M-36964 addresses the questions of: (i) what interest the United States retains in railroad ROWs granted pursuant to the 1875 Act, or (ii) what happens to such ROWs after they are no longer in active use. The focus of this memorandum is on a railroad's rights within an active 1875 ROW.

⁴ The Court in *Western Union Telegraph* looked at the interrelationship between a railroad ROW act and an act giving certain eminent domain authorities to telegraph companies, not the scope of the 1875 Act.

State or Territory ... or by the Congress of the United States, which shall have filed with the Secretary of the Interior a copy of its articles of incorporation, and due proofs of its organization under the same, to the extent of one hundred feet on each side of the central line of said road; also the right to take, from the public lands adjacent to the line of said road, material, earth, stone, and timber necessary for the construction of said railroad; also ground adjacent to such right of way for station-buildings, depots, machine shops, side tracks, turn-outs, and water-stations, not to exceed in amount twenty acres for each station, to the extent of one station for each ten miles of its road.

Sec. 2. That any railroad company whose right of way, or whose track or road-bed upon such right of way, passes through any canyon, pass, or defile, shall not prevent any other railroad company from the use and occupancy of the said canyon, pass, or defile, for the purposes of its road, in common with the road first located, or the crossing of other railroads at grade. ...

Sec. 4. That any railroad-company desiring to secure the benefits of this act, shall, within twelve months after the location of any section of twenty miles of its road, if the same be upon surveyed lands, and, if upon unsurveyed lands, within twelve months after the survey thereof by the United States, file with the register of the land office for the district where such land is located a profile of its road; and upon approval thereof by the Secretary of the Interior the same shall be noted upon the plats in said office; and thereafter all such lands over which such right of way shall pass shall be disposed of subject to such right of way ...

18 Stat. at 482-83.

B. Canon Of Construction Applicable To Railroad ROW Grants

The established rule governing the interpretation of grants of federal lands holds that "public grants are construed strictly against the grantees" and that any doubts "are resolved for the Government, and not against." *Leo Sheep Co. v. United States*, 440 U.S. 668, 682 (1979). However, the Supreme Court has cautioned that this canon does not "apply ... in its full vigor to grants under the railroad acts." *Id.* Due to the unique nature of those grants, the Supreme Court has articulated a modified version of this familiar canon which states:

When an act, operating as a general law, and manifesting clearly the intention of Congress to secure public advantages, or to subserve the public interests and welfare by means of benefits more or less valuable, offers to individuals or to corporations as an inducement to undertake and accomplish great and expensive enterprises or works of a quasi public character in or through an immense and undeveloped public domain, such legislation stands upon a somewhat different footing from merely a private grant, and should receive at the hands of the court a more liberal construction in favor of the purposes for which it was enacted.

Id. at 683 (emphasis added). Nevertheless, while railroad ROW grants are to be liberally construed to carry out their purpose, they are still "subject to the general rule of construction that

any ambiguity in a grant is to be resolved favorably to a sovereign grantor – ‘nothing passes but what is conveyed in clear and explicit language.’” *Great Northern*, 315 U.S. at 272 (internal citations omitted); see also *United States v. Union Pacific*, 353 U.S. 112, 116 (1957) (“land grants are construed favorably to the Government, [such] that nothing passes except what is conveyed in clear language, and that if there are doubts they are resolved for the Government, not against it.”).

C. Prior Interpretations Of The 1875 Act

Consistent with the approach to statutory interpretation outlined above, the Supreme Court concluded that the 1875 Act “clearly grants only an easement, and not a fee [interest].” *Great Northern*, 315 U.S. at 271.⁵ The Court observed that the purpose of the 1875 Act was to “permit the construction of railroads through the public lands and thus enhance their value and hasten their settlement,” but expressly noted that “[t]he achievement of that purpose does not compel a construction of the right of way grant as conveying a fee title to the land ... [as] a railroad may be operated though its right of way be but an easement.” *Id.* at 272. The Court based its conclusion that the 1875 Act granted only an easement on two considerations.

First, the *Great Northern* Court looked to the text of the 1875 Act itself. It observed that “Section 1 [of the Act] indicates that the right is one of passage since it grants ‘the,’ not a, ‘right of way’ through the public lands.” *Id.* at 271. Similarly, the Court observed that Section 2 also supported the conclusion that the right conveyed by the 1875 Act was “one of use and occupancy only, rather than the land itself” based on its declaration “that any railroad whose right of way passes through a canyon, pass or defile ‘shall not prevent any other railroad company from the use and occupancy of the said canyon, pass, or defile, for the purposes of its road, in common with the road first located.’” *Id.* (emphasis in original). Finally, the Court found “especially persuasive,” the statement in Section 4 that “all such lands over which such right of way shall pass shall be disposed of *subject to* such right of way.” *Id.* (emphasis in original). The Court concluded that “[a]fter words to indicate the intent to convey an easement would be difficult to find,” because the “reserved right to dispose of the lands subject to the right of way is wholly inconsistent with the grant of a fee.” *Id.*⁶ The text of Section 4 is noteworthy because the railroad ROW statutes that preceded the 1875 Act contained no such provision. *Id.* at 278.

Second, the Court considered the legislative and policy changes that occurred contemporaneously with the passage of the 1875 Act. *Id.* at 272-77. The Court explained that prior to 1871 Congressional policy was geared towards “subsidizing railroad construction by lavish grants from the public domain.” *Id.* at 273. As a result, courts interpreting those pre-1871

railroad ROW statutes have concluded that they granted “limited fee” interests in the lands described by the ROWs. By the 1870s, however, “[t]his policy incurred great public disfavor,” and in 1872 the House adopted a resolution, dated March 11, 1872, which stated:

Resolved, That in the judgment of this House the policy of granting subsidies in public lands to railroads and other corporations ought to be discontinued, and that every consideration of public policy and equal justice to the whole people requires that the public lands should be held for the purpose of securing homesteads to actual settlers, and for educational purposes, as may be provided by law.

Id. at 273-74 (citing Cong. Globe, 42d Cong., 2d Sess., 1585 (1872)). Based on this change, after 1871 “outright grants of public lands to private railroad companies seem to have been discontinued.” *Id.* at 274. In its place, post-1871, Congress encouraged the “development[] of the Western vastnesses” through the 1875 Act by “grant[ing] rights to lay track across the public domain,” *Id.* at 274-75, but that the “right[s] granted ... [were] of use and occupancy only.” *Id.* at 270 (observing that Section 2 of the 1875 Act confirms this conclusion) and 275 (“It is improbable that Congress intended by [the 1875 Act] to grant more than a right of passage.”).⁷

The *Great Northern* Court also observed that its conclusion about the nature of the 1875 ROW grants was confirmed by the Department’s first interpretation of the Act, contained in the general ROW circular of January 13, 1888, 12 L.D. 423. *Id.* at 276. That circular concluded that “[t]he act of March 3, 1875, is not in the nature of a grant of lands; it does not convey an estate in fee, either in the ‘right of way’ or the grounds selected for depot purposes. It is a *right of use only*, the title still remaining in the United States.” 12 L.D. at 428 (emphasis added). This interpretation was confirmed in regulations adopted by the Department on May 21, 1909. 37 L.D. 787, 788 (“A railroad company to which a right of way is granted [under the 1875 Act] does not secure a full and complete title to the land on which the right of way is located. It obtains only the right to use the land for the purposes for which it is granted and for no other purpose.”).⁸ Lower courts have recently affirmed the more limited nature of the 1875 Act ROW grants. See *Home on the Range*, 386 F. Supp. 2d at 1017 (observing that Section 4 of the 1875 Act is wholly inconsistent with the grant of a fee interest); *Hash v. United States*, 403 F.3d 1308 (Fed. Cir. 2005) (same).⁹ And while the Supreme Court has questioned the need for *Great*

⁷ *Wyoming v. Andrus*, 602 F.2d 1379, 1382 (10th Cir. 1979) (“The 1875 Act is ... significant in that it reduced the quality of the grant to the railroads.”).

⁸ The *Great Northern* court did note that there had been a shift in the regulatory interpretation of the 1875 Act towards “describe[ing] the right as a ‘base or qualified fee’.” 315 U.S. at 276. The Court, however, dismissed that subsequent interpretation and did not “regard [it] ... as binding on the Department ... since it was impelled by what ... [the court] regard[ed] as inaccurate statements in [*Rio Grande W. Ry. Co. v. Stringham*, 239 U.S. 44, 47 (1915)].”.

⁹ Unlike the ROWs at issue in Opinion M-36964 and *Home on the Range*, the ROW at issue in *Hash* was found by the court to have been abandoned. See *Hash*, 403 F.3d at 1318; *Ellamae Phillips Co. v. United States*, 564 F.3d 1367, 1370 (Fed. Cir. 2009). As a result, one of the questions addressed by the court in *Hash* was what interest was retained by the United States in the 1875 Act ROW at issue there. While that specific question is outside the scope of this opinion, see note 3, the Federal Circuit has narrowed the reach of the holding in *Hash* to the specific facts of that case. See *Ellamae Phillips*, 564 F.3d at 1373-74. As noted below, other courts confronted with the same question as the Federal Circuit in *Hash* and *Ellamae Phillips* have concluded that the United States retains a reversionary interest in an 1875 Act ROW. See, e.g., *Idaho v. Oregon Short Line R.R. Co.*, 617 F. Supp. 207, 212 (D. Idaho 1985); *Marshall v. Chicago & Northwestern Transp. Co.*, 31 F.3d 1028, 1032 (10th Cir. 1994).

⁵ See also *Himonas v. Denver & R.G.W.R. Co.*, 179 F.2d 171 (10th Cir. 1949) (same). The dispute in *Great Northern* was whether the railroad or the United States retained the rights to the mineral estate underlying an 1875 Act ROW. The Supreme Court held that those rights were retained by the United States, based in part on its conclusion that an 1875 Act ROW was merely an easement. Prior to *Great Northern*, the Supreme Court had indicated that the 1875 Act conveyed a limited fee. *Rio Grande W. Ry. Co. v. Stringham*, 239 U.S. 44, 47 (1915). However, *Great Northern* explicitly overruled this interpretation, concluding that the *Stringham* decision was “inconsistent with the language of the [1875] Act, its legislative history, its early administrative interpretation and the construction placed on it by Congress in subsequent legislation.” *Great Northern*, 315 U.S. at 279.

⁶ This interpretation is also consistent with the Act’s legislative history. *Great Northern*, 315 U.S. at 272 n3 (citing Cong. Globe, 42d Cong., 2d Sess., 2137 (1872)) (the 1875 Act “grants no land to any railroad company”).

Northern's "easement" versus "limited fee" distinction, it has only done so in the context of resolving the question of which party held title to the mineral estate under a ROW granted pursuant to the Act of July 1, 1862, 12 Stat. 489. See *Union Pacific*, 353 U.S. at 119. After the *Union Pacific* decision, *Great Northern's* distinction between pre-1871 and 1875 Act ROWs remains relevant to determining what rights a railroad received under the 1875 Act relative to the government grantor.¹⁰

Based on the preceding, we conclude that the rights conveyed by the 1875 Act are narrower than the pre-1871 acts, contrary to Opinion M-36964's conclusion that a railroad received "an interest tantamount to fee ownership" in the 1875 Act ROWs. The implication of this conclusion and analysis of the rights that accompany an 1875 Act ROW are discussed in Section II below.

II. ANALYSIS

A. The Conclusions In Opinion M-36964 With Respect To The 1875 Act Are Inconsistent With The Act, Its Legislative History, Prior Interpretations, And The Applicable Canons of Statutory Construction

Opinion M-36964 addressed the specific question of whether MCI Telecommunications Corporation ("MCI") had to obtain a ROW grant or permit from the BLM in order to install a fiber optic communications line and associated equipment shelters within existing railroad ROWs granted to the Southern Pacific Transportation Co. ("Southern Pacific"), or its predecessors, under various railroad ROW acts.¹¹ Although Opinion M-36964 addresses the specific question presented by MCI and Southern Pacific, per its terms "it is intended to provide general guidance in similar situations." 96 I.D. at 439.

Opinion M-36964 concluded that railroad ROWs granted pursuant to the two pre-1871 railroad acts at issue "conveyed a 'limited fee' interest in the [ROW],"¹² and as such that those pre-1871 ROWs were "privately owned, except for reserved minerals, [and] not subject to the administrative jurisdiction of th[e] Department." 96 I.D. at 444-45, 450.¹³ With respect to the 1875 Act grants, Opinion M-36964 concluded that those grants carried with them "the right to

¹⁰ Similarly, while the significance of the shift in Congressional policy identified in *Great Northern* has been questioned in the academic literature, see, e.g., Darwin P. Roberts, *The Legal History of Federally Granted Railroad Rights-of-Way and the Myth of Congress's "1871 Shift"*, 82 U. COLO. L. REV. 85 (2011), the *Great Northern* court's analysis has not been rejected or questioned by subsequent courts.

¹¹ While MCI's line was primarily a commercial trunk line, a portion of its capacity was dedicated to the railroad.

¹² The limitations on the "limited fee" created by the pre-1871 grants are (i) that the mineral rights underlying them were reserved to the United States, and (ii) that they were subject to an "implied condition of reverter in the event that the company ceased to use or retain the land" for railroad purposes. 96 I.D. at 444.

¹³ Given the multitude of railroad ROW acts, especially pre-1871, it should be noted that the key factor in determining what rights a railroad has within a particular ROW is not determined by the date the ROW grant was issued, but rather by the terms and interpretation of the act establishing the grant. For purposes of this analysis, we do not disagree with the conclusions articulated by Opinion M-36964 with respect to the pre-1871 grants at issue there, but note that courts have found certain other pre-1871 grants to convey lesser interests. See, e.g., *Energy Transp. Sys., Inc., v. Union Pac. R.R. Co.*, 606 F.2d 934, 936-38 (10th Cir. 1979) ("*ETSI I*") (concluding that Section 2 of the Pacific Railroad Act of 1862 and 1864 conveyed a ROW only, while Section 3 conveyed a fee interest); *Energy Transp. Sys., Inc., v. Union Pac. R.R. Co.*, 619 F.2d 696 (8th Cir. 1980) ("*ETSI II*") (same).

exclusive use and occupancy of the land," such that the rights conveyed by those grants were "unlike an ordinary common-law easement ... [and were] tantamount to fee ownership." According to Opinion M-36964, the interest conveyed under the 1875 Act includes the right to authorize others to use the surface, subsurface, and airspace when not inconsistent with railroad operations, analogous to the authority available to the holders of the pre-1871 ROWs at issue. *Id.* at 447, 450, 451 (internal citation omitted). In reaching those conclusions, Opinion M-36964 overruled a July 5, 1985, memorandum and a February 24, 1986, letter by the Associate Solicitor, Energy and Resources, addressing a proposal by U.S. Telecom, Inc., to install a buried communications cable within railroad ROWs granted under the Act of July 1, 1862, and the 1875 Act. 96 I.D. at 440-41. The Associate Solicitor's 1985 memorandum had opined that such ROWs were surface easements; that the subsoil was unappropriated public land; and that the railroad could not authorize third parties to install buried systems in the subsoil, especially where such systems were not railroad-related. 96 I.D. at 440-41.

Opinion M-36964's conclusion with respect to the scope of an 1875 Act ROW grant has been the subject of some debate since its issuance, and was specifically criticized by the *Home on the Range* court. In that case, the court found that Opinion M-36964 "did not cite any law for th[e] proposition" that 1875 Act grants were tantamount to fee ownership and faulted the Opinion for "effectively ignor[ing] the Supreme Court's decision in *Great Northern*, which took pains to distinguish between the 'limited fee' granted by the pre-1871 statutes and the easements granted by later statutes." See *Home on the Range*, 386 F. Supp. 2d at 1022. To support its conclusions regarding the 1875 Act, Opinion M-36964 cited only two cases – *Great Northern*, 315 U.S. 262 and *Idaho v. Oregon Short Line R.R. Co.*, 617 F. Supp. 207 (D. Idaho 1985). Opinion M-36964's interpretation of those cases is incorrect.

Opinion M-36964 asserts that the Supreme Court in *Great Northern* confirmed "the significant rights of the 1875 Act grantees, i.e., use and occupancy ... [and] did not limit the grantees' rights to those of a common-law easement." 96 I.D. at 447 (emphasis in original). While we agree with the observation that an 1875 Act ROW is not akin to a common law easement, that observation does not, as M-Opinion 36964 concludes, mean that the rights in a ROW conveyed by the 1875 Act are the same as those conveyed by the pre-1871 railroad ROW acts. Without any analysis, Opinion M-36964 relies on *Great Northern's* acknowledgment that a railroad ROW is a unique property right to support the proposition that the 1875 Act grants an interest tantamount to a fee. 96 I.D. at 447. This leap is directly at odds with one of the express holdings of the case, namely that the 1875 Act conveys an easement and not a fee interest.

Opinion M-36964's reliance on *Oregon Short Line* is also misplaced. As the *Home on the Range* court explained, the *Oregon Short Line* case did not deal with the question of the scope of an 1875 ROW; rather, it addressed "only the use of the ... [ROW] itself." *Home on the Range*, 386 F. Supp. 2d. at 1019. The court in *Oregon Short Line* was asked to determine whether the United States retained a reversionary interest in an 1875 Act ROW pursuant to 43 U.S.C. § 912. In concluding that the United States retained such an interest, the court also affirmed that the 1875 Act did not "convey to the railroads a fee interest," but rather a ROW "suitable for railroad purposes," *Oregon Short Line*, 617 F. Supp. at 212. This holding is at odds with Opinion M-36964's characterization of the case as supporting its conclusion that the 1875 Act conveyed an interest "tantamount to a fee." 96 I.D. at 447.

Opinion M-36964 also relies on the following statement by Justice Frankfurter in his dissent in *Union Pacific* to support its analysis of the 1875 Act:

[Northern Pacific Ry. v. Townsend, 190 U.S. 267 (1903)] ... also serves to refute the suggestion that the railroad in its use of the right of way is confined to what in 1957 is narrowly conceived to be "a railroad purpose" ... The Court [in Townsend] recognized that the land could revert to the grantor only in the event that it was used in a manner inconsistent with the operation of the railroad ... Had Congress desired to make a more restrictive grant of the right of way, there would have been no difficulty in making the contingency for the land's reversion its use for any purpose other than one appropriately specified.

96 I.D. at 446 (emphasis in original) (quoting *Union Pacific*, 353 U.S. at 131-32). While Justice Frankfurter's statement in isolation suggests that railroad ROW grants are broad, it was made in the dissent in reference to a pre-1871 ROW grant, as Opinion M-36964 acknowledges. 96 I.D. at 446. Moreover, in the same dissent, Justice Frankfurter observed that the 1875 Act "was significantly different from the Act of 1862 and its companions" in terms of what they granted a railroad. *Union Pacific*, 353 U.S. at 127-130; see also *Home on the Range*, 386 F. Supp. 2d at 1022. Thus, Justice Frankfurter's dissent does not provide even implicit support for Opinion M-36964's conclusion with respect to the 1875 Act.

Finally, in addition to being unsupported by the case law, Opinion M-36964's construction of the 1875 Act is also inconsistent with the canons of construction holding that while railroad ROW grants are to be liberally construed with the respect to the purpose for which they were enacted, they are nevertheless still subject to the general rule that any ambiguities in grants of federal lands are to be resolved in favor of the United States. Opinion M-36964 reasoned that because 1875 Act grants carried with them "the right to exclusive use and occupancy of the land" that was "unlike an ordinary common-law easement," they therefore conveyed a property right "tantamount to fee ownership." 96 I.D. at 447, 450 (internal citation omitted). Opinion M-36964's interpretation of the scope of a railroad's "exclusive use and occupancy" of the surface and non-mineral subsurface of an 1875 Act ROW is inappropriate for two reasons. First, it impermissibly extends the scope of such ROW grants beyond the purposes for which the 1875 Act was enacted, namely the "construction of ... [a] railroad." 18 Stat. at 482. Second, Opinion M-36964's conclusion that a railroad's "exclusive use and occupancy" of an 1875 Act ROW allows it to undertake or authorize any activity that is *not inconsistent* with railroad purposes ignores judicial precedent which establishes that the railroad's "exclusive use and occupancy" is more limited – i.e., it extends only to activities that derive from or further a railroad purpose. By interpreting the 1875 Act as granting such broad rights, Opinion M-36964 construed it in a manner that is not favorable to the government in direct contradiction to the rule that grants of federal lands are to be construed strictly against the grantees. Moreover, Opinion M-36964's construction is inconsistent with the Act's text and legislative history. See Section I(C) above.

Based on the foregoing, we conclude that Opinion M-36964's interpretation of the 1875 Act is inconsistent with the Act itself, the applicable legislative history, Supreme Court precedents, and the applicable canons of statutory construction. As explained above, the purpose of the 1875 Act was to provide a ROW for "railroad purposes." Construing the 1875 Act, as we

must, in a manner most favorable to both the purposes for which it was enacted and to the Government, leads to the conclusion that a railroad's exclusive use and occupancy of such ROWs includes all those activities that either derive from or further a *railroad purpose* (see Section I above), but does not include, as Opinion M-36964 opines, rights that are "tantamount to a fee." See *Home on the Range*, 386 F. Supp. 2d at 1024. Therefore, we withdraw that portion of Opinion M-36964 that relates to the scope of the 1875 Act. The implications of this conclusion are addressed in the next section.

B. A Railroad's Authority To Authorize Other Activities Within An 1875 Act ROW Is Limited To Those Activities That Derive From or Further A Railroad Purpose

While the *Home on the Range* court confirmed that the scope of an 1875 Act ROW grant is limited to those activities that are "derived from or further a railroad purpose," 386 F. Supp. 2d at 1024, it did not attempt to define "railroad purpose." Section 1 of the Act sets forth a list of the rights accompanying the grant, including the "right to take, from the public lands adjacent to the line of said road, material, earth, stone, and timber necessary for the construction of said railroad; also ground adjacent to such right of way for station-buildings, depots, machine shops, side tracks, turn-outs, and water-stations." 18 Stat. at 482. While the general canon of statutory construction for grants of federal land would conclude that activities not expressly identified in that list would be prohibited, under the more liberal canon applied to railroad ROW grants courts have concluded that railroads were given as part of their authorization to construct, the right to conduct whatever activities would be necessary to construct and operate said railroad. Therefore, courts confronted with such questions examine the activity in question to determine whether it "derive[s] from or further[s] a railroad purpose"¹⁴ to determine whether it is within the scope of the ROW grant. *Home on the Range*, 386 F. Supp. 2d at 1024. Some courts and commentators refer to this inquiry as the "incidental use doctrine." See, e.g., *Mellon v. S. Pac. Transp. Co.*, 750 F. Supp. 226, 230 (D. Tex. 1990).

This inquiry starts with the basic premise that a railroad has the exclusive right to utilize the entirety of its ROW for the purposes of operating a railroad, which means "the free and perfect use of the surface of the land ... and ... as much above and below its surface as may be needed [to] ... further[] the business of the railroad." 65 AM JUR 2D RAILROADS § 75;¹⁵ *Mellon*, 750 F. Supp. at 230 ("[A] railroad may make many uses of its right-of-way including the building of side tracks, building, telegraph lines, and other structures necessary for its business.")

¹⁴ This is in contrast to ROWs granted under Title V of the Federal Land Policy and Management Act of 1976 ("FLPMA"), 43 U.S.C. §§ 1761, *et seq.*, where the scope of the grant is explicitly defined in the ROW grant itself.

¹⁵ Railroad operations include "the right to tunnel the land, to cut embankments, to grade and make roadbeds, and to operate and maintain a railroad with one or more lines of track with proper stations, depots, turnouts, and other appurtenances of a railroad," unless a particular activity is specifically prohibited under the terms of the grant. 65 AM JUR 2D RAILROADS § 75; see also 10-78A POWELL ON REAL PROPERTY § 78A.14; see also Section 1 of the 1875 Act, 18 Stat. 482. They also include the right to take material, earth, stone, and timber from the public lands adjacent to the roadbed that are necessary for the construction of the railroad. See, e.g., 18 Stat. at 482. And, while generally such ROWs included exclusivity of use, there are limitations on that exclusivity in the 1875 Act context. See Section 2 of the 1875 Act, 18 Stat. at 482 (stating that a railroad with a ROW through a canyon, pass, or defile, "shall not prevent any other railroad company from the use and occupancy of the said canyon, pass, or defile.").

(internal citations omitted);¹⁶ *Union Pac. Ry. v. Chicago, R.I. & P. Ry.*, 163 U.S. 564, 581 (1896); *ETSI v. Union Pacific R.R.*, 435 F. Supp. 313, 317 (D. Wyo. 1977), *aff'd*, 606 F.2d 934 (10th Cir. 1979) (a railroad may use its ROW for “all uses incidental to railroad purposes”). Determining whether an activity “derives from or furthers a railroad purpose” requires a fact specific case-by-case inquiry. Courts conducting such inquiries have allowed railroads to:

1. Run telephone lines (and previously telegraph lines) to “provide for communications between stations.” 10-78A POWELL ON REAL PROPERTY § 78A.14; *Home on the Range*, 386 F. Supp. 2d at 1021 (observing in dicta that an 1875 Act ROW included the right to install “telegraph or other communication technology for the purpose of facilitating the operation of the railroad itself.”);¹⁷ *see, e.g., St. Louis, Iron Mountain & S. Ry. Co. v. Cape Girardeau Bell Tel. Co.*, 114 S.W. 586, 587 (Mo. Ct. App. 1908) (same);¹⁸ *Grand Trunk R.R. Co. v. Richardson*, 91 U.S. 454, 468 (1876) (observing that it does not matter if the activity in question “may also be for the convenience of others” in addition to the railroad);¹⁹
2. Construct structures, such as commercial warehouses, where convenient, to facilitate the delivery of freight that may ultimately be shipped on the railroad. *See, e.g., Miss. Inv. Inc. v. New Orleans & N.E.R. Co.*, 188 F.2d 245, 247 (5th Cir. 1951) (concluding that a warehouse for receiving freight constructed within a railroad ROW easement was “consistent with the purposes for which the easements were acquired [i.e., railroad purposes].”);²⁰

¹⁶ The court in *Mellon* addressed a challenge to another segment of the same MCI fiber optic line at issue in Opinion M-36964. While the court in *Mellon* did not specifically characterize the nature of the railroad ROW grant at issue there, it held that the railroad had the authority to authorize the installation of the fiber optic line within its ROW because the line was incidental to railroad operations as it was used, in part, to provide communication capacity to the railroad. *See generally Mellon*, 750 F. Supp. at 230; *see also Long Beach v. Pac. Elec. Ry. Co.*, 283 P.2d 1036, 1038 (Cal. 1955) (“railroads may use their rights of way for certain commercial activities,” so long as “they contribute to the railroad’s business.”) (internal citations omitted).

¹⁷ It should be noted that in *Home on the Range*, the court specifically observed that AT&T offered no evidence to suggest that its fiber optic line in any way furthered the purpose of the railroad itself. 386 F. Supp. 2d at 1021.

¹⁸ The court in *Cape Girardeau*, construing a railroad’s rights within a state railroad ROW that had been deemed to grant an easement, stated that “telegraph and telephone are conveniences so essential, if not indispensable to the purposes of a railroad, that a railroad company may establish and construct one or both along the line of its right of way, to be used in the prosecution of its business in operating the road, and such use, essential as it is, is not an additional servitude upon the fee.” *Cape Girardeau*, 114 S.W. at 587, and that “the mere commercial use of the telephone under the circumstances mentioned, is entirely consistent and in no manner interferes with the railroad ... easement.” *Id.* at 590.

¹⁹ *Compare The Am. Tel. & Tel. Co. of Baltimore City v. Pearce*, 18 A. 910, 912 (Md. 1889) (“a line of telegraph on a railroad right of way is an additional burden, unless constructed for the use of the railroad company in the operation of its road and dispatch of its business.”) (internal citations omitted; emphasis in original), and *W. Union Tel. Co. v. Nashville, C. & St. L., Ry. Co.*, 237 S.W. 64, 89 (Tenn. 1921) (observing that a railroad company operating within a ROW easement was not “entitled to operate a commercial telegraph along its right of way entirely disconnected from its own business.”).

²⁰ *Grand Trunk*, 91 U.S. at 468; *Or. Short Line R. Co. v. Ada County*, 18 F. Supp. 842 (D. Idaho 1937) (same); *see also Solicitor’s Opinion M-36016, Lease of Railroad’s Station Grounds at Parker, Arizona* (1949) (recognizing that warehouses for receiving freight constitute a use incidental to railroad purposes); Railroad Right of Way – Lease for

3. String power lines. *Long Beach v. Pac. Elec. Ry. Co.*, 283 P.2d 1036 (Cal. 1955) (power lines necessary for operation of electric railroad);²¹ and

4. Construct combined bulk and retail oil facilities. *Mitchell v. Ill. Cent. R.R. Co.*, 51 N.E.2d 271 (Ill. 1943) (affirming construction of a facility within a railroad ROW easement for the receipt and shipment of bulk oil via the railroad, where such facility also sold oil to retail customers).

These precedents establish that railroads have the right to undertake a range of activities within their ROWs, including commercial activities, so long as the activity is derived from or furthers a railroad purpose consistent with the discussion above. A railroad’s right to undertake activities within an 1875 Act ROW includes the right to authorize other parties to undertake those same activities. *See, e.g., Grand Trunk*, 91 U.S. at 468 (“[I]f the [railroad] ... might have put up the buildings, why might it not license others to do the same thing for the same object ...?”). For example, in *Grand Trunk* the freight warehouse that was determined to be related to a railroad purpose was constructed by a third party under a license from the railroad. *See also Miss. Inv. Inc.*, 188 F.2d at 247 (a third party warehouse authorized by the railroad was “not so foreign to railroad purposes as to constitute [an] ... additional servitude not permissible under the right ... acquired for railroad purposes.”)²² Consistent with these cases, Opinion M-36964 affirmed that a railroad can authorize a third party to undertake any activity within a railroad ROW that the railroad itself would be able to undertake. 96 I.D. at 446;²³ *see also* Section II(C) below.

Based on the preceding, we conclude that Opinion M-36964’s assertion that a railroad has the broad authority to approve any activity within an 1875 Act ROW so long as it is not inconsistent with railroad operations, 96 I.D. at 450-51, is incorrect because it does not require a demonstration that such activities derive from or further a railroad purpose. Therefore, Opinion M-36964’s conclusion about the types of activities that may be authorized by a railroad in an 1875 Act railroad ROW is hereby withdrawn consistent with the analysis above. As a result, any activity undertaken or authorized by a railroad on public lands within an 1875 Act ROW that does not derive from or further a railroad purpose would require authorization from the Department.²⁴

Warehouse Purposes, 29 L.D. 569 (1900) (same); *Garry v. Atchison Topeka and Santa Fe Ry. Co.*, 378 P.2d 609 (NM 1889).

²¹ *Compare with Tompkins v. Atl. Coast Line. R. Co.*, 79 S.E.2d 41, 47 (Ga. Ct. App. 1953) (“The grant of an easement for railroad purposes does not include an easement for an electric-power transmission line, unconnected with the operation of the railroad.”) (internal citations omitted); *Muncie Elec. Light Co. v. Joliff*, 109 N.E. 433 (Ind. Ct. App. 1915) (same).

²² *See also Hartford Ins. Co. v. Chicago, M. & S.P. Ry.*, 175 U.S. 91, 99 (1899); *Chicago, R.I. & P. Ry.*, 163 U.S. at 581; *Mitchell*, 51 N.E.2d at 275.

²³ Opinion M-36964’s conclusion with respect to the authorization of third party activities by a railroad is not affected by this withdrawal of the 1875 Act portion of that Opinion.

²⁴ *See, e.g., infra* notes 19 and 21; *see also ETSI II*, 619 F.2d at 700 (concluding that the State of Nebraska’s interest in the subsurface of the servient estate underlying a railroad ROW was sufficient to “permit the state to convey to ETSI a pipeline easement” underneath the railroad ROW). We would note that in circumstances where the authority to undertake or authorize a specific activity lies with the servient estate owner, and not the railroad, such an activity

C. Implications Of This Memorandum For The Activities Specifically Referenced In Opinion M-36964

Based on this withdrawal of Opinion M-36964's conclusion with respect to the 1875 Act, we analyze the implications of the withdrawal on the activities specifically addressed in Opinion M-36964. As noted above, Opinion M-36964 considered the specific question of what approvals, if any, MCI had to obtain from the BLM in order to install a fiber optic communications line and associated facilities along Southern Pacific's railroad ROWs across BLM-administered lands, including ROWs granted pursuant to: (i) the Act of July 27, 1866, 14 Stat. 292; (ii) the Act of March 3, 1871, 16 Stat. 573; and (iii) the 1875 Act. As explained above, this Opinion does not alter the conclusions of Opinion M-36964 with respect to the 1866 or 1871 act ROWs.

With respect to the fiber optic line installed along Southern Pacific's 1875 ROW, we find that the outcome reached by Opinion M-36964 was correct, namely that the installation of the line was within the scope of the railroad's authority to authorize, but that the basis given for that conclusion, as set forth above, was incorrect. MCI demonstrated that its fiber optic line, in addition to providing commercial communication services, also furthered railroad operations. Prior to the issuance of Opinion M-36964, MCI provided a letter to the Department from Southern Pacific which stated that Southern Pacific "will use the fiber optic capacity it receives from MCI to improve the efficiency of its own communications systems, and thereby improve the safety of its operations."²⁵ Such evidence demonstrates that MCI's line furthered, at least in part, a railroad purpose, as required by the incidental use doctrine, and therefore, Southern Pacific had the authority to approve the installation of MCI's line in its ROW across BLM-administered lands without approval from the Department.

III. CONCLUSION

Based on the foregoing analysis, we withdraw that portion of Opinion M-36964 containing conclusions with respect to the scope of a railroad's authority within an 1875 ROW.²⁶ This withdrawal is based on our findings that:

- Opinion M-36964's conclusions with respect to the activities that a railroad may undertake, or authorize others to undertake, within an 1875 Act ROW are not consistent with the Act, the relevant legislative history, prior interpretations of the Act, or the

cannot interfere with the railroad's use of the ROW for railroad purposes. See, e.g., *ETSI I*, 606 F.2d at 938; *ETSI II*, 619 F.2d at 696 n. 4, 697.

²⁵ Letter from Southern Pacific Transportation Company, Roger W. Pearson, to Steven P. Quarles, Crowell & Moring, counsel for MCI, dated Mar. 28, 1988; Memorandum from S. Quarles, Crowell & Moring, on Behalf of MCI, to the Solicitor of the Department of the Interior, "MCI's Buried Fiber Optic Line Use of the Southern Pacific Right-of-Way Requires No FLPMA Permit from Interior" (undated) (on file with author) (arguing, in part, that MCI's fiber optic line is allowed without BLM approval under the incidental use doctrine); see also 96 I.D. at 439 (observing that the MCI line "further[s] railroad purposes").

²⁶ The subsurface/surface distinction in the Associate Solicitor's 1985 memorandum, which had been overruled by the 1875 Act portion of Opinion M-36964, has not been reinstated by this memorandum, because that distinction is not relevant to determining what can, or cannot, be undertaken within an 1875 Act ROW. As stated above, the key question is whether or not the activity in question has a railroad purpose or is derived from or furthers such a purpose.

established rules that railroad ROW grants are liberally construed in favor of the purposes for which they were enacted, but otherwise are subject to the general rule that grants of lands from the public domain are construed strictly against the grantee and that any doubts as to the scope of the grant are resolved for, and not against, the Government; and

- A railroad's authority to undertake or authorize activities within an 1875 Act ROW is limited to those activities that derive from or further a railroad purpose.

The BLM should exercise its discretion under Title V of FLPMA to determine the extent to which development actions within 1875 Act ROWs have been taken in reliance on Opinion M-36964. The BLM should, in light of this Opinion, evaluate those prior actions on a case-by-case basis. Such evaluations should consider the relationship of those prior actions to railroad purposes, as outlined above, in order to determine what actions, if any, need to be taken with respect to such ROW activities. BLM may prioritize these evaluations through its ongoing inventory of resources on the public lands.²⁷


Hilary E. Tompkins

²⁷ This Opinion was prepared with the substantial assistance of Dylan Fuge and Michael Hickey in the Solicitor's Office.



United States Department of the Interior

BUREAU OF RECLAMATION
Lower Colorado Regional Office
P.O. Box 61470
Boulder City, NV 89006-1470

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IN REPLY REFER TO:

LC-2620
ENV-6.00

FEB 02 2012

VIA ELECTRONIC MAIL

Mr. Tom Barnes
Environmental Science Associates
626 Wilshire Boulevard, Suite 1100
Los Angeles, CA 90017

Subject: Notice of Availability of Draft Environmental Impact Report (EIR) for Cadiz Valley
Water Conservation, Recovery, and Storage Project (Project)

Dear Mr. Barnes:

Thank you for the opportunity to review the draft EIR for the Project. The Bureau of Reclamation has no comments on the document. Please keep us on your mailing list for Project updates.

1

If you have questions regarding this letter please contact Ms. Faye Streier, National Environmental Policy Act Coordinator, at 702-293-8132 or fstreier@usbr.gov.

Sincerely,


 Valerie E. Thomas, Chief
Resources Management Office



United States Department of the Interior

NATIONAL PARK SERVICE
Mojave National Preserve
2701 Barstow Road
Barstow, CA 92311



IN REPLY REFER TO:
L7621 (MOJA)

February 13, 2012

Tom Barnes, ESA
626 Wilshire Blvd., Suite 1100
Los Angeles, CA 90017

Re: *National Park Service Comments to Draft Environmental Impact Report for the Cadiz Valley Water Conservation, Recovery and Storage Project.*

Dear Mr. Barnes:

By Notice of Availability (NOA) dated December 5, 2011, the Santa Margarita Water District (SMWD), as the Lead Agency, informed interested parties that it had prepared a Draft Environmental Impact Report (Draft EIR) pursuant to the California Environmental Quality Act (CEQA) for the *Cadiz Valley Water Conservation, Recovery, and Storage Project* (Project), and invited comments on the Draft EIR to be submitted by February 13, 2012. The SMWD, along with other participating water agencies acting as Responsible Agencies, is proposing to implement the Project in partnership with Cadiz Inc. (Cadiz), which owns approximately 34,000 acres of land located in the Cadiz and Fenner Valleys of San Bernardino County, and the Fenner Mutual Water Company (FMWC), a non-profit California mutual water company formed to deliver water at cost to its shareholders that are public water systems who will purchase water from the Project.

The following letter and attachments constitute the complete set of comments of the National Park Service (NPS) and the Mojave National Preserve (Preserve). A brief summary is provided below of the NPS's main issues and concerns with this document as it moves forward in the CEQA process toward a Record of Decision. Most of the NPS's concerns center on the sustainability of the Project. Consolidated general and specific comments provided on the attached comment forms describe these main issues and concerns, as well as others, in more detail.

ISSUE #1: Most of the non-Project related groundwater recharge studies conducted in the study area indicate that natural recharge to the Fenner and Bristol Valleys likely ranges from 2,000 to 10,000 acre-feet per year and that the Project's recharge estimate is 3 to 16 times too high. Given the amount of recoverable groundwater that the Project is seeking to extract from these two watersheds, the NPS is concerned that the proponent is substantially overestimating the amount of natural precipitation recharging the groundwater basins in these two valleys. As noted in the NPS's March 29, 2011 scoping comments letter to this EIR, this is the same trend that was observed with the former Cadiz Project back in the early 2000s and is counter to most of the realistic recharge estimates presented by other studies in the area. The NPS's concern is best demonstrated by a comparison of recharge (and discharge) estimates from past and current Cadiz Project investigators with recharge estimates from other independent investigators presented in

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the table below. The reported estimates are based partially on a summary table of recharge study results presented in earlier revised EIS comments submitted by Dr. John Bredehoeft, Ph.D, (HydroDynamics Group, 2001) for the former Cadiz Project and reprised in the NPS's March 29, 2011 scoping comments letter to this EIR.

METHODOLOGY/AUTHOR	RECHARGE ESTIMATES (acre-feet/year)	
	Other Investigators	Cadiz Investigators
1. Watershed Runoff Modeling		
MWD & BLM (1999) – <i>Cadiz Project I</i>		20,000 – 70,000
CH2M Hill (2010) – <i>Cadiz Project II</i>		32,000
2. Groundwater Modeling		
Geoscience (1999) – <i>Cadiz Project I</i>		50,000
CH2M Hill (2010) – <i>Cadiz Project II</i>		32,400
3. Maxey/Eakin Method		
USGS (2000)	2,550 – 11,200	
Durbin (2000)	5,000	
LLNL (2000) – <i>Cadiz Project I</i>		16,200 – 29,200
4. Fenner Gap Groundwater Flow		
Friewald (1984 – USGS)	270	
Geothermal Surveys (1984) – <i>Cadiz Project I</i>		18,000 – 36,000
Todd (1984) – <i>Cadiz Project I</i>		11,000
LaMoreaux (1995)	3,700	
USGS (2000)	2,600 – 4,300	
5. Chloride Mass Balance Method (correctly applied)		
USGS (2000)	1,700 – 9,000	
Durbin (2000)	2,000	
6. Drawdown Associated with Cadiz Co. pumping		
Boyle Engineering (1996)	4,000	
7. Evaporative Discharge from Dry Lake Areas (estimated using rates from other studies in region)		
CH2M Hill (2010) – <i>Cadiz Project II</i>		6,000 – 42,000
NPS	4,700 – 7,800	
Range of Estimates:	270 – 11,200	6,000 – 70,000
Mean Estimate ⁽¹⁾ :	4,100	30,500

⁽¹⁾ Where a range of values is given, the mean of the range was taken as one value, and then this value was averaged with all other estimates to arrive at the "mean value" reported.

To put this into perspective, consider that the Death Valley Regional Groundwater Flow System drains an area of about 15,800 square miles in Nevada and southern California, and includes 30

hydrographic basins (USGS, Harrill and Prudic, 1998, Prof Paper 1409-A). Groundwater discharge by evapotranspiration from the floor of Death Valley, the terminal discharge from the Death Valley Regional Groundwater Flow System, was estimated by the USGS at approximately 35,000 AFY (DeMeo and others, 2003, Water Resources Investigation Report 2003-4254). By comparison, the drainage area of the four Cadiz project watershed(s) totals 2,320 square miles, which is a much smaller drainage area than the Death Valley system. All else equal, the contributing area to the Death Valley Regional Groundwater Flow System is roughly 7 times larger than the contributing area to the Cadiz Project, suggesting that the annual recharge (and discharge) from the Project area should be on the order of 5,000 AFY.

The project proponent's estimates of the annual recharge (and discharge) for the Cadiz project watershed in the range of 30,000 AFY are not reasonable and should not even be considered. The recharge estimates provided in 2000 by the USGS in its technical review of the former Cadiz Project, which were computed by a variety of methods, ranged from 2,000 – 10,000 AFY. These values, computed by a scientific agency with no financial stake in the proposed project, peer-reviewed and made available to the public, provide a reasonable range of recharge estimates for the Project area. This range of values should be used to guide evaluation of the proposed Cadiz Project.

ISSUE #2: It is inappropriate to conclude "a priori" that all springs in the watershed area are hydraulically discontinuous with the target aquifer. The SMWD presents a brief reconnaissance study in the Draft EIR of potential effects on springs and seeps from groundwater pumping by the Project concluding, unsurprisingly, that springs are not connected to the target aquifer and thus will be unaffected by the Project. Available evidence indicates that some springs within Mojave National Preserve likely are hydraulically continuous with the aquifer that is the target of the subject groundwater development, and that other springs within the Preserve likely are not hydraulically continuous with this aquifer. In the absence of more conclusive, site-specific studies, it would be inappropriate to conclude "a priori" that all springs in the area are hydraulically discontinuous with the target aquifer. To resolve this uncertainty, the NPS requests that a study of selected springs within Mojave National Preserve be a component of any proposed Monitoring and Management Plan.

ISSUE #3: An alternative Project scenario limiting pumping in the watersheds to the perennial yield amount would likely increase the conservation efficiency of the Project, decrease adverse impacts in the project watersheds, and allow Cadiz to achieve many of their Project objectives and "Green Compact" stewardship principles. Pumping in excess of the perennial yield of the basin under the currently proposed project pumping scenarios increasingly exacerbates mining of groundwater, as evidenced by the three pumping schemes that were simulated. Capture of groundwater that is ultimately destined for the dry lake areas could likely be achieved through a less aggressive pumping scheme that would not withdraw groundwater in excess of the perennial yield of the basin, and if the current objective of trying to

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maximize the retrieval of fresh groundwater that is already down-gradient of the proposed wellfield is abandoned.

ISSUE #4: The hydrologic analysis in the Draft EIR is technically deficient with respect to constraining the Project recharge estimate through physical measurement and quantification of groundwater discharge from the playa areas. Data are presented that indicate extensive evaporation from the playa is unlikely, including reports of water depths beneath Bristol Dry Lake ranging from 8 to 35 feet, which would require an unrealistic capillary rise to support a discharge of 32,000 AFY. The NPS demonstrates through extrapolation of results from a USGS study of groundwater discharge rates in Death Valley (which compensates for the effect of surface water runoff to soil evaporation) that total groundwater discharge from the dry lakes (and therefore, recharge to the Project area) is probably on the order of 4,650 to 7,750 AFY at best. This estimated range falls within the range of recharge (2,000 to 10,000 AFY) provided by the USGS in 2000. As noted in the NPS's March 29, 2011 scoping comments letter to this EIR, estimates of groundwater discharge need to be verified through physical measurements of soil evaporation at the dry lake sites and groundwater levels beneath the dry lakes. Quantification of water loss off of these two dry lakes is extremely important - this is the limiting factor on the amount of recharge entering the flow system and how much recoverable water is available for the project. If it is shown that the amount of soil evaporation occurring at the dry lake areas is small or negligible, then the Project's claim to being sustainable must be rejected.

ISSUE #5: The distributed parameter watershed model INFIL3.0 likely is over-estimating recharge in the Project watersheds. Based on a recent USGS study near Joshua Tree, CA that utilized an earlier version of the INFIL3.0 distributed-parameter watershed model, a numerical flow model and several supporting field techniques, coupled with the Cadiz Project's over-reliance on the INFIL3.0 watershed model results without additional supporting field data to constrain the recharge estimates, it is likely that the Cadiz project's recharge estimates using INFIL3.0 could be larger than the true recharge by a factor of 2 to 10 times. The NPS also suspects that the Fenner Basin watershed model may be under-estimating the amount of evapotranspiration and surface water runoff occurring in the basin, all of which contributes to an over-estimation of the amount of water infiltrating past the root zone.

ISSUE #6: The ability of the numerical groundwater flow model to accurately simulate groundwater discharge by evapotranspiration is questionable. Model water balance results suggest that the model is not producing annual volumes of evapotranspiration discharge equivalent to the amounts of recharge going into the model. The NPS estimates that the model is only discharging 76% of the 32,000 AFY of recharge going into the model. The NPS is also concerned with how the model estimates evapotranspiration discharge, when the existing pre-pumping depth to water (18 feet) beneath Bristol Dry Lake already exceeded the extinction depth of 15 feet prior to simulating any of the pumping/recharge scenarios. The USGS has also shown in a study from nearby China Lake that the annual rate of evaporation from bare soil decreased to

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negligible amounts at water-level depths of more than 7 feet below land surface, thus calling into question the validity of the extinction depth established for the model.

ISSUE #7: The SMWD has failed to adequately consider inclusion of monitoring and mitigation measures developed under the earlier Cadiz Project, and to adequately demonstrate the effectiveness of certain current mitigation measures proposed to address pumping-related impacts. As noted in the NPS's March 29, 2011 scoping comments letter to this EIR, the SMWD should consider the relevancy of the mitigation measures that were developed and proposed under the former Cadiz Project and determine which measures might have utility to this EIR. The NPS recommends that the principal features of that plan be adopted, including a participatory role for the potentially affected parties (like the NPS), establishment of an array of "early-warning" monitoring wells between the proposed project pumping and Mojave National Preserve, and "action criteria" to trigger consideration of mitigation measures as effects are observed over time. With all the inherent uncertainty that exists on groundwater projects such as this, it is imperative that the project proponent practice adaptive management of their project, with coordination and input from their neighbors, the potentially affected parties.

Additionally, the NPS is not convinced that the SMWD has sufficiently demonstrated the effectiveness of several key mitigation measures to be able to conclude that the direct and cumulative impacts to groundwater and surface water resources would be less than significant with mitigation and would not be cumulatively considerable. The SMWD needs to better demonstrate and discuss the potential effectiveness of these important corrective measures in the EIR document using existing and/or additional groundwater modeling simulations that test these corrective measures.

CONCLUSIONS

While the NPS is concerned about the SMWD's broad characterization of natural evapotranspiration processes as "wasted water," we are not averse to the concept of recovering groundwater that naturally discharges to the atmosphere if it is not destructive of natural ecosystems, nor are we averse to the concept of using an aquifer to store surplus surface water supplies and extracting these stored supplies during dry years, as long as (1) the Project adopts and adheres to a hydrologic sustainable yield concept, and (2) the Project does not directly or indirectly affect water resources, water-dependent resources, and other natural and cultural resources within NPS park units. Based on several deficiencies with the current analysis presented in the Draft EIR, the NPS recommends that additional refinements be made in the Final EIR that provide a more accurate representation and evaluation of the groundwater flow system, the affected environment, and the effectiveness of proposed mitigation measures. Much of this can be accomplished using additional scientific methods to better constrain the recharge estimate of the study area. Until these refinements are made, the NPS is not confident concluding that the proposed Cadiz Project is sustainable and protective of park resources.

Thank you for the opportunity to provide comments on this Draft EIR. For any clarification or follow up regarding our comments, please contact Debra Hughson, Science Advisor, Mojave National Preserve at (760) 252-6105.

Sincerely,



Stephanie R. Dubois
Superintendent

cc:

PWRO-REC per Alan Schmierer
Bill Hansen - WRD
Bill Van Liew - WRD
Gary Karst - PWR
Debra Hughson - MOJA

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Agency	NATIONAL PARK SERVICE
Offices	Mojave National Preserve (MOJA) NPS Pacific West Region (PWR)

GENERAL COMMENTS

1.	The Project appears to be unsustainable from the perspective of a sufficient supply of water and power. It appears that the two most important aspects of this project, water and power, do not exist in sufficient supply at the site to support a “sustainable” project. The power supply involves consumption of natural gas and/or upgrade and installation of transmission lines (whose environmental effects are not considered), while the water supply involves removing groundwater from storage (mining). Given the amount of recoverable groundwater that the Project is seeking to extract from these two watersheds, the NPS is concerned that the proponent is substantially overestimating the amount of natural precipitation recharging the groundwater basins in these two valleys. The project proponent’s estimates of the annual recharge (and discharge) for the Cadiz project watershed in the range of 30,000 AFY are not reasonable and should not even be considered. The recharge estimates provided in 2000 by the USGS in its technical review of the former Cadiz Project, which were computed by a variety of methods, ranged from 2,000 – 10,000 AFY. These values, computed by a scientific agency with no financial stake in the proposed project, peer-reviewed and made available to the public, provide a reasonable range of recharge estimates for the Project area. This range of values should be used to guide evaluation of the proposed Cadiz Project. For both of these resources, the project appears to be unsustainable.	9 10
2.	It is inappropriate to conclude “a priori” that all springs in the watershed area are hydraulically discontinuous with the target aquifer. The SMWD presents a brief reconnaissance study in the Draft EIR of potential effects on springs and seeps from groundwater pumping by the Project concluding, unsurprisingly, that springs are not connected to the target aquifer and thus will be unaffected by the Project. Available evidence indicates that some springs within Mojave National Preserve likely are hydraulically continuous with the aquifer that is the target of the subject groundwater development, and that other springs within the Preserve likely are not hydraulically continuous with this aquifer (written communication from William Van Liew, Hydrologist, NPS Water Resource Division, February 10, 2011). In the absence of more conclusive, site-specific studies, it would be inappropriate to conclude “a priori” that all springs in the area are hydraulically discontinuous with the target aquifer. To resolve this uncertainty, the NPS requests that a study of selected springs within Mojave National Preserve be a component of any proposed Monitoring and Management Plan.	11
3.	An alternative Project scenario that limits pumping in the watersheds to the perennial yield amount would likely increase the conservation efficiency of the Project, decrease adverse impacts in the project watersheds, and allow Cadiz to achieve most of their Project objectives and “Green Compact” stewardship principles. The EIR describes a groundwater mining project, where in all scenarios groundwater is pumped in excess of the most optimistic estimate of recharge. The only factor preventing long-term dewatering of the aquifer is the assumption that the project will end in 50 years and natural recovery will occur afterwards. Pumping in excess of the perennial yield of the basin under the currently proposed project increasingly exacerbates mining of groundwater, as evidenced by the three pumping schemes that were simulated where 18,000 to 45,000 AFY of groundwater would be mined annually. Conservation efficiencies (defined by the NPS as the ratio of water conserved to water mined) for the Project over the 50-year pumping period currently range from an efficiency of 1.2:1 to 1:10. Capture of groundwater that is ultimately destined for the dry lake areas could likely be achieved through a less aggressive	12

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	pumping scheme that would not withdraw groundwater in excess of the perennial yield of the basin, if the current objective of trying to maximize the retrieval of fresh groundwater that is already down-gradient of the proposed wellfield is abandoned. This alternative should be evaluated further under the Alternatives Analysis in the Final EIR.
4.	Clarification is needed on how the “Green Compact” Stewardship Principles will be incorporated into the Proposed Project. Under the “Green Compact” agreement with the Natural Heritage Institute (NHI), Cadiz has committed to manage their property and develop projects in accordance with several Stewardship Principles, some of which appear to be associated with the Proposed Project being evaluated in this draft EIR. The NPS respectfully requests that the SMWD provide more details about how these Stewardship Principles will be incorporated into the Proposed Project. In particular, the NPS would like more details presented on the following Stewardship Principles: Long-term Sustainability Pledge, Renewable Energy Commitment, Groundwater Banking, Groundwater Management Principles, Independent Resource Evaluation Study, and Local Priority of Water Use.
5.	The hydrologic analysis in the EIR is technically deficient with respect to constraining the Project recharge estimate through physical measurement and quantification of groundwater discharge from the playa areas. This project is predicated on the capture of groundwater “wasted” to evaporation. This assertion is repeated at least 13 times in the first three chapters of the EIR yet very little convincing data are presented to show that this discharge actually exists. On the other hand, data are presented that indicate extensive evaporation from the playa is unlikely. This includes reports of depth to water beneath Bristol Dry Lake ranging from 8 to 12 feet at salt production trenches to 35 feet (Appendix F4), and water levels on the northeast edge of the playa greater than 85 feet. Thus the project proponents need to show how evaporation from the playa could be occurring from a capillary rise of this magnitude. The draft EIR weakly demonstrates through use of NDVI analysis and extrapolation of playa evaporation rates generated from nearby studies that groundwater may be discharging from the dry lake areas on the order of 6,000 to 42,000 AFY. However, these methods do not compensate for the contribution to soil evaporation from the dry lakes due to surface water runoff, and therefore, likely over-estimate the amount of discharge that might be occurring. The NPS has demonstrated through extrapolation of results from a USGS study of groundwater discharge rates in Death Valley (which compensates for the effect of surface water runoff to soil evaporation) that total groundwater discharge from the dry lakes is probably on the order of 4,650 to 7,750 AFY at best. In any case, estimates of groundwater discharge need to be verified through physical measurements of soil evaporation at the dry lake sites and groundwater levels beneath the dry lakes, which was a recommendation by the USGS in its review of the former Cadiz Project, and requested by the NPS in its scoping comment to the current Cadiz Project. To date, physical measurement of groundwater discharge has not been performed.
6.	The hydrologic analysis is incomplete with respect to providing plausible, additional lines of evidence that support the recharge estimate presented in the EIR. The analysis has neglected to provide additional lines of evidence that would support the optimistically high recharge estimate. In addition to verifying the recharge estimate through physical soil evaporation measurements and groundwater level measurements at and beneath the dry lakes, other lines of evidence that might help to support or refute the proposed recharge estimate include performing a chloride mass balance of precipitation and groundwater to estimate recharge, and isotopic age-dating analysis of the groundwater to estimate whether groundwater recharge has occurred in recent or ancient times. Both of these methods were attempted under the original version of the Cadiz Project, but were incorrectly applied leading to questionable results. Based on corrections applied by the USGS to these methods at that time, recharge estimates using the chloride mass balance approach were calculated to range from 1,700 to 9,000 AFY. Original results of carbon ¹³ /carbon ¹⁴ age dating analyses from the Fenner Basin indicated uncorrected groundwater ages ranging from 11,500 to 14,000 years before present, while corrected ages presented by the USGS ranged from 5,500 to 10,600 years before present. Similar isotopic age-dating of groundwater from surrounding basins indicate uncorrected ages ranging from about 3,000 to 32,000 years before present. Results from these other analysis methods all suggest a much lower recharge rate for this portion of the Mojave Desert than is proposed in the EIR. The SMWD should assimilate these earlier lines of evidence and/or require the project proponent to conduct follow-up supporting studies, and discuss the results in the final EIR.
7.	The hydrologic analysis ignores important considerations about the hydrologic setting in the Project watersheds. The SMWD has elected not to quantify the amount of recharge assumedly coming from the western, southern and eastern portions of the Bristol and Cadiz watersheds, which is also expressed in the watershed and numerical modeling analyses, as these areas have been excluded from the model domains. The SMWD explicitly states that only partial recharge estimates are being used in the modeling analyses, and that this unaccounted recharge may be substantial enough to reduce the predicted drawdown in the current

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	simulations. The NPS views exclusion of these other watershed regions and recharge sources as a serious flaw in the current hydrologic analysis and respectfully requests the hydrologic influences from these areas to be accounted in the watershed and numerical modeling simulations, and the results discussed accordingly in the EIR document. The SMWD should also endeavor to better understand the hydraulic connectivity of the carbonate rock unit encountered in the subsurface at the Fenner Gap with carbonate rock outcroppings occurring throughout the rest of the watershed. Given statements that the full extent, potential yield and storage capacity of the carbonate aquifer has not been fully quantified at this time, additional hydrogeologic investigations need to be conducted and the results need to be discussed in the final EIR document to better resolve these uncertainties, especially since Project pumping is targeted for the carbonate aquifer.	16 cont.
8.	The Project over-estimates the area contributing recharge to Fenner Gap. Recharge is estimated for the entire Fenner watershed, which includes the New York Mountains, and assumes that all of this recharge flows south to Fenner Gap. The modeling report also cites a USGS Water Resources Investigations Report by Friewald, D.A. (1984. Report 83-4082) but apparently disregarded its conclusions. The Friewald Report (Plate 1) shows groundwater in the southwesterly portion of Lanfair Valley flowing eastward towards Piute Gorge and not south to Fenner Gap. As a result, the project overestimates the area contributing recharge to Fenner Gap since, according to the USGS report, recharge in the New York Mountains, Woods Mountain, and Hackberry Mountain discharges to Piute Spring and does not flow to Fenner Gap. The NPS's analysis of water level data in the NWIS database supports this conclusion.	17
9.	The distributed parameter watershed model may be over-estimating recharge in the Project watersheds by a factor of 2 to 10 times. A recent USGS study near Joshua Tree, CA utilized an earlier version of the INFIL3.0 distributed-parameter watershed model and a numerical flow model, along with several field techniques such as the installation of instrumented boreholes in washes to measure recharge by stormflow infiltration, and isotopic water analyses to determine the likely age of the groundwater. Results of the distributed-parameter watershed model indicated most of the recharge in the study region likely occurs from periodic infiltration of stormflow runoff, and that 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 these areas. It was concluded the simulated total annual recharge by stormflow runoff estimated by the watershed model was 2 to 10 times greater than the measured total annual stormflow runoff. Based on the results of the nearby Joshua Tree area study, its close proximity to the Cadiz study area, and the Cadiz Project's over-reliance on the INFIL3.0 watershed model results without additional supporting field data to constrain the recharge estimates, it is likely that the Cadiz project's recharge estimates using INFIL3.0 could be over-estimated by a factor of 2 to 10 times. Based on this USGS study, the NPS also suspects that the Fenner Basin watershed model may be under-estimating the amount of ET and surface water runoff occurring in the basin, all of which contributes to an over-estimation of the amount of water infiltrating past the root zone.	18
10.	The ability of the numerical groundwater flow model to accurately simulate groundwater discharge by evapotranspiration is questionable. It is unclear in the discussion whether or not the maximum ET rates reported for the model represent the ET rates prior to simulating Project pumping, a constant ET rate used throughout the modeling simulations, or if the ET rate varies as water levels decline (as would be expected). If these maximum rates represent constant, pre-pumping ET rates, then they would seem to generate too much ET discharge from those portions of the model domain setup to accommodate ET discharge. Conversely, model water balance results suggest that the model is not producing annual volumes of ET discharge equivalent to the amounts of recharge going into the model. The NPS estimates that discharge by ET at Year 117 in the model (full recovery) would be 24,641 AFY, which is approximately 76% of what Cadiz stated should be occurring (i.e., 32,425 AFY). Without starting water balances to confirm the amount of pre-pumping ET occurring in the model simulations, this observation calls into question how well the model is able to simulate the natural flow system. The NPS is also concerned with how the model estimates ET discharge as water levels approach and drop below the assumed extinction depth. It appears in the model that the existing pre-pumping depth to water (18 feet) beneath Bristol Dry Lake already exceeded the extinction depth of 15 feet prior to simulating any of the pumping/recharge scenarios. Furthermore, the USGS has also shown in a study from nearby China Lake that the annual rate of evaporation from bare soil decreased to negligible amounts at water-level depths of more than 7 feet below land surface, thus calling into question the validity of the extinction depth established for the model. If this is correct, the NPS does not see how the model could simulate discharge of groundwater by ET from the Bristol Dry Lake area of the model.	19
11.	The SMWD has failed to adequately consider inclusion of monitoring and mitigation measures developed under the earlier Cadiz Project, and to adequately demonstrate the effectiveness of certain current mitigation measures proposed to address pumping-related impacts. The SMWD should	20

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	<p>consider the relevancy of the mitigation measures that were developed and proposed under the former Cadiz Project and determine which measures might have utility to this EIR. The NPS recommends that the principal features of that plan be adopted, including a participatory role for the potentially affected parties (like the NPS), an array of “early-warning” monitoring wells between the proposed project pumping and Mojave National Preserve, and “action criteria” to trigger consideration of mitigation measures as effects are observed over time. With all the inherent uncertainty that exists on groundwater projects such as this, it is imperative that the project proponent practice adaptive management of their project, with coordination and input from their neighbors, the potentially affected parties. Additionally, the NPS is not convinced that the SMWD has sufficiently demonstrated the effectiveness of several key mitigation measures to be able to conclude that the direct and cumulative impacts to groundwater and surface water resources would be less than significant with mitigation and would not be cumulatively considerable. Implementing corrective measures such as a reduction or cessation in pumping, redistribution of pumping locations, or an injection and/or extraction scheme to manage the migration of hyper-saline water from the dry lake areas may be ineffective or not as effective as originally presumed. The SMWD needs to devote more analysis and discussion on the groundwater level recovery analysis conducted and its implications on determining the potential effectiveness of corrective measures such as reduction or cessation of pumping. The SMWD also needs to better demonstrate and discuss the potential effectiveness of these important corrective measures in the EIR document using existing and/or additional groundwater modeling simulations that test these corrective measures. If the existing and/or additional modeling simulations reveal that these mitigations measures are ineffective or less effective at addressing adverse drawdown and water quality impacts than originally presumed, then the SMWD cannot claim that direct and cumulative impacts to groundwater and surface water resources would be less than significant with mitigation and would not be cumulatively considerable.</p>

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ES-2		MOJA	Closed basin – the northeast boundary of the Fenner watershed passes through the alluvial basin of Lanfair Valley. The very probable flow of groundwater across this boundary through the alluvial sediments of the Lanfair Valley basin would invalidate the closed basin assumption.	21
ES-2		MOJA	In the sentence, “The proposed conservation (capture of evaporation) is not dependent upon future rainfall, snow pack or the needs and demands of others: the groundwater is already in storage” the EIR appears to confuse two fundamental aspects of groundwater hydrology – storage and flow.	22
ES-3		MOJA	“...long-term sustainable operations.” How is it that a project to extract more groundwater by pumping than is replaced by recharge and that would result in a declining water table can be termed “sustainable”? In addition, how does the term “sustainable” apply to the use of natural gas to power the pumps?	23
1-4	Sect. 1.2.3	PWR	1 st paragraph: It is stated that “participating entities may join the Project at any time until the established Project capacity is reached.” Please define what the established Project capacity is (50,000 afy, 75,000 afy?) as part of this discussion.	24
2-5	Sect. 2.3.2	MOJA	Rational for not triggering NEPA – The document cites a DOI Solicitor opinion that no further authorizing is needed “as long as new activities derive from or further a railroad purpose” but does not explain how groundwater extraction and conveyance infrastructure is either derived from or furthers a “railroad purpose” other than to say that the railroad has signed onto the project.	25
2-5	Sect. 2.3.3	PWR	<p>On the surface, the “Green Compact” that Cadiz and the Natural Heritage Institute (NHI) signed in 2009 is commendable, but it is unclear from the discussion what the nexus is between this Green Compact and the Proposed Project. Under this agreement, Cadiz has committed to manage their property and develop projects in accordance with several Stewardship Principles, some of which appear to be associated with the Proposed Project being evaluated in this draft EIR. The NPS respectfully requests that the SMWD provide more details about how these Stewardship Principles will be incorporated into the Proposed Project. In particular, the NPS would like more details presented on the following Stewardship Principles:</p> <ul style="list-style-type: none"> • <u>Long-term Sustainability Pledge.</u> How does long-term sustainability apply to the groundwater development being conducted under the Proposed Project? It would appear the Project is removing an annual amount of groundwater from storage that would substantially exceed the estimated perennial yield of the aquifer system, thus creating a long-term, unsustainable overdraft condition in the aquifer. • <u>Renewable Energy Commitment.</u> In the press release by Cadiz for this pledge, it is stated that “Cadiz will make up to 20,000 acres of land available and provide a reliable water supply for the development of photovoltaic and solar thermal technologies,” which is different from what is stated in the draft EIR. If this is true, what is the source of the water supply (existing agricultural water, Proposed Project water, other water) that will be provided by Cadiz? If solar thermal technologies are being considered, this could potentially represent another substantial demand on the groundwater supply in the project area. Please clarify this Stewardship Principle and its relationship to the Proposed Project. • <u>Groundwater Banking.</u> In the press release by Cadiz, it is stated that “Cadiz will seek to develop a groundwater banking operation for irrigation, solar, municipal water supply, environmental restoration, and other beneficial uses,” which is different from what is stated in the draft EIR. Is this groundwater banking pledge related to the Imported Water Storage Component of the Proposed Project or separate? Please provide more details on this particular aspect of the Green Compact 	26

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			<p>pledge, how it relates to the Proposed Project, and how it will be achieved.</p> <ul style="list-style-type: none"> • <u>Groundwater Management Principles</u>. This Stewardship Principle was identified in the press release by Cadiz, but was not included in the list of Stewardship Principles presented in Section 2.3.3. In the press release, it is stated that “Cadiz will promote the optimal, long-term, and sustainable use of its water resources and manage the groundwater supply in a manner that will not result in environmental harm. Through its water bank, the company will promote restoration of unrelated aquatic ecosystems currently impaired by water development.” Please provide more details on this particular aspect of the Green Compact pledge, how it relates to the Proposed Project, and how it will be achieved. • <u>Independent Resource Evaluation Study</u>. Please replace the description of this Stewardship Principle in the draft EIR with the more detailed description presented in the press release by Cadiz, which states that “Cadiz will complete a study of available water resources including precipitation, aquifer recharge, total quantities of groundwater in storage, and the safe quantity of dewatered storage that may be made available for a conjunctive use project without harming the underlying aquifer system or ecosystems that depend upon it.” The more detailed description provides the reader a better understanding of studies to which Cadiz is committing under the Green Compact pledge. With respect to the more detailed description, why was an evaluation of the amount of natural discharge from the aquifer omitted from the study? Characterizing the natural discharge from the aquifer is critically important to constraining the aquifer recharge estimate and characterizing the “safe quantity of dewatered storage that may be made available for a conjunctive use project without harming the underlying aquifer system or ecosystems that depend upon it.” • <u>Local Priority of Water Use</u>. Please replace the description of this Stewardship Principle in the draft EIR with the more detailed description presented in the press release by Cadiz, which states that “the highest priority of water use will be given to reasonable and beneficial uses on the overlying property, including but not limited to agriculture, domestic, environmental or solar power uses.” Based on this description, it appears the thrust of this Stewardship Principle is to give priority to the use of the groundwater on the overlying Cadiz property, which seems at odds to the stated purpose of the Proposed Project – exporting an average annual amount of 50,000 acre-feet of groundwater from the project basin to be used in the Los Angeles metropolitan area. Please provide more details on this particular aspect of the Green Compact pledge, how it relates to the Proposed Project, and how it will be achieved.
3-2	Sect. 3.1.1	PWR	3 rd paragraph: In the discussion at the end of this paragraph about “carry-over storage,” please clarify if there are any limitations on how much water can be carried-over and for how long. In the event that all of the participants elect to forego their entire annual water delivery for one or more years, how will this affect the operation of the groundwater extraction wells? Will the system be shut down during such a period?
3-2	Sect. 3.1.1	PWR	4 th paragraph: At the bottom of page 3-2, it is stated that “Withdrawal of water for this Project component would be limited to a maximum of 75,000 AFY of water in any given year...” Please clarify if this amount takes into consideration the delivery of carry-over storage that might be used in a given year.
3-4	Sect. 3.1.1	PWR	4 th paragraph: The discussion in this paragraph focuses on the potential use of one or more unused natural gas pipelines that exist in the Project area that may be converted for use as a water conveyance facility under the Imported Water Storage Component of the Project. Please indicate whether or not these unused pipelines cross federal lands and if so, whether their use as a water conveyance

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			facility instead of a gas/oil conveyance facility precipitates an environmental review under the National Environmental Policy Act (NEPA), since this was not their intended use. Additionally, please clarify if these pipelines have been used in the past to convey natural gas or oil. If so, please speak to the possibility of contaminating any water that might be conveyed through them under the Project and how this concern would be addressed in this discussion and the one presented on pages 3-41 and 3-42.	29 cont.
3-6	Sect. 3.2	PWR	1 st partial paragraph: At the top of page 3-6, it is generally stated that 3 MAF of groundwater presently held in storage between the proposed wellfield and the Dry Lakes will become saline and lost to evaporation over the next 100 years, and that by strategically managing groundwater levels, the Project could conserve up to 2 MAF of this water before it is lost to evaporation. The NPS believes this discussion to be incomplete and should also recognize the results of the two other recharge scenarios that were evaluated. If annual recharge to the Project area is closer to 5,000 AFY, as many other investigators in the area have indicated, no cumulative net water savings will be realized, but rather a cumulative depletion (mining) of storage of approximately 1.4 MAF will occur over this 100-year period (see Table 4.9-11). As a result, the discussion on page 3-6 and elsewhere in the document should be revised to recognize the possible range of water conservation and depletion that might occur from the Project, depending on which estimate of recharge one believes to be more plausible.	30
3-7	Sect. 3.3.1	MOJA	The northwest boundary of the Fenner watershed with the Lanfair watershed (specifically the line that connects the New York Mountains with Vontrigger Hills) is not a topographical boundary but appears to be approximately perpendicular to the elevation contour lines. Thus it is incorrect to say that the watersheds are a “topographically-closed drainage system”. On 1-m NAIP imagery surface drainages can be seen crossing the watershed boundary from the Fenner basin into the Lanfair basin, so likely groundwater is as well.	31
3-9	Sect. 3.3.2	PWR	3 rd paragraph: The discussion in this paragraph mentions that “natural recharge in the Watersheds has been the subject of several studies since 1970,” but no further discussion is presented summarizing the results from these earlier studies. Instead, the discussion focuses solely on the most recent work by CH2M Hill, who was contracted by Cadiz for this Project. By focusing solely on one study and neglecting other studies, the SMWD is biasing the EIR toward a specific set of results. Please revise the discussion on page 3-9 and elsewhere in the EIR document to address this issue.	32
3-9	Sect. 3.3.3	PWR	In the discussion under Section 3.3.3, the NPS requests that the EIR document address the possibility of interbasin groundwater flow from Cadiz Valley into Chuckwalla Valley. This issue has come up in a couple of recent EIRs/EISs that have been conducted for solar energy projects in Chuckwalla Valley. These EIRs/EISs have cited some sources that suggest groundwater may be flowing from Cadiz Valley into Chuckwalla Valley, which would raise concerns about this groundwater being tributary to the Colorado River, and other sources that suggest this interbasin flow is not likely occurring. The NPS requests that the SMWD further investigate and discuss the possible hydrologic connection between these two valleys in the EIR document, and if necessary, conduct additional field investigations to determine this possible connection, prior to finalizing the EIR.	33
3-10	Sect. 3.4.1 Groundwater Pumping Operations	PWR	3 rd paragraph: The discussion in this paragraph focuses on the reasons why it is necessary to pump groundwater in excess of the natural recharge rate. The NPS strongly disagrees with the SMWD’s evaluation that it is necessary to pump beyond the natural recharge rate (i.e., perennial yield) of the basin to achieve the objectives of the project. Based on the two reasons presented in the discussion, the NPS contends that proposed pumping beyond the perennial yield is largely needed to achieve the second objective, which is to pull back and recover the fresh groundwater that is already down-gradient of the proposed wellfield and on its way to the	34

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			<p>dry lake areas. The NPS contends that pumping beyond the perennial yield of the basin does not outweigh the potential negative trade-offs (e.g., increased drawdown and depletion of groundwater storage) that come with trying to retrieve the down-gradient groundwater that “has already left the station” in all practicality. The NPS’s contention is largely supported by the information presented at the end of the 3rd paragraph, which bears closer examination. While this excessive pumping might optimistically “conserve” 1.36 MAF of groundwater destined to be naturally evaporated over a 50-year operational period, what is not mentioned is that out of the 2.5 MAF of groundwater that will be withdrawn during this 50-year period, approximately 1.14 MAF of it represents mining of other groundwater in storage. Comparison of the amount of groundwater conserved (1.36 MAF) to the amount of groundwater mined from the aquifer (1.14 MAF) indicates a 1.2:1 tradeoff ratio of water conserved to water mined. This trade-off comparison potentially worsens if the recharge is on the order of 5,000 AFY, as suggested in an earlier NPS comment for page 3-6. Under this lower recharge scenario, only 221,000 AFY of groundwater would be “conserved” out of the 2.5 MAF of groundwater that will be withdrawn during this 50-year period, meaning that 2,279,000 AF of this total pumped volume represents mining of groundwater in storage. This represents a 1:10 tradeoff ratio of water conserved to water mined. In either case, the NPS is concerned about the conservation efficiency of the Project (defined by the NPS as the ratio of water conserved to water mined) and requests the SMWD to evaluate and discuss this in more detail in the final EIR.</p> <p>Capture of groundwater that is upstream of the wellfield and ultimately destined for the Dry Lakes could likely be achieved through a less aggressive pumping scheme that would not withdraw groundwater in excess of the perennial yield of the basin. An approach that limits <u>total</u> pumping in the basin to the perennial yield amount would likely increase the conservation efficiency of the Project, reduce drawdown impacts in the basin, and allow Cadiz to achieve many of the Stewardship Principles they have pledged to meet under the Green Compact, especially long-term sustainability. Additionally, by foregoing the objective of trying to maximize the retrieval of fresh groundwater that is already down-gradient of the proposed wellfield and on its way to the Dry Lakes area, this same down-groundwater would help to act as a buffer to slow the possible migration of highly saline groundwater from the Dry Lakes toward the project wellfield. The NPS requests that the SMWD investigate the potential positive trade-offs that this alternative approach provides to the Project in the final EIR.</p>
3-10	Sect. 3.4.1 Groundwater Pumping Operations	MOJA	Regarding the last sentence on this page, “Over the Project’s 50-year operational period, greater pumping rates in excess of natural recharge are expected to generally result in higher conservation benefits.” The NPS believes the more accurate term is “interception” as in the interception of natural discharge by groundwater pumping. Nothing is “conserved” by water table drawdown, but any evaporative discharge might be more efficiently intercepted.
3-10 & 3-13	Sect. 3.4.1 Groundwater Pumping Operations	PWR	The NPS is concerned that the statements made in the last paragraph on page 3-10 and the first paragraph on page 3-13 are not corroborated by supporting information. As noted by the NPS in the preceding comment for page 3-10, the project does not appear to be very efficient in conserving evaporating groundwater, when it was demonstrated that the amount that is conserved in the 50-year operating period (1.36 MAF) is nearly equal to the amount of groundwater that was mined from storage (1.14 MAF) during this same period. If additional groundwater modeling simulations were conducted to evaluate the maximum efficiency of “conserving” groundwater in storage destined to be evaporated, please provide a summary of these results as part of this discussion, so that the reader can verify the claims being made. If more detailed information is presented elsewhere in the EIR document to substantiate

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			these claims, please provide a reference in this discussion indicating where this information is discussed. Additionally, the SMWD's definition of conservation efficiency has not been clearly established and appears to be based on maximizing the capture or retrieval of groundwater destined for evaporation regardless of pumping impacts such as excessive water level drawdown and depletion of aquifer storage. Please provide your definition of conservation efficiency in the final EIR document so the reader has better context on which to evaluate the statements in these two paragraphs. The NPS strongly recommends adopting a definition and pumping approach that optimizes retrieval of evaporated groundwater while minimizing groundwater mining and other the pumping-related impacts.	36 cont.
3-14	Sect. 3.4.1 Groundwater Operations for Conservation and Recovery Component and Imported Water Component	PWR	The discussion in the second paragraph on page 3-14 focuses on several reasons why the proposed approach is greatly preferred to a strategy of implementing the Imported Water Storage Component alone. The NPS is confused by some of this reasoning and respectfully requests the SMWD to provide further clarification of the reasoning in the final EIR document in the following areas. In the first reason presented, how much steeper would be the groundwater gradient resulting from artificial recharge mounding versus the gradient of the cone of depression created by dewatering of the aquifer under Phase 1 of the Project, and has this claim been substantiated by some form of analysis (e.g., groundwater modeling)? Intuitively, it would seem that dewatering would produce a steeper gradient, thus accelerating the flow of the artificially recharged water down-gradient at a rate greater than the gradient produced by the mounding. The second reason presented appears to be an extraneous argument, as Phase 1 of the Project presumably will proceed even if Phase 2 doesn't. Therefore, the conserved water from Phase 1 would be put to beneficial use regardless of whether Phase 2 of the Project is implemented or not. In the third reason presented, if the groundwater gradient produced by dewatering under Phase 1 is steeper than that produced solely by mounding of artificially recharged water introduced during Phase 2, couldn't the participants have the same problem of having to find a short-term beneficial use for this artificially recharged water if it is migrating faster downgradient than just under mounding conditions? This would seem especially true during extremely wet periods when artificial recharge to the aquifer would be expected to increase due to presumed availability of surplus surface water supplies, coupled with reduced demand for the "conserved" groundwater resulting from the increased availability of remaining surface water supplies that would meet demands during these wet periods.	37
3-15	Sect. 3.4.2	PWR	3 rd paragraph: The discussion at the end of this paragraph states that "Without the benefit of the drawdown in the proposed wellfield and the resulting hydraulic control, the Storage and Recovery phase would face the challenge of incurring substantial losses." Has this "substantial loss" been quantified by the SMWD? If so, please provide an estimate of these losses. Additionally, assuming there would be no Phase 1 to the Project, couldn't these losses be controlled using the interceptor wellfield that presumably would be in place to extract this water and recycle the water back to the infiltration basins for re-introduction into the aquifer? Presumably, the interceptor wellfield would be designed to provide enough hydraulic control to assure the stored water isn't lost to evaporative loss.	38
3-16	Sect. 3.4.3 Overview	PWR	In the last paragraph on page 3-16, reference is made to a Technical Review Panel (TRP) that would be established to review data reports and propose management refinements to the Lead Agency. Please provide additional discussion indicating whether this is a hydrologic TRP that is envisioned and what stakeholders might comprise the TRP.	39
3-17	Figure 3-4	PWR	The NPS requests that the boundary of the Mojave National Preserve be represented on Figure 3-4 and all other appropriate figures in the EIR document which illustrate lands included within the boundary of the Preserve. This helps the NPS and the public to understand the proximity of the Project to the NPS park units. Additionally, please indicate the location of Bristol Dry Lake on	40

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			Figure 3-4 and all other figures that depict this dry lake. Bristol, Cadiz and Danby Dry Lakes should be identified accordingly on all relevant figures and maps to help the reader understand where the project is located relative to these features.	40 cont.
3-19	Sect. 3.4.3 Groundwater Monitoring	PWR	The discussion under this heading indicates that a total of 15 existing observation wells would be used to monitor groundwater levels, but inspection of Figure 3-4 shows the locations at least 25 existing observation wells. Is the plan to only utilize a subset of the existing observation wells or was this statement made in error? Additionally, the discussion states that four observation well clusters would be installed. However, Figure 3-4 shows the location of five proposed monitoring wells, not including the two previously mentioned proposed monitoring wells to be installed outside the Project area. Are only four of these five proposed monitoring well locations going to be installed as well clusters, or is this statement in error? Please clarify these apparent discrepancies in the final EIR document. This concern also applies to a similar discussion presented at the bottom of page 3-40 and the top of page 3-41.	41
3-19	Sect. 3.4.3 Land Subsidence Monitoring	PWR	The discussion indicates that the location of a network of 22 land survey benchmarks to be installed can be found on Figure 3-4. Examination of the figure shows this network of benchmarks has not been depicted on the figure as stated in the text. Please correct this discrepancy.	42
3-26	Sect. 3.6.1 Project Wellfield	PWR	In the first paragraph at the top of page 3-26, it is stated that well pumps are assumed to operate 24 hours a day, 365 days a year. This operation would appear to contradict an earlier statement at the bottom of page 3-13, which states that pumping under Phase 1 of the Project would be conducted over a period of 10 months each year (approximately 83% operational). It also contradicts statements in Appendix H (Vol. 1, page 46) that assumed wells in Well Configurations A and B would be 70% operational. Please address and make any necessary revisions to clarify the apparent contradictions in the expected operational capacity (100%, 83% or 70%) of the Project wells.	43
3-39 and	Appendix D	MOJA	It appears that there are unresolved issues in supplying power to the well pumps. On page 3-39 information is presented that indicates three power supply options are being examined, with the preferred not yet selected. The first is all natural gas but the Power Requirements Analysis (Appendix D, page 8 of 15) says that this option is unrealistic due to cost and maintenance. The second option is a combination of on-site solar panels and natural gas engines. However, the Power Requirements Analysis (Appendix D, page 10 of 15) says that all of the electrical transmission would have to be installed at "full capacity regardless, as it would have to be available when solar was not producing." The third option is all electric power, requiring an upgrade of existing lines with possibly construction of a new substation and, as mentioned in the Power Requirements Analysis (Appendix D, page 6 of 15), "an easement through Bureau of Land Management (BLM) land from the pumping plant to the new pipeline alignment along the ARZC railroad." If upgrades to existing lines, substation construction, or a new easement to power the pumps require NEPA analysis by the BLM, the project proponents would need to explain why this would not trigger NEPA for the entire project. Upgrades and construction associated with powering the project are not included in this EIR and thus the cumulative environmental effects analysis for the project is incomplete.	44
3-40	Sect. 3.6.1 Observation Wells	PWR	The discussion in the paragraph at the bottom of page 3-40 incorrectly states that Figures 3-6a and 3-6b identify the location of the observation wells called out in the text. The locations of these wells are found on Figures 3-4 and 3-5. Please correct the text.	45
3-42	Sect. 3.6.2 Water	PWR	In the discussion in the paragraph at the bottom of page 3-42, please provide clarification to the reader whether or not the State of California or the County of San Bernardino require the imported water that will be artificially recharged into the aquifer to be treated	46

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	Conveyance Pipeline Extension		before its introduction underground. Some states and/or local governments in the western U.S. have laws that require such water to be treated to prevent accidental contamination of the aquifer. If this is a requirement for this Project, how will this be achieved under the current plan?	46 cont.
3-45	Sect. 3.6.2 Spreading Basins	PWR	4 th paragraph: The discussion in this paragraph describes the general operation of the spreading basins that will be used to artificially recharge the imported water under Phase 2 of the Project. At this time, does the SMWD know what the expected infiltration rate(s) might be for the spreading basins? If so, please provide an estimate(s) and how it was derived, as part of this discussion.	47
4-9.2	Sect. 4.9.1 Watersheds Fig. 4.9.1	MOJA	The text and the figure are inconsistent again in saying that Fenner is a topographically bounded drainage. You can clearly see from the figure the watershed boundary perpendicular to the contour lines and from NAIP imagery you can see surface flow features (arroyos) flowing out of Fenner and into Lanfair. Groundwater from Lanfair flows eastward to Piute Gorge, outflows at Piute Spring, and into Piute Valley.	48
4.9-2	Sect. 4.9.1 Watersheds	PWR	1 st and 3 rd paragraphs: In the discussions about the Fenner Watershed and the Orange Blossom Wash, the NPS requests the SMWD to note in the discussion that much of the upland portions of these two watersheds are contained within the Mojave National Preserve, and that the boundary of the Preserve be demarcated on Figure 4.9-1 and all other pertinent figures in the EIR document where the Preserve would be represented in the field of view. This will make it easier for the public to understand that the Preserve represents a critical resource to be protected and that the Project has the potential for impacting critical resources in the Preserve's including water resources.	49
4.9-8	Figure 4.9-2	PWR	The NPS requests expansion of the field of view presented in Figure 4.9-2 to include a view of all the project watersheds. It is asserted in the associated discussion on page 4.9-7 that this map shows that annual precipitation ranges from 4 inches in the Cadiz Valley (on the map) to 12 inches in the New York Mountains (off the map). As a result, the reader cannot independently confirm this assertion by referring to the current figure.	50
4.9-9 & 4.9-10	Sect. 4.9-1 Relationship of Precipitation to Elevation	PWR	The discussion under this heading refers to an observation by Davisson and Rose (May, 2000) that precipitation versus elevation is higher east of the 116° W longitude than west of it. The NPS is unclear as to the relevance of this observation to the Project, as it seems that the SMWD is relying on estimates of precipitation generated from PRISM. Is this observation incorporated into PRISM estimates? How much higher is the precipitation and how far east of this longitude do the effects become pronounced? Please clarify in the discussion the importance of this observation by Davisson and Rose and its applicability to estimating precipitation (and presumably recharge) in the Project watersheds. Additionally, please provide supporting data in the EIR document so that the reader can substantiate this observation.	51
4.9-11	Sect. 4.9-1 Climate Change	PWR	2 nd paragraph: The discussion in this paragraph notes "mountain recharge of groundwater basins may decline due to thinning snowpack and precipitation falling as rain rather than snow. In contrast, while mountain recharge may decline, much of this recharge water may run off onto the region's fans and basins and potentially increase recharge on fans and groundwater basin floors." Please clarify what is meant by these statements as they are somewhat confusing and contradictory. Is mountain recharge meant to be different from the more commonly recognized term of mountain-front recharge? It is generally recognized by most hydrologists that mountain-front recharge is the dominant groundwater recharge process in the Great Basin. Under this process, the amount of snowpack accumulation in the watershed is largely the driver for determining the amount of water that will runoff and be recharged on fans and groundwater basin floors. If snowpack will be thinned and precipitation falls more as rain instead of snow, it would seem	52

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			the runoff would be more susceptible to direct evaporation (due to the presumed warmer temperatures) and uptake and transpiration by vegetation that might normally be buried by the snowpack, and therefore, less runoff would be available to recharge fans and groundwater basin floors.
4.9-15	Sect. 4.9-1 Climate Change	MOJA	The lower recharge runs of 16,000 and 5,000 AFY were done to account for uncertainty in present day recharge but in this section are used again to account for recharge reduction due to climate change drying. It seems to be a poor form of analysis to use simulations for one source of uncertainty to account for another as the sources of uncertainty are cumulative, not interchangeable.
4.9-15 through 4.9-18	Sect. 4.9-1 Dry Lakes (Playas)	PWR	<p>The environmental setting for dry lake playas lacks discussion on natural groundwater evaporation rates that can be expected from dry lake playas like Bristol and Cadiz Dry Lakes. The NPS respectfully requests that the SMWD provide additional context on this subject by including additional discussion on reputable scientific studies in the area that have attempted to quantify the amount of bare soil evaporation rate one might expect from these two dry lake playas. One of the biggest technical deficiencies that the NPS sees with the hydrologic analysis presented in the draft EIR is that the recharge estimate proposed by Cadiz, Inc. (32,000 AFY) is unconstrained by an attempt to physically measure and quantify the amount of natural discharge occurring as direct evaporation from these dry lake surfaces. Including a discussion of existing studies in the region that have quantified such evaporation rates from dry lake playa surfaces and extrapolating these results to these two dry lake playas would be a good start at trying to constrain the proposed recharge estimate. There appears to be some discussion along this line that is buried in Appendix H (Vol. 2, Appendix A, pages 4-9 & 4-10) that could be reprised in this discussion. In its earlier review of the former Cadiz Project, the USGS recommended that contribution to soil evaporation from the dry lakes due to surface water runoff not be neglected, as it has been under the current and former version of the Cadiz Project. One study that would have application to this discussion was a 1997 to 2001 study by the USGS (Water Resources Investigation Report 2003-4254) which estimated groundwater discharge by evapotranspiration from the floor of Death Valley. This study estimated, in part, the annual groundwater discharge rates from salt-encrusted playa areas (0.13 feet) and from bare soil playa areas (0.15 feet), which compensated for the contribution to soil evaporation from the dry lakes due to surface water runoff. If one uses the Death Valley study number for the evaporation rate from salt-encrusted playa areas (0.13 foot per year), and multiplies that by the estimated total area of the dry lake playa surfaces estimated by the SMWD (approximately 59,650 acres), the estimated maximum groundwater discharge by direct evaporation for the playa surfaces is 7,750 AFY or about 387,700 AF over the 50-year project period. If the described puffy surfaces on these playas represent the areas where capillary water action (i.e., active evaporation) is occurring and these puffy surfaces occur on about 60 percent of the playa surfaces [see Appendix H (Vol 2, Appendix A, Section 2.1.4 - Dry Lakes (Playas))], then the estimated groundwater discharge by direct evaporation for the playa surfaces is reduced to 4,650 AFY or about 232,600 AF over the 50-year project period. Both estimates are considerably less than the Project's assumed discharge estimate of 32,000 AFY (1.6 MAF over 50 years) and therefore, calls into question the accuracy of Cadiz, Inc.'s unconstrained recharge estimate.</p> <p>These comparative study estimates of evaporative discharge should be further supported by physical soil evaporation measurements at the dry lake sites and groundwater level measurements beneath the dry lakes, which was a recommendation by the USGS in its review of the former Cadiz Project, and requested by the NPS in its scoping comment to the current Cadiz Project to conclusively demonstrate the amount of groundwater discharge is actively occurring at these dry lake areas. The USGS noted in their previous</p>

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			review that the project proponent's discharge estimate in their groundwater flow model (50,000 ac-ft/yr) was unreasonable on the basis of the depth to water (estimated to be 10 feet or greater) and soil characteristics beneath the dry lake areas. The NPS has similar concerns with the current groundwater, which are addressed in a later NPS comment. To address this concern, the USGS recommended installation of multiple depth monitoring wells to determine the depth of water beneath the dry lakes, and the use of energy-budget methods or salt crust accumulation methods to better quantify the water loss off of the dry lakes. Physical quantification of water loss off of these two dry lakes is extremely important - this is the limiting factor on the amount of recharge entering the closed flow system and how much recoverable water is available for the project. To date, physical measurement of groundwater discharge has not been performed.	54 cont.
4.9-19	Sect. 4.9.1 Springs	PWR	In the discussion under Springs, it is stated that there is no observed hydraulic continuity between groundwater in fractured granitic bedrock where the springs exist and the regional groundwater table of the alluvial aquifer. It is stated later on page 4.9-31 under the discussion about Aquifer Parameters that within the Fenner Gap area, the alluvial units and the carbonate unit are in hydraulic continuity with each other. Given this observed hydraulic connection and the apparent intent to pump from the alluvial and carbonate aquifers in this area, please provide additional discussion about the possibility of such pumping affecting springs in the watersheds that might be sourced from the carbonate aquifer unit in the final EIR. One area of concern for the NPS could be springs and seeps in the vicinity of Mitchel Caverns, which is a known karst limestone area located in the Providence Mountains within the Mojave National Preserve and the Providence Mountains State Recreation Area. The SMWD should endeavor to better understand the hydraulic connectivity of the carbonate rock unit encountered in the subsurface at the Fenner Gap with the carbonate rock outcroppings occurring throughout the rest of the watershed and in the Providence Mountains. Given the statement presented on page 4.9-23 that the full extent, potential yield and storage capacity of the carbonate aquifer has not been fully quantified at this time, additional hydrogeologic investigations need to be conducted and the results need to be discussed in the final EIR document to better resolve these uncertainties.	55
4.9-20	Fig. 4.9-3	PWR	The hydrologic study area boundary on Figure 4.9-3 appears to be different from the watershed boundaries shown in Figure 1-1. In particular, the western half of the Bristol Watershed boundary represented in Figure 1-1 appears to be excluded from the hydrologic study area boundary represented in Figure 4.9-3 and several other subsequent figures showing the hydrologic study area boundary. Please explain why there is a discrepancy between the watershed boundary and the hydrologic study area boundary, and correct this discrepancy if it is in error.	56
4.9-22 to 4.9-24	Sect. 4.9-1 Hydro- geologic Units	PWR	In the discussion about Hydrogeologic Units, it is stated that there are three principal formations or aquifers in the study area capable of readily storing and transmitting groundwater. One of these is a bedrock aquifer consisting of Tertiary fanglomerate, Paleozoic carbonates, and fractured and faulted granitic rock, which appear to be in hydraulic continuity with each other. However, the discussion on this bedrock aquifer unit only focuses on the carbonate rock unit and the granitic rock unit. Please provide additional discussion concerning the water-bearing characteristics of the fanglomerate unit and its potential importance as an aquifer.	57
4.9-31	Sect. 4.9-1 Groundwater Flow Patterns and Depths	PWR	The discussion in the last paragraph under the heading Groundwater Flow Patterns and Depths focuses on the estimated depth to groundwater beneath the dry lake areas, primarily the Bristol Dry Lake area. The depth to water beneath this dry lake is estimated from reported water levels in trenches dug in the central portions of Bristol Playa that are related to the salt production operation. It is unclear if the water levels in the trenches represent the static level of native groundwater or the free-standing level of water that is	58

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			pumped into the trenches as part of the ongoing salt production and harvesting operations. As stated elsewhere in the draft EIR document, pumping of the highly saline groundwater beneath the playa areas into these trenches followed by subsequent evaporation of this water can seal the trenches with salts. As a result, the water levels observed in the trenches could just as easily represent isolated, free-standing water instead of the static groundwater level. Direct measurement of water levels from wells completed within the central portions of the playa areas would provide a more reliable indication of the static depth to groundwater beneath the two dry lake areas. Are there any production wells or monitoring wells located on the two playas that could be accessed to collect this information? Figure 4.9-5 indicates there are three wells that appear to be completed in the central portions of the Cadiz Dry Lake, but no water level information has been presented or discussed for these wells in the draft EIR.
4.9-32	Sect. 4.9.1 Aquifer Parameters	PWR	The discussion in the paragraph at the top of page 4.9-32 presents the range of hydraulic conductivity and storage coefficient estimates for the three main aquifer units identified at the project site. It appears the hydraulic conductivity estimates are the result of model calibrated data originating from several pump tests that were matched to the observed water level data near the Fenner Gap. If this is the case, the NPS respectfully requests that the SMWD also provide in the final EIR the range of hydraulic conductivity and storage coefficient estimates that were calculated from the aforementioned pump tests, so that the reader can easily compare the pump test-derived estimates with the model calibrated estimates. Additionally, was there any attempt to calibrate the model to existing water levels by generally maintaining the original hydraulic conductivity and storage coefficient estimates calculated from the pump tests and adjusting the recharge amount in the model? The NPS is concerned that the project proponent has elected to calibrate the model to the more uncertain model parameter of recharge by holding this parameter constant in the model and varying the more reliable model parameters of hydraulic conductivity and storage, which were actually measured by conducting aquifer pump tests. At a minimum, the SMWD should address this issue as part of model sensitivity analyses and present a summary discussion of the sensitivity results in the main body of the EIR document. As part of this discussion, the SMWD should address the parameters to which the model is most sensitive – hydraulic conductivity, storativity, recharge, etc.
4.9-32	Sect. 4.9.1 Summary of Groundwater in Storage	PWR	Please clarify in the discussion under this heading whether estimated groundwater in storage (17 to 34 MAF) represents the total water in storage or the recoverable amount of water in storage, as this is not clear from the present discussion. In other words, does this estimate include groundwater contained within the interstitial pores of finer grain sediments such as clay and silt which is not easily recoverable?
4.9-33	Sect. 4.9.1 Summary of Recharge Estimates	PWR	In the discussion under the minor heading titled Previous Recharge Estimates, a couple of studies from the 1960s are referenced in the discussion, in which the reliability of these studies is called into question by the SMWD. However, no recharge estimates are reported in the discussion, making it hard for the reader to independently confirm this conclusion. Given that one of the studies was conducted by the California Department of Water Resources (CDWR), the NPS requests the SMWD to report the recharge estimates from these studies in the EIR document for the sake of completeness. Even if the SMWD views these results to be less reliable than later estimates, these results are still part of the knowledge base related to quantifying recharge in the project basins and should be reported. In addition, the NPS respectfully requests that the SMWD also include in the discussion the annual estimates of recharge in the Fenner, Bristol and Cadiz Valley originally reported in 1975 by the CDWR and still recognized by the CDWR in Water Bulletin 118. These annual recharge estimates are reported as 3,000 AFY for the Fenner Valley, 2,100 AFY for the Bristol Valley, and 800 AFY for the Cadiz Valley, all totaling 5,900 AFY for the three watersheds.

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4.9-33	Sect. 4.9.1 Summary of Recharge Estimates	PWR	In the discussion under the minor heading titled 1980 to 1984 Estimates, it is stated in the first paragraph that: “An estimate of recharge as 1 percent to 10 percent of assumed average annual precipitation yielded results of 780-7,800 AFY. An estimate of recharge as 10 percent of assumed annual precipitation at elevation above 2,400 feet yielded a result of 20,600 AFY.” It is unclear from the discussion if these statements relate to the previously cited Cadiz-funded study by Geothermal Surveys or if they are related to another study. If they are related to the Geothermal Surveys study, please provide more details on whether there was a scientific basis for making these estimates, beyond an apparent random selection of some percentage of the average annual precipitation.	62
4.9-34 & 4.9-35	Sect. 4.9.1 Summary of Recharge Estimates	PWR	In the discussion under the minor heading titled 1995 to 1998 Modeling, it is stated on pages 4.9-34 and 4.9-35 that “the model is highly sensitive to the parameter values of field capacity and soil thickness; uncertainty in the estimates of these values has a great influence on the total recoverable water estimate. The model is relatively insensitive to values of soil moisture ...” Please clarify as to which model these statements are referring. Is this a reference to the previously mentioned MODFLOW model or the watershed model on page 4.9-34, or some other model?	63
4.9-35	Sect. 4.9.1 Summary of Recharge Estimates	PWR	In the discussion under the minor heading titled 1995 to 1998 Modeling, reference is made in the second paragraph on page 4.9-35 about a comparative analysis to the previously described watershed model using a regional water balance for the same watershed area. Please clarify if this regional water balance was a general water balance accounting or if it was conducted as part of a larger numerical modeling effort (suggested in the next paragraph). If this was a general water balance accounting, please provide the results of the analysis in the EIR document. The discussion in this paragraph is confusing relative to the remaining discussion under this heading.	64
4.9-37	Sect. 4.9.1 Current Recharge Estimates	PWR	1 st paragraph: Please delete the last sentence in this paragraph as it duplicates the preceding sentence.	65
4.9-38	Sect. 4.9.1 Current Recharge Estimates	PWR	1 st partial paragraph: The discussion in this paragraph refers to several variables that CH2M Hill used in estimating the amount of groundwater in storage, including volume of the aquifer, percent of aquifer saturated thickness expected to be an aquifer, and estimated specific yield. In order to aid the reader in better understanding this analysis, please provide in the discussion the range of values used for these variables in calculating the amount of groundwater in storage.	66
4.9-38	Sect. 4.9.1 Current Recharge Estimates	PWR	1 st full paragraph: The last sentence in this paragraph states that by intercepting the groundwater flow coming through the Fenner Gap there would be no reduction in groundwater storage. Assuming the recharge estimate of 32,000 is believable and there will be 50,000 AFY of pumping on average, this would equate to an annual reduction in groundwater storage of 18,000 AFY. As a result, this statement is in error and should be corrected.	67
4.9-38	Sect. 4.9.1 Current Recharge Estimates	PWR	2 nd full paragraph: The discussion in this paragraph claims that the annual recharge to the project watersheds estimated from the USGS INFIL3.0 watershed model is 32,000 AFY and that over a 50-year period, approximately 1.6 MAF of this water would be lost to natural evaporation from the Dry Lake areas. The NPS has serious reservations about the SMWD relying solely on the USGS INFIL3.0 watershed model to estimate the likely annual recharge for the project basins, especially when Cadiz, Inc. and the SMWD have not constrained the recharge estimate by an attempt to physically measure and confirm the amount of natural discharge from the Dry Lake areas. It should be noted that other attempts to estimate recharge from desert basins in this region using the USGS INFIL3.0 watershed model have indicated that these estimates are likely to be unreasonably high. In a 2004 study by the USGS	68

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			(Scientific Investigations Report 2004-5267), the USGS INFILv3 watershed model was used as one of several methods to estimate annual recharge for the groundwater basin around the Town of Joshua Tree, CA, located about 40-50 miles southwest of the Cadiz Project area. In this report, the USGS cautioned that the recharge estimates generated by the INFILv3 model may be overestimated by a factor of 2 to 10 times, when compared to the recharge estimates from some of the other physical measurement methods employed in this study. Applying this observation to the Cadiz Project watersheds suggests the annual recharge generated from CH2M Hill's INFIL3.0 watershed model might more realistically range from 3,200 to 16,000 AFY, which is more consistent with recharge estimates from earlier studies in the area (approximately 2,500 to 11,200 AFY). Additionally, why has there been no attempt to confirm the actual evaporative discharge loss from the Dry Lake areas using physical soil evaporation measurements at these sites and groundwater level measurements beneath the dry lakes? As noted in the NPS's scoping comments to the EIR, this was a major criticism of the former Cadiz Project from a decade ago. In their review of the Cadiz's <i>Draft Environmental Planning Technical Report, Groundwater Resources, Volumes I and II (Draft Report)</i> assembled during this earlier effort, the USGS noted that the project proponent's discharge estimate in their groundwater flow model (50,000 ac-ft/yr) was unreasonable on the basis of the depth to water (estimated to be 10 feet or greater) and the soil characteristics beneath the dry lake areas. The USGS recommended installation of multiple depth monitoring wells to determine the depth of water beneath the dry lakes, and the use of energy-budget methods or salt crust accumulation methods to better quantify the water loss off of the dry lakes. The USGS also recommended that contribution to soil evaporation from the dry lakes due to surface water runoff not be neglected, as it was with the extrapolation of study results to the Project study area under the former Cadiz Project and the current Cadiz Project. Quantification of water loss off of these two dry lakes is extremely important - this is the limiting factor on the amount of recharge entering the flow system and how much recoverable water is available for the project. If it is shown that the amount of soil evaporation occurring at the dry lake areas is small or negligible, then the Project's claim to being sustainable must be re-evaluated.
	Sect. 4.9.1 Current Recharge Estimates	PWR	The NPS respectfully requests the SMWD to provide a summary table in the main body of the EIR document of the recharge estimates derived from the previous and current studies that have been discussed on pages 4.9-32 through 4.9-38. This will help the public to better understand the range of recharge estimates that have been discussed for the project area.
	Sect. 4.9.1 Current Recharge Estimates	PWR	The NPS is concerned that the current recharge analysis does not incorporate additional lines of evidence that would support the project proponent's optimistically high rate of recharge for the Fenner Watershed. In its scoping comments to the EIR, the NPS requested that the current estimate of annual groundwater recharge for the Project be supported by several independent lines of analysis. This has not been accomplished based on the discussions presented in the draft EIR, and as a result, is a major deficiency with the EIR. It is interesting to note that the analysis for the former Cadiz Project from a decade ago utilized additional lines of evidence to support the recharge estimate proposed at the time, including the use of a chloride mass balance calculation and carbon ¹³ /carbon ¹⁴ stable isotope data to predict the age of the groundwater in the aquifers. The NPS respectfully requests that the SMWD to assimilate these earlier lines of evidence and/or require the project proponent to conduct follow-up supporting studies, and discuss the results in the final EIR. If the earlier chloride mass balance and carbon ¹³ /carbon ¹⁴ isotope study results are to be assimilated, additional studies may be necessary to address the concerns expressed by the USGS in their review of this earlier work. In the case of the previous chloride mass balance study, the USGS noted the project proponent misapplied their approach in estimating the amount of recharge to the flow system, as they assumed a much higher chloride concentration of precipitation than

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			values used by other previous investigators in the area. In the case of the earlier carbon ¹³ /carbon ¹⁴ isotope study, the project proponent reported apparent groundwater ages ranging from 11,500 to 14,000 years before present, but suggested that rock-water reactions had occurred and as a result, groundwater ages were younger than the apparent ages indicated. This claim can be verified or corrected by (1) collecting aquifer material samples and analyzing for carbon ¹³ /carbon ¹⁴ content so that site specific age corrections can be made, or (2) estimating corrected carbon ¹⁴ ages for the groundwater using data and rock-water reactions interpreted from other studies. The USGS attempted the latter as part of its previous review and noted that corrected carbon ¹⁴ ages ranged from 5,500 to 10,600 years before present, which suggests a very low current-day recharge rate. It's also interesting to note that the 2004 USGS study near the Town of Joshua Tree, CA (Scientific Investigations Report 2004-5267) collected similar isotopic data and reported uncorrected carbon ¹⁴ ages ranging from 2,700 to 32,300 years before present. Recent groundwater sampling and age-dating by the USGS in the Chuckwalla Valley near the town of Desert Center, located immediately south of Cadiz Valley, suggests an uncorrected carbon ¹⁴ age of 15,500 years before present (written communication with Michael Wright, Hydrologist – U.S. Geological Survey, May 3, 2011). The earlier carbon ¹⁴ data from the former Cadiz Project and the more recent carbon ¹⁴ data from these two additional studies from groundwater basins in close proximity to the Project basins strongly suggest that little water has been recharged in “modern times” in these desert basins. This line of evidence would seem to contradict the current project proponent's optimistic recharge estimate of 32,000 AFY.
4.9-44	Sect. 4.9.2 Law of the River	PWR	In the discussion under the minor heading titled Law of the River, what implications does the 2003 Quantification Settlement Agreements (i.e., Interim Surplus Guidelines) have on the Imported Water Storage Component of the Project? Do these guidelines increase or decrease the likelihood that there will be surplus Colorado River water supplies available for storage underground in the Fenner Basin and can this be quantified or estimated at this time? If the goal of this agreement is to wean California from an excess use of 800,000 AFY of Colorado River water supplies, it would seem there will be a decreased likelihood of surplus surface water supplies being available to the Project participants for future storage underground. Please elaborate on this issue in the final EIR.
4.9-46	Sect. 4.9.3 Methodology	PWR	2 nd and 3 rd paragraphs: The discussion indicates that several pumping simulations were modeled using recharge values of 32,000 afy, 16,000 afy and 5,000 afy. However, in all three cases, an annual average groundwater production of 50,000 afy was modeled for each simulation. Please explain why it was necessary to pump 50,000 afy for the two lower recharge simulations, if the premise has been that 50,000 afy of pumping was necessary to establish hydraulic control under the 32,000 afy recharge scenario. Logic would dictate that the two lower recharge scenarios should require lower proportional pumping (on the order of 25,000 afy and 7,800 afy, respectively) in order to establish hydraulic control of the lower recharge amounts. Maintaining the 50,000 afy production rate for these two lower recharge scenarios only serves to exacerbate the mining of groundwater from storage that the Project already produces. Instead of mining 18,000 afy of water from storage under the 32,000 afy recharge scenario, the Project would mine 34,000 afy and 45,000 afy of water from storage under the 16,000 afy recharge scenario and the 5,000 afy recharge scenario, respectively.
4.9-46	Sect. 4.9.3 Methodology	PWR	3 rd paragraph: The discussion states that the modeling did not include recharge that occurs west, south and east of the Bristol and Cadiz Dry Lakes and therefore, the results are conservative as the inclusion of this additional unaccounted recharge from the other portions of the project watershed would reduce the predicted groundwater level drawdown. This statement obviously cannot be substantiated, as the SMWD has elected not to quantify the amount of recharge assumedly coming from the western, southern and eastern portions of the project watershed. These statements concern the NPS from a couple of perspectives. First, they demonstrate

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			that an incomplete hydrologic analysis was conducted, as the SMWD explicitly states that only partial recharge estimates are being used in the modeling analyses, and that this unaccounted recharge may be substantial enough to reduce the predicted drawdown in the current simulations. It should also be noted that if there is substantial recharge coming from these areas, it could act as an additional hydraulic influence to drive hyper-saline groundwater toward the cone of depression created by project pumping. The NPS views exclusion of these other recharge sources as a flaw in the current hydrologic analysis and respectfully requests the amount of recharge from these areas to be accounted in the watershed and numerical modeling simulations and the results discussed accordingly in the EIR document. Second, one could also conclude from these statements that the unaccounted recharge from the other portions of the project watershed was negligible enough not to warrant inclusion into the numerical modeling simulations and subsequent discussion in the EIR. If this is the case, then these statements are misleading, as this recharge would not significantly reduce the currently predicted drawdown. In this case, the negligible recharge amounts should still be factored into the numerical modeling simulations in order to remove doubts and concerns about the completeness of the hydrologic analysis performed for the EIR.	73 cont.
4.9-46 & 4.9-47	Sect. 4.9.3 Methodology	PWR	3 rd and 4 th paragraphs: The discussion in these two paragraphs indicates that two different well field configurations were utilized in the groundwater modeling simulations to address the potential range in recharge estimates and the transmissivity variations of the aquifer. Please clarify for the reader whether or not the two well field configurations were evaluated in each modeling scenario. If both configurations were evaluated for each modeling scenario, the results for each configuration should be presented and discussed in the EIR document. Additionally, please clarify how the well field configurations helped to address the range in recharge estimates and the transmissivity variations. It is the NPS's experience that most numerical groundwater modeling analyses establish the recharge and transmissivity estimates as part of the model calibration process. These estimates are kept constant throughout subsequent modeling simulations conducted to optimize well placement and pumping rates needed to achieve the desired hydraulic control or production, and to evaluate resulting impacts from the pumping. Therefore, well placement should have no effect on refining recharge or transmissivity estimates as these estimates are established during the model calibration process.	74
4.9-49	Sect. 4.9.3 Groundwater Quality	PWR	The discussion at the bottom of page 4.9-49 indicates that the maximum predicted migration distance of the saline water/freshwater interface occurred under the 32,000 AFY recharge scenario. This result seems counter-intuitive, as one would expect greater migration of this interface to occur under the 5,000 AFY recharge scenario, which resulted in a much deeper cone of depression and steeper hydraulic gradients in the vicinity of the cone of depression (see Figures 4.9-12 to 4.9-14) when the same amount of groundwater (50,000 AFY) was pumped in all three recharge scenarios. Please explain in more detail to the reader why the furthest migration of this interface occurred under the 32,000 AFY recharge scenario, which produced the shallowest cone of depression and associated hydraulic gradients out of the three recharge scenarios modeled. Furthermore, please provide additional discussion in the EIR document noting the migration distance at the end of the 50-year pumping period and that the furthest extent of migration occurred at the end of the recovery period (50 years after pumping ceases), which is reflected in the results presented in Table 4.9-5 but is neglected in the current discussion. Emphasis should be given that migration of this interface (and the cones of depression) will continue to occur even after pumping ceases.	75
4.9-56	Table 4.9-7	PWR	The NPS has concerns about the potential effectiveness of some of the corrective measures presented in Table 4.9-7 that will be used to address induced flow of lower-quality water from the dry lake areas. In particular, the corrective measures described under the fifth and sixth bullets may be ineffective or not as effective as originally presumed by the SMWD, based on the results presented in	76

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			Table 4.9-5 related to the migration distances of the saline water/freshwater interface under pumping and recovery periods. In the case of implementing a reduction or cessation in pumping as a corrective measure, the results in Table 4.9-5 indicate that intrusion of hyper-saline water toward or into an existing well may not be mitigated for an extended period of time (possibly many years) as migration of this hyper-saline water continues even after pumping is fully ceased. The NPS respectfully requests the SMWD to devote more analysis and discussion in the EIR document on the groundwater level recovery analysis conducted and its implications on determining the potential effectiveness of corrective measures such as reduction or cessation of pumping. This discussion is currently missing from the EIR document. In the case of redistributing pumping locations to minimize or avoid water quality impacts, the effectiveness of this measure is greatly constrained by the fact that the project proponents prefer to locate the pumping within the confines of Cadiz-owned property. Given the limited space constraints associated with Cadiz-owned property, the effectiveness of this measure is questionable. The NPS respectfully requests the SMWD to better demonstrate and discuss the potential effectiveness of this measure in the EIR document using existing and/or additional groundwater modeling simulations that test this corrective measure. Finally, in the case of implementing an injection and/or extraction scheme to manage the migration of hyper-saline water from the dry lake areas, the EIR document lacks any demonstration or discussion that this corrective measure would be effective. Where would the lower-TDS water needed for injection come from and where would high-TDS water that might be extracted go to? The NPS respectfully requests the SMWD to better demonstrate and discuss the potential effectiveness of this measure in the EIR document using existing and/or additional groundwater modeling simulations that test this corrective measure. The groundwater model for this project provides a powerful tool for demonstrating the potential effectiveness of these three proposed mitigation measures and should be utilized to its fullest extent in this EIR.
4.9-57 & 4.9-58	Sect. 4.9.3 Mitigation Measures	PWR	The fifth bullet (page 4.9-58) under the discussion about mitigation measure HYRDO-2 identifies several possible measures that could be implemented until adverse effects are no longer present at the affected well(s). This description is similar to the description of the two corrective measures presented in the fifth and sixth bulleted items in Table 4.9-7 (page 4.9-56). What is the difference between the descriptions of these two similar corrective measures and why is only one of them represented under the discussion about mitigation measure HYDRO-2?
4.9-58	Sect. 4.9.3 Significance Conclusion	PWR	The NPS respectfully requests the SMWD to provide more detailed summary discussion in this section on how they arrived at the conclusion: "Less than significant with mitigation." The current statement stands alone without any supporting data and discussion. As noted in the NPS's earlier comment for page 4.9-56 (Table 4.9-7), the corrective measures described under the fifth and sixth bullets presented in Table 4.9-7 may be ineffective or not as effective as originally presumed, and that the SMWD needs to better demonstrate and discuss the potential effectiveness of these corrective measures in the EIR document using existing and/or additional groundwater modeling simulations that test these corrective measures. This concern applies to all other similar sections titled "Significance Conclusion" throughout the rest of this chapter, which also appear to provide similar stand-alone statements that are unsupported by accompanying data or discussion.
4.9-59	Sect. 4.9.3 Impact Analysis – Springs	PWR	In the first paragraph under the impact analysis discussion on springs, a statement is made that "As shown in Figure 4.9-2, the proportion of precipitation recharging the mountainous bedrock system is relatively small in comparison to the volume of precipitation that migrates vertically downward through the rock formations eventually reaching the aquifer in the alluvial valleys below." Examination of Figure 4.9-2 shows it to be a representation of the precipitation isohyets of a portion of the overall study area

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			watersheds (see earlier NPS comment for page 4.9-8 [Figure 4.9-2]), which leaves out some of the mountainous bedrock system. Furthermore, this figure does not give the reader any indication of the proportion of precipitation recharging the mountainous bedrock system nor the volume of precipitation that migrates vertically downward through the rock formations eventually reaching the aquifer in the alluvial valleys, as it is only a representation of the average annual amount of precipitation that falls over the area. Please provide another figure and/or a table that actually presents the volumes of water that the SMWD believes is recharged to the bedrock, carbonate-rock and alluvial aquifers that are discussed in the draft EIR document, and provide supporting discussion on how these recharge volumes were calculated.	79
4.9-62 & 4.9-63	Sect. 4.9.3 Impact Analysis – Legal Framework	PWR	<p>The discussion in the first paragraph on page 4.9-62 provides an ambiguous definition of safe yield by the State of California as “the amount of water that can be withdrawn <i>without an undesirable result</i>,” and states that this standard is not a rigid calculation of natural recharge. Furthermore, it is stated that the California Supreme Court has held the concept of safe yield and overdraft must reflect opportunities to increase the supply of groundwater from active management techniques through the concept of allowing for a “temporary surplus.” Given these statements, how does the SMWD propose to determine whether or not an undesirable result has resulted under this ambiguous description of safe yield? How are these concepts and the rest of the legal framework discussion tied into the CEQA significance thresholds defined on page 4.9-59? In the case of these CEQA significance thresholds, how is “substantially depleting groundwater supplies,” or “interfering substantially with recharge such that there would be a net deficit in aquifer volume,” or “significant lowering of the local groundwater table level” defined with respect to evaluating whether or not these thresholds have been exceeded by the Project? Finally, the discussion at the top of page 4.9-63 provides another definition of safe yield established by the San Bernardino County Desert Groundwater Ordinance. How does this definition of safe yield fit into the overall legal framework discussed in the EIR document with respect to this definition superseding the State of California’s definition of safe yield and the ability of the Project not to exceed the established significance thresholds?</p> <p>The NPS is also concerned that the SMWD’s interpretation and application of the cited Court decision that would allow the Cadiz Project to pump a quantity of water in excess of the natural recharge as a “temporary surplus” may be stretching the intent of the original court decision on this matter. The NPS understands that this concept was developed for a situation in which artificial groundwater recharge was done in an alluvial aquifer where there was a shallow depth to water. The concern was that if water was to be artificially recharged under this condition, then might cause the water table to raise meaning some of this water could be extracted by phreatophytic plants, and “lost” to the atmosphere as ET. As a result, the plaintiff was allowed to take some of the aquifer storage, to make room for the stored “surplus” surface water in the aquifer. However, this is not the situation at the Cadiz site where the depth to groundwater is several hundred feet and there is plenty of room to store the Cadiz Project’s imported water supplies.</p>	80
4.9-63	Sect. 4.9.3 Impact Analysis – Groundwater Drawdown	PWR	In the discussion in the last paragraph on this page, reference is made to a 50-year term of Project operations, after which pumping will stop and impacts are expected to subside. It is unclear whether or not the 50-year term is related to some undisclosed permitting period, or if the participants actually intend to close the Project after 50 years, which seems to be the suggestion. Please clarify this in the final EIR document. If the 50-year term is related to a permit period and the participants intend to operate the Project beyond this timeframe, then the modeling simulations and the discussion in the EIR document should address the potential impacts over a longer period of pumping (e.g., 100 to 200 years).	81

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4.9-65	Sect. 4.9.3 Impact Analysis – Groundwater Drawdown	PWR	The NPS suggests changing the first conceptual cross-section (i.e., Time 0) in Figure 4.9-11b to be consistent with the last conceptual cross-section (i.e., Time 4) in Figure 4.9-11a. At Time 4, the cross-section shows a sufficient lowering in the water table beneath the conceptual dry lake areas resulting in the cessation of evaporation from the dry lake surfaces. However, the Time 0 cross-section does not show this same lowering of the water table. Both of these cross-sections should show the same conceptual features as they essentially represent the same point in time, but for different illustrative purposes.	82
4.9-66	Sect. 4.9.3 Impact Analysis – Groundwater Drawdown	PWR	<p>1st and 2nd paragraphs: The discussion in the first paragraph on this page makes reference to three figures showing the drawdown results for the three recharge scenarios simulated. In all three cases, the average annual pumping simulated was 50,000 AFY. It is unclear to the NPS why it was necessary to pump 50,000 AFY for the two lower recharge scenarios (16,000 AFY and 5,000 AFY) when the original premise under the largest recharge scenario (32,000 AFY) was that 50,000 AFY of pumping was needed to establish hydraulic control and lower the water table beneath the dry lake area sufficiently to cease natural evaporation. Intuitively, lower recharge to the flow system should require proportionately less pumping to establish similar hydraulic control and lowering of the water table. If this is not the case, the SMWD should provide additional figures in the EIR document demonstrating the results of simulations where lower pumping was attempted to establish necessary hydraulic control and water level reduction. Otherwise, the reader cannot verify that this evaluation was conducted. As a result, the NPS must conclude that simulating 50,000 AFY of pumping under the lower recharge scenarios serves only to exacerbate the mining of more groundwater from storage than may be necessary to achieve the same results (see also previous NPS comment for page 4.9-46 – 2nd and 3rd paragraphs) and distorts the intent of creating a temporary surplus.</p> <p>The discussion in the second paragraph indicates that complete recovery of water levels to pre-Project levels is estimated to occur at 67 years after the Project pumping stops. The NPS requests that the SMWD provide additional discussion in this paragraph referencing these results can be found in Table 4.9-10 and summarizing the water level recovery results for the other two lower recharge scenarios for the sake of completeness. These results are also presented in Table 4.9-10 and indicate that complete recovery of water levels under the 16,000 AFY and 5,000 AFY recharge scenarios won't be achieved for 103 years and 390 years.</p>	83
4.9-66	Sect. 4.9.3 Impact Analysis – Groundwater Drawdown	PWR	The discussion in the last paragraph on page 4.9-66 focuses on the potential impacts to local water supply wells from the Project and describes in general terms the possible wells that might be affected. The NPS recommends showing the locations of all local wells that might be affected on the Figures 4.9-12, 4.9-13 and 4.9-14 (and all other pertinent figures showing drawdown) in order to aid the public in understanding the degree of impacts that might be expected.	84
4.9-71	Sect. 4.9.3 Impact Analysis – Groundwater Drawdown; Table 4.9-10	PWR	Please clarify in the discussion how the cumulative change in volume estimates reported in the second and fourth columns of Table 4.9-10 were calculated and what these volumes represent. Do these volume estimates represent excess pumped water in storage beyond the amount of natural recharge (or discharge) destined for evaporation from the dry lake areas (i.e., the amount of “temporary surplus” that was produced by the Project)?	85
4.9-72	Sect. 4.9.3 Impact Analysis –	PWR	Please clarify in the discussion how the cumulative reduction of evaporative loss estimates (column 3) reported in Table 4.9-11 were calculated and what this volume represents. How can the cumulative reduction in evaporative losses exceed 100 percent of the	86

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	Groundwater Drawdown; Table 4.9-11		amount of recharge occurring over the 50-year period? Assuming 100% capture of recharge under the three different recharge scenarios simulated, this would result in cumulative reductions of 1,600,000 AF, 800,000 AF, and 250,000 AF. Are the higher amounts reported related to downgradient groundwater destined for evaporation that is pulled back and captured?	86 cont.
4.9-73	Sect. 4.9.3 Impact Analysis – Groundwater Drawdown	PWR	The discussion in line 2 on page 4.9-73 incorrectly states the average annual natural recharge as 50,000 AFY and should be corrected to 32,000 AFY, as purported elsewhere in the EIR document. It should be noted that the NPS believes the 32,000 AFY estimate of recharge is significantly over-estimated and is not confirmed by other lines of evidence.	87
4.9-76 & 4.9-77	Sect. 4.9.3 Impact Analysis	PWR	The discussion on these two pages provides a programmatic evaluation of the projected water quality impacts resulting from the artificial recharge of surplus surface water supplies into the groundwater reservoir. Most of the discussion centers on surplus water from the Colorado River Aqueduct (CRA), with occasional mentioning of surplus water from the State Water Project (SWP). The NPS requests that the SMWD provide expanded discussion of the potential impacts associated with infiltration of the SWP water. If this water source is being considered as a viable recharge source, additional information on the average water quality of this source should be provided in the EIR document (e.g., Table 4.9-8 or a new table) and discussed accordingly. The expanded discussion should also focus on potential concerns with the introduction of hydrocarbon-based contaminants into the subsurface that might come from using the previously mentioned abandoned oil/gas pipelines in the area as a means of transporting SWP water to the Project spreading basins. Additionally, please provide expanded discussion on the whether California law allows artificial recharge of untreated water into the subsurface.	88
5-5	Sect. 5.1.2 Geographic Scope	PWR	Please correct the discussion in the first paragraph to show that I-95 roughly constitutes the eastern geographic boundary and not the western boundary, and that the Marine Corps Air Ground Combat Center, SR-247, and SR-62 through Yucca Valley roughly constitutes the western geographic boundary and not the eastern boundary. This is confirmed by Figure 5-1.	89
5-36	Sect. 5.3.9 Hydrology and Water Quality	PWR	2 nd paragraph: The NPS is not convinced that the SMWD has sufficiently demonstrated the effectiveness of several key mitigation measures to be able to conclude that the direct and cumulative impacts to groundwater and surface water resources would be less than significant and would not be cumulatively considerable. As previously noted in the NPS's comments to pages 4.9-56 and 4.9-58, the corrective measures described under the fifth and sixth bullets presented in Table 4.9-7 may be ineffective or not as effective as originally presumed, and that the SMWD needs to better demonstrate and discuss the potential effectiveness of these important corrective measures in the EIR document using existing and/or additional groundwater modeling simulations that test these corrective measures. If the existing and/or additional modeling simulations reveal that these mitigations measures are ineffective or less effective at addressing adverse drawdown and water quality impacts than originally presumed, then the SMWD cannot claim that direct and cumulative impacts to groundwater and surface water resources would be less than significant and would not be cumulatively considerable. This concern is also tied into the SMWD more clearly defining the magnitude of the "significance thresholds" that were previously described, as they are too ambiguous to be able to determine when these thresholds are exceeded (see NPS comment for page 4.9-62 & 4.9-63). The NPS generally agrees with the SMWD's assessment in the fourth and fifth sentences of the second paragraph that "cumulative extractions from (the) groundwater basin would essentially be the condition analyzed in this Draft EIR since other contributions to groundwater extraction is low." However, these two sentences are somewhat redundant and confusing as they are currently stated. To clarify this confusion, the NPS would recommend revising the discussion in	90

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			<p>the last three sentences to read as follows:</p> <p>“Given the amount of past, present and reasonably foreseeable groundwater pumping in the project watersheds is exceedingly small in comparison to the amount of Project pumping, it can be concluded that Project pumping will contribute quite significantly to the total direct and cumulative drawdown and water quality impacts to groundwater and surface water resources in the project watersheds. Evaluation of the effectiveness of the proposed mitigation measures to address these impacts indicates that the direct and cumulative impacts to groundwater and surface water resources (would or would not) be reduced to less than significant levels and, therefore, (would or would not) be cumulatively considerable.”</p>	90 cont.
7-41 & 7-42	Sect. 7.6.3, Hydrology & Water Quality	PWR	<p>Please explain why the evaluation of environmental impacts for the Reduced Project Alternative – 25 Percent Reduction in Proposed Groundwater Withdrawal only addresses the 32,000 AFY and 16,000 AFY recharge scenarios and omits an evaluation of the 5,000 AFY recharge scenario. For the sake of completeness, the alternatives analysis should evaluate the same three recharge scenarios that the Proposed Action alternative does, so that the reader can make an across-the-board comparison to see if the results for this alternative are greater or less than those for the Proposed Action. The discussion should also present an evaluation of the expected water level recovery similar to the Proposed Action so that the reader can confirm the SMWD’s claim that water levels would recover quicker under this alternative than under the Proposed Action. Finally, the NPS requests that Figures 7-1 and 7-2 (and the new Figure 7-3 for the 5,000 AFY recharge scenario) show the positioning of the saline-freshwater interface (pre- and post-pumping) so that the reader can confirm if the expected water quality impacts will be greater or less than those for the Proposed Action.</p>	91
8-2 & 8-3	Sect. 8.2.1	PWR	<p>The NPS believes the current EIR analysis has failed to substantiate the optimistically high recharge estimate of 32,000 AFY, as the analysis has neglected to provide additional lines of evidence that would support this estimate. Most significantly, the current analysis makes no attempt at physically quantifying the amount of groundwater the Project proponents claim is naturally discharging (evaporating) from the dry lake areas, which would help to constrain this recharge estimate. When this was done by the USGS in a recent groundwater study near Joshua Tree, CA, it was shown that an earlier version of the INFIL3.0 watershed prediction model used by the Project proponents may be overestimating natural recharge rates in this part of the Mojave Desert by a factor of 2 to 10 times. Furthermore, the majority of previous hydrologic analyses conducted in and around the Fenner Basin area indicates the average annual recharge rate for the Project watershed is probably on the order of 2,000 to 10,000 AFY. Based on the simulations presented in the draft EIR, the only simulation that would be reasonable to use in evaluating the possibility of an irreversible and irretrievable commitment of water resources is the recharge scenario simulating an average annual recharge rate of 5,000 AFY. As shown by the results presented in Tables 4.9-9, 4.9-10 and 4.9-11 for this recharge scenario, pumping of 50,000 AFY over a 50-year period, coupled with a 50-year recovery period, indicates a net deficit of nearly 2,000,000 AF of groundwater being removed from storage. Coupled with the result that full recovery of water levels under this simulation would take nearly 400 years (approximately 16 generations) to occur, leads a reasonable person to conclude that the Conservation and Recovery Component of the Project is likely to cause an irreversible and/or irretrievable commitment of water resources under a timeframe that most people can understand and appreciate.</p>	92
	Appendix B1	MOJA	<p>The Groundwater Management, Monitoring, and Mitigation Plan doesn’t appear to take into account the momentum of groundwater aquifers. Corrective measures for deleterious impacts such as land subsidence, water level drawdown, and brine movement that</p>	93

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			involve changes to project operations appear to implicitly assume that changing operations will result in a positive response at the monitoring location. But in fact the models will show that the deleterious impacts will continue to occur at the observation location for a period of time after modification of operations that is related to the aquifer response time. The monitoring and mitigation plan needs to account for this period of continuing deteriorating conditions. The monitoring network needs to be specifically designed, using the models, to predict deleterious impacts and implement corrective procedures before damage is done.	93 cont.
	Appendix B2	MOJA	The NPS has concerns that there might be a conflict of interest by having managers from the consulting companies conducting the data analyses and modeling (i.e. Geoscience and CH2M Hill) also serving on the Groundwater Stewardship Committee. Likewise with potential beneficiaries of the project (e.g. Golden State Water Company).	94
	Appendix H	MOJA	There appears to be a mismatch between the groundwater flow model and the model used to estimate recharge. The northern boundary of the groundwater flow model is south of Woods and Hackberry Mountains (see for example Figure 5 of VOLUME 1: REPORT Cadiz Groundwater Modeling and Impact Analysis) whereas the area used for modeling recharge is the entire Fenner HUC (see Figure 4.2 of VOLUME 2: APPENDIX A Cadiz Groundwater Modeling and Impact Analysis). The implication that groundwater recharge in the New York Mountains and Mid Hills all flows to Fenner Gap appears to be an assumption unsupported by data, and in the groundwater flow model there is no way for this recharge to reach the project area as all of the cells north of the northern boundary are no-flow.	95
	Appendix H	MOJA	An alternative hypothesis, that Tertiary volcanic rocks of the Woods Mountain volcanic center form a hydrogeologic barrier, suggests that recharge from the New York Mountains, Mid Hills, and Woods/Hackberry may flow east towards Piute Gorge. Where are the data shown that reject this hypothesis?	96
	Appendix H	MOJA	Most of the data collection, analyses, and modeling effort is directed towards estimating recharge and calculating if it's possible for that much water to pass through Fenner Gap without having to invoke unreasonable hydrologic parameters. But where is the corresponding effort to quantify actual discharge – the water that the project hopes to capture? If the models and assumptions are correct then it should be possible to collect evaporation data from the playas to demonstrate existing discharge in the equivalent amount.	97
19	Volume 1, Appendix H, Sect. 3.2	PWR	The discussion in the first paragraph describes four broad categories of geologic formations found in the Project watersheds. The subsequent discussions address 3 of the 4 categories but neglects any discussion on the fourth category mentioned (i.e., fine-grained sediments and evaporate deposits underlying the dry lake areas). Please correct this oversight by providing a discussion on this geologic formation.	98
28	Volume 1, Appendix H, Sect. 5.3	PWR	Please provide additional discussion in this section why large portions of the Bristol and Cadiz watersheds were left out of the numerical model domain that was developed for the Project. In particular, given the importance of Cadiz Dry Lake as a discharge area, this feature is barely represented in the model domain. Furthermore, as stated elsewhere in the draft EIR document, additional recharge is assumed to occur west, south and east of the Cadiz project area within the Bristol and Cadiz watersheds that has not been accounted or modeled. What uncertainties are introduced into the current modeling results by not including the rest of the Bristol and Cadiz watersheds into the model domain?	99
29	Volume 1, Appendix H, Sect. 5.4	PWR	The NPS has concerns with how some of the boundary conditions were established for the model domain and would like them addressed with additional clarifying discussion presented in the final EIR. First, what is the basis for establishing such a large area of	100

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			recharge in the middle of Fenner Valley, as shown on Figures 6 and 21? If this is related to the flow accumulation routing resulting from the INFIL3.0 watershed modeling, please indicate this. Additionally, why was it necessary to establish this recharge area in tandem with the higher flux boundary conditions shown on the east and west sides of Fenner Valley (see Figure 21)? Second, what is the reasoning for establishing the small area of head-dependent model cells representing evapotranspiration (ET) from the Cadiz Dry Lake area? This small area (compared to the actual size of Cadiz Dry Lake and Bristol Dry Lake) appears to be accommodating what the SMWD expects to be a large amount of groundwater discharge by ET from this dry lake. What effects does the representation of a very small ET area for Cadiz Dry Lake versus an ET area similar in size to the actual dry lake area have on the modeling results? This concern is also related to concerns expressed in the preceding comment for page 28.	100 cont.
31 & 32	Volume 1, Appendix H, Sect. 5.5.2	PWR	Please provide additional clarifying discussion in this section describing the basis for establishing a layer thickness of 10 feet for Layers 4, 5, and 6 in the numerical model. This thickness appears to be arbitrarily selected and could pose problems of dewatering these layers during simulation runs unless this is compensated for in other areas of the model (e.g., vertical leakance or hydraulic conductivity).	101
32 & 33	Volume 1, Appendix H, Sect. 5.5.4	PWR	The discussion refers to a Table 14 in the GEOSCIENCE 1999 report that presents hydraulic conductivity estimates for the alluvium. Since this report is not readily available to the public or has been presented as part of the EIR, please reprise this table in this appendix so the reader can substantiate the reported values. Additionally, what is the reason for establishing lower hydraulic conductivity values for the alluvium in Layers 1-3 up-valley versus down-valley (see Figures 13-15)? Were there existing data from the up-valley areas to confirm these values? Given that the up-valley area is generally nearer the mountainous areas that are shedding erosional debris, one would normally expected higher permeabilities in the proximal areas where coarser-grained sediments are deposited, with the permeabilities decreasing down-valley and toward the axis of the valley where finer-grained sediments are normally expected to be deposited.	102
36 & 37	Volume 1, Appendix H, Sect. 5.6.3	PWR	The NPS has concerns with the discussion on evapotranspiration (ET) in this section that it would like clarified in the final EIR. It is unclear in the discussion whether or not the maximum ET rates presented in the table on page 37 represent the rates of ET prior to simulating Project pumping, a constant ET rate used throughout the modeling simulations, or if the ET rate varies as water levels decline (as would be expected). If these maximum rates represent constant, pre-Project pumping ET rates, then they would seem to generate too much ET discharge from those portions of the model domain setup to accommodate ET discharge. For example, the maximum ET rates for Bristol Dry Lake and Cadiz Dry Lake for the 32,000 AFY recharge scenario are estimated to be 240 inches/year (or 20 feet/year) and 613 inches/year (or 51 feet/year), respectively. When the constant pre-pumping ET rate of 20 feet/year for Bristol Dry Lake is applied over the total area for both dry lakes (estimated by the SMWD to be 59,650 acres) it results in a pre-pumping annual discharge of groundwater by evapotranspiration of 1,193,000 acre-feet/year (59,650 acres x 20 feet/year), which far exceeds the modeled recharge of 32,000 acre-feet/year. In order to accommodate this ET rate, the total ET area of the model would have to be approximately 1,600 acres in size to generate a total discharge of 32,000 AFY (i.e., 1,600 acres x 20 feet/year = 32,000 acre-feet/year). Comparatively speaking, a constant pre-pumping ET rate of 6.4 inches/year (or 0.54 feet/year) over the total area of both dry lakes would be needed to produce a total ET discharge of 32,000 AFY. Conversely, model water balance results presented in Tables 2, 3 and 4 suggest that the model is not producing an annual volume of	103

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			<p>discharge by ET equivalent to the amounts of recharge going into the model. For example, in Table 2 the annual volume of discharge by ET that has been re-established by Year 100 is 22,316 AFY. As noted in the discussion on page 53, full recovery is not expected for another 17 years. Based on the average ET recovery rate over the last 17 years of this simulation and projecting this rate forward in time, it is estimated that discharge by ET at Year 117 in the model would be approximately 24,641 AFY, which is approximately 76% of what Cadiz stated should be occurring (i.e., 32,425 AFY). Without a starting water balance at Year 0 in Tables 2-4 to confirm the amount of pre-pumping ET occurring in the model, this observation brings into question how well the model is able to simulate the natural flow system and the findings of the model simulations.</p> <p>The NPS is also concerned with how the model estimates ET discharge as water levels approach and drop below the assumed extinction depth of 15 feet. Preferably, once the extinction depth is exceeded in a model cell, discharge by ET will cease. In fact, it appears in the model that the existing pre-pumping depth to water (18 feet) beneath Bristol Dry Lake already exceeded the extinction depth of 15 feet (see values reported in table presented on page 52) prior to simulating any of the pumping/recharge scenarios. If this represents the shallowest depth to water in this region of the model domain, how could the model simulate discharge of groundwater by ET from the Bristol Dry Lake area of the model? Furthermore, as noted by the USGS in its technical review comments to the former Cadiz Project, it was shown in a study from nearby China Lake (Kunkel and Chase, 1969) that the annual rate of evaporation from bare soil decreased to negligible amounts at water-level depths of more than 7 feet below land surface, thus calling into question the validity of the extinction depth established for the model.</p>	103 cont.
46	Volume 1, Appendix H, Sect. 7.3	PWR	With respect to the discussion about what the recharge amount for Sensitivity Scenario 2, it is stated the natural recharge was reduced to 5,000 AFY, which is the approximate historical production by Cadiz. What does Cadiz's historical pumping have to do with establishing and evaluating the lower recharge value of 5,000 AFY? A much better reason for establishing and evaluating this lower recharge estimate is that it is representative of many of the earlier estimates of recharge within the Project watersheds.	104
46	Volume 1, Appendix H, Sect. 7.4.1	PWR	There is a discrepancy between the average annual amount of pumping (50,000 AFY) being reported throughout the EIR document and the amount of pumping represented for Wellfield Configuration A (52,500 AFY) and Wellfield Configuration B (51,000 AFY). Please correct this discrepancy in the reported values for the average annual amount of pumping.	105
48	Volume 1, Appendix H, Sect. 7.5	PWR	The discussion references Figure 57, which shows the initial TDS concentrations used in the numerical modeling simulations. The concentrations shown in this figure are considerably different from the TDS concentrations shown previously in Figure 3. Figure 3 at least seems to cover the upper range of TDS concentrations reported in the EIR (298,000 mg/L), but does not clearly demarcate the saline-fresh water interface (1,000 mg/L) like Figure 57 does. Please correct this discrepancy for one or both figures in the final EIR.	106
2-8	Volume 2, Appendix H, Appendix A, Sect. 2.4	PWR	4 th paragraph: The discussion states that the dry lake areas have static groundwater levels at or near the playa surfaces, using references from 20 or more years ago. Are there more recent data that can be presented substantiating the current groundwater level conditions beneath the playa areas?	107
2-9	Volume 2, Appendix H, Appendix A, Sect. 2.4.1	PWR	3 rd paragraph: The discussion focuses on the carbonate aquifer unit and states that the full extent, potential yield, and storage capacity of this aquifer have not been quantified at this time. The NPS is concerned that if the extent and character of the carbonate aquifer is unknown at this time, then the potential impacts from pumping this aquifer cannot be fully evaluated, which is a deficiency of this EIR. Given its stratigraphic positioning, it is likely that it will be a confined aquifer and therefore, pumping effects could	108

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			potentially be transmitted greater distances. There has been no attempt at evaluating or discussing whether there are springs or wells in the project watersheds that are sourced from this presumed regional carbonate aquifer, and what the potential impact might be to such water resources from Project pumping.
3-1 & 3-2	Volume 2, Appendix H, Appendix A, Sect. 3.0	PWR	<p>The NPS has several concerns with the analysis and discussion presented for Section 3.0 (Groundwater in Storage) that it would like the SMWD to clarify in the final EIR document, including:</p> <ul style="list-style-type: none"> • Please provide a summary of the groundwater storage estimates currently recognized by the California Department of Water Resources (DWR) for Fenner Valley, Bristol Valley and Cadiz Valley, and why the SMWD believes the DWR estimates differ so significantly from those proposed by Cadiz, Inc. DWR Bulletin 118 currently recognizes the total groundwater storage in these three valleys at 5,600,000 AF, 7,000,000 AF, and 4,300,000 AF, respectively, resulting in a total of 16,900,000 for all three valleys. This additional discussion should be provided in Appendix A and in Section 4.9 of the main EIR document. • In the second paragraph of this section, please clarify the statement that “These estimates are for groundwater in storage in the alluvial aquifers and should not be taken as a total volume that could be pumped out of these alluvial aquifers.” What should these estimates be taken as? If this means that pumping will actually result in lower volumes of recoverable water, then the SMWD should provide what the likely amount of recoverable storage is and base all subsequent impact analyses on the depletion of recoverable groundwater in storage and not total groundwater in storage. Do the lower DWR estimates above represent the likely recoverable volume of groundwater in storage? • With respect to Table 3-1, please clarify in the discussion how the estimates for the variables Percent of Saturated Thickness which is Aquifer and Specific Yield were determined. Does the variable Percent of Saturated Thickness which is Aquifer factor in such things as a maximum well depth which makes pumping economically feasible? It was stated in Section 2.3.1 that the thickness of alluvial sediments in portions of these valleys can exceed several thousand feet. If this is true, then estimates of groundwater in storage should not include those portions of the alluvial aquifer(s) below a reasonable extraction depth (for example 2,000 feet). Below depths of a few thousand feet in alluvial aquifers, one can likely expect the potential volume of groundwater in storage to decrease significantly as the storativity (specific yield) and permeability of these sediments are reduced due to compaction and cementation of the open pore spaces. This effect seems to be confirmed in the significantly lower hydraulic conductivity estimates for the older Tertiary-aged alluvial sediments which are reported in the draft EIR document. • In the fourth paragraph of this section, it is stated that the groundwater storage estimates are very conservative, partly because it does not include storage in the carbonate aquifer. The discussion continues with an attempt to roughly estimate what this storage volume might be. The NPS believes this estimate is purely conjectural and should be removed from the discussion as it is misleading. The SMWD admits in Section 2.4.1 of Appendix A that the full extent, potential yield, and storage capacity of this aquifer have not been quantified at this time (see NPS comment for page 2-9 above). Instead of guessing what the storage volume of the carbonate aquifer might be, the SMWD should require Cadiz, Inc. to conduct additional field studies to determine the likely extent of this aquifer, so that the degree of impacts to this aquifer can be evaluated in the EIR document.

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			<ul style="list-style-type: none"> The NPS would recommend changing Figure 3-1 from a figure showing the depth to the base of the alluvial aquifer to a figure showing the thickness of the saturated alluvial sediments. This would help the reader better understand how the alluvial aquifer thickness changes in these basins. Additionally, does the base of the alluvial aquifer coincide with the base of the younger or older alluvial sediments? With respect to Figure 3-2, please provide additional discussion clarifying how and why the various storage zones were determined the way they shown in this figure. There is confusion as to whether these storage zones are based on hydrogeologic information or are based on something else. For example, Zones 1 and 2a appear to be combined in Figure 3-2, but Table 3-1 shows different properties for both zones. Do these two zones overlie Zones 2 and 3, or do they extend to the base of the alluvial aquifer? 	109 cont.
	Volume 2, Appendix H, Appendix A, Sect. 4.1.2	PWR	The NPS requests that the SMWD provide a separate discussion on estimating evapotranspiration, similar to the discussions presented in Sections 4.1.1 through 4.1.6 for other important parameters in the INFIL3.0 model. Evapotranspiration (ET) is an important parameter which is represented in the water balance equation presented on page 4-2, but is not discussed in any great detail, except for a brief mention related to the model parameters SKYVIEW and RIDGE(36) presented under Section 4.1.2. Direct evaporation of precipitation before and after this water infiltrates is known to be significant in the Mojave Desert, especially during warmer months, and therefore, greatly impacts the amount of water that escapes the root zone and becomes recharge. Does calculation of ET in the INFIL3.0 model include estimating direct evaporation of precipitation before and after this water infiltrates, and before the infiltrated water is utilized by vegetation? What input values are needed and were used to calculate this parameter of the water balance? Additionally, please discuss the results of ET estimated by the INFIL3.0 model, as the reader currently cannot gage the potential accuracy of this portion of the INFIL3.0 analysis. The NPS is concerned that the amount of ET has been underestimated in the modeling simulations, and therefore, the amount of net infiltration (recoverable water) has been overestimated. The discussion presented in the final EIR should provide sufficient information to address this concern.	110
4-4	Volume 2, Appendix H, Appendix A, Sect. 4.1.2	PWR	A reference is made to Hevesi (2008) at the top of page 4-4, but this reference is not include in the References Cited section at the end of Appendix A.	111
4-9	Volume 2, Appendix H, Appendix A, Sect. 4.1.8.1	PWR	1 st full paragraph: The discussion in this paragraph focuses on the choice of input values for the model parameter IROUT and the associated results for net infiltration and runoff out of the watershed. The NPS recommends that the SMWD report the more conservative net infiltration and runoff results corresponding to IROUT = 0, as this scenario more accurately simulates the runoff of water to the dry lake playa areas that have been observed and reported in the draft EIR (e.g., see Section 4.9.1, page 4.9-16). Additionally, the estimates of runoff out of the watershed seem low based qualitatively on the combined size of the dry lake surfaces (estimated by SMWD at 59,650 acres) and that standing water that has been observed on these playas at least once a year since 1991 (see Section 4.9.1, page 4.9-16). Failure to quantify the amount of runoff reaching the playas on an annual basis is another deficiency of this EIR that should be addressed. Doing so would help to further constrain the amount of net infiltration occurring in the project watersheds.	112
4-9	Volume 2, Appendix H,	PWR	2 nd paragraph: The discussion provides a rebuttal critique on the USGS review of the hydrologic analysis for the previous incarnation of the Cadiz groundwater development and storage project, which focuses on the evaluation of the USGS's critique by Davisson and	113

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	Appendix A, Sect. 4.1.8.1		<p>Rose (2000), and tries to assert some kind of unique precipitation-elevation relationship that occurs east of the 116° W longitude. The NPS contends this unique precipitation-elevation relationship is over-stated and doesn't justify the expectation of higher precipitation east of the 116° W longitude. The NPS's contention is supported by the results presented in the 2004 USGS study (Scientific Investigations Report 2004-5267) in the Joshua Tree, CA area (located about 40-50 miles southwest of the Cadiz study area) by Nishikawa et al., (2004), which is cited several times in this EIR. It should be noted that the watersheds for USGS study straddle the 116° W longitude and have mountainous elevations similar to the Fenner Watershed. In the USGS report, an earlier version of the INFIL3.0 distributed-parameter watershed model (INFILv3) and a numerical flow model were utilized, along with several field techniques such as the installation of instrumented boreholes in washes to measure recharge by stormflow infiltration, and isotopic water analyses to determine the likely age of the groundwater. A key conclusion that came out of this study is that the results of the distributed-parameter watershed model indicated most of the recharge in the region likely occurs from infiltration of stormflow runoff 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. Furthermore, it was concluded the simulated total annual recharge by stormflow runoff is 2 to 10 times greater than the measured total annual stormflow runoff, indicating that the recharge values estimated using INFILv3 may be overestimated. Additionally, it was concluded that 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. Given the close proximity of the Joshua Tree and Cadiz study areas and similarities in recharge elevations, the contention that precipitation and recharge should be higher east of the 116° W longitude is greatly weakened by the Cadiz project's over-reliance on the INFIL3.0 watershed model results, without additional supporting field data to constrain the recharge estimates. Based on the results of the nearby Joshua Tree area study, one can argue that the Cadiz project's recharge estimates using INFIL3.0 could be over-estimated by a factor of 2 to 10 times, making the likely range of recharge estimates more on the order of 3,200 to 16,000 AFY. The NPS respectfully requests that the SMWD recognize the Joshua Tree area distributed-parameter watershed model results in the EIR document and state that without corroborating field measurements to constrain the analysis, it is possible that the recharge estimates could be overestimated by as much as 2 to 10 times.</p>
4-10	Volume 2, Appendix H, Appendix A, Sect. 4.1.8.2	PWR	<p>2nd paragraph: With respect to the discussion about the assessment of the occurrence of moist soils at Bristol and Cadiz dry lakes using NDVI as qualitative evidence of groundwater discharge by evaporation, the NPS is not convinced that the presence of moist soils beneath these dry lakes is solely due to shallow groundwater in the subsurface. Closer examination of Figures 4-17 through 4-22 and comparison of the timeframes represented in these figures with the simulation results presented for the same timeframes in Figures 4-11 and 4-12 indicates that 3 of the 4 years represented in Figures 4-17 through 4-22 could be considered above-average to exceptional wet years where more surficial runoff could be expected to accumulate at the dry lakes. The results in these set of figures represent conditions in 1990 (Figure 4-17), 1991 (Figures 4-18 and 4-19), 1992 (Figure 4-20) and 2005 (Figures 4-21 and 4-22). Results presented in Figures 4-11 and 4-12 show that 1990 was a very dry year compared to 1991, 1992 and 2005. This trend appears to be reflected in the NDVI results presented in Figures 4-17 through 4-22, where the results for 1990 show much lower moisture conditions at the dry lakes compared to the results for 1991, 1992 and 2005. The NPS contends the wet soil conditions reflected for 1991, 1992 and 2005 are largely the result of excess surface water that accumulated at the dry lakes during these wet years. This is further supported by comparison of the results in Figures 4-17, 4-19 and 4-21 which shows NDVI results for a similar</p>

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			period of the year (i.e., May 1990, May 1991 and May 2005). As noted in an earlier NPS comment above, the NPS's contention is supported by statements in the EIR of standing water that has been observed on these playas at least once a year since 1991 (see Section 4.9.1, page 4.9-16). Again, failure to quantify the amount of runoff reaching the playas on an annual basis is another deficiency of this EIR that should be addressed. Doing so would help to further constrain the amount of net infiltration occurring in the project watersheds.
4-10	Volume 2, Appendix H, Appendix A, Sect. 4.1.8.2	PWR	4 th paragraph: The NPS requests that the SMWD also include discussion about the 1997 to 2001 study by the USGS (Water Resources Investigation 2003-4254) which estimated groundwater discharge by evapotranspiration from the floor of Death Valley. This study estimated, in part, the annual groundwater discharge rates from salt-encrusted playa areas (0.13 feet) and from bare soil playa areas (0.15 feet), which compensated for by the effects of surface runoff to evaporative discharge from these surfaces. If one uses the Death Valley study estimated evaporation rate from salt-encrusted playa areas (0.13 foot per year), and multiplies that by the estimated area of dry lake playa surface (estimated by the SMWD to be 59,650 acres), the estimated maximum groundwater discharge by direct evaporation of groundwater for the playa surfaces is 7,750 AFY or about 387,500 AF over the 50-year project period. If the previously described puffy surfaces on these playas represent the areas where capillary water action (i.e., active evaporation) is occurring and these puffy surfaces occur on about 60 percent of the playa surfaces [see Appendix A, Section 2.1.4 - Dry Lakes (Playas)], then the estimated groundwater discharge by direct evaporation for the playa surfaces is reduced to 4,650 AFY or about 232,500 AF over the 50-year project period. It should also be noted that in their discussion and use of the evaporative discharge rates reported by Lacznia et al., 2001, the SMWD elected to ignore the potential effect that precipitation (i.e., surface runoff) has on the total evaporative discharge rate that was measured, and therefore, chose to use the less conservative total discharge rates, which would tend to over-estimate the amount of discharge occurring at these dry lake areas.

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UNITED STATES MARINE CORPS
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A_USMC

IN REPLY REFER TO:
5000
4

MAR 19 2012

Tom Barnes, ESA
626 Wilshire Boulevard, Ste 1100
Los Angeles, Ca 90017

Dear Mr. Barnes:

SUBJECT: ENVIRONMENTAL IMPACT REPORT FOR CADIZ VALLEY WATER CONSERVATION,
RECOVERY, AND STORAGE PROJECT

Thank you for providing the Marine Corps Air Ground Combat Center with the information on the preparation of the draft Environmental Impact Report for the Cadiz Valley water storage project. The United States Marine Corps currently has a Land Acquisition and Airspace Establishment Study under way with a Final Environmental Impact Statement scheduled for release in April 2012. The public lands around your project have been temporarily withdrawn by the Bureau of Land Management for this study since 2008 to accommodate our decision making process.

As can be seen in the Draft Environmental Impact Statement for our proposed project, your project is located within the east study area and Alternative 3 for sustained, combined arms, live-fire and maneuver training. The Department of the Navy anticipates a Record of Decision in July 2012. If Alternative 3 is selected, your project would be incompatible with the proposed live-fire training.

We request that any California Environmental Quality Act compliance actions being analyzed for your project and its associated activities fully examine impacts of such activities on potential Marine Corps live-fire and maneuver training in that area. We appreciate your consideration in this matter and will keep you informed of decisions made by the Department of the Navy as it relates specifically to our Land Acquisition and Airspace Establishment Study and your project.

Sincerely,

J. A. GRANATA
Colonel
U. S. Marine Corps
Assistant Chief of Staff G-4

Copy to: Office of General Counsel