2.3 Organizations

TABLE 2-5
ORGANIZATIONS SUBMITTING COMMENTS

Commenter	Date of Comment	Signatory and Title
Ameron International Corporation	03/09/2012	Dennis E. Shearer, PE District Sales Manager
Best Western Colorado River Inn	01/26/2012	Philip C. Crouch, CHA General Manager
BNSF Railway Company	02/10/2012	David T. Rankin Senior General Attorney
Joseph E. Bonadiman & Associates, Inc.	03/13/2012	Joseph S.C. Bonadiman, Ph.D., PE
Center for Biological Diversity	03/14/2012	Adam Lazar
Desert Cycle Works	03/08/2012	[signature illegible]
Fairfield Inn & Suites by Marriott in Twentynine Palms	01/25/2012	Rob Fleck Director of Sales
Goodspeed Distributing Inc.	03/09/12	Thomas Goodspeed President
Layne Christensen Company	03/09/2012	Robert C. Minella Regional General Manager
Los Angeles Salad Company	03/08/2012	Robert Hana CEO
Lozeau Drury LLP on behalf of Laborers International Union of North America LaborersLocal Union 783 (2 submissions)	12/12/2011 and 01/11/2012	Richard Drury and Christina Caro Attorneys for Local 783
Mojave Desert Heritage and Cultural Association	01/24/2012	Chris Ervin
Mojave Desert Land Trust	03/09/2012	Nancy Karl Executive Director
Morongo Basin Regional Economic Development Consortium	03/09/2012	Alan Rasmussen Chair
Shady Myrick Research Project	12/06/2012	John Lightburn Project Director
Submitted on behalf of: Center for Biological Diversity: National Parks Conservation Association California Wilderness Coalition San Bernardino Valley Audubon Society Sierra Club Desert Committee Mojave Desert Land Trust Sierra Club Morongo Basin Conservation Association Defenders of Wildlife Desert Tortoise Council Sierra Club Desert Committee, San Gorgonio Chapter, and National Organization Southern California Watershed Alliance Desal Response Group Desert Survivors	03/13/2012	Seth Shteir California Desert Field Representative National Parks Conservation Association, *et al.*
Native American Land Conservancy	03/14/2012	Michael J. Madrigal President

TABLE 2-5
ORGANIZATIONS SUBMITTING COMMENTS

Commenter	Date of Comment	Signatory and Title
National Chloride Company of America (2 submissions)	02/01/2012 and 02/27/2012	Tom Beeghly
Needles Chamber of Commerce	01/12/2012	Jeff Williams President
Northwest Pipe Company	02/14/2012	Gary Stokes Sr. VP, Sales and Marketing
Office Supplies Plus	undated	Dee Richhart President & CEO
Orange County Coastkeeper	02/06/2012	Colin Kelly Staff Attorney
Pacific Institute	03/13/2012	Dr. Newsha Ajami
River Archaeological Heritage Association of the Lower Colorado River (4 submissions)	2/12/2012, 03/12/2012 and 03/13/2012 (2)	Ruth Musser-Lopez
Roscoe Moss Company	03/07/2012	Robert A. Van Valer
Salt Products Company	03/14/2012	Nael Bratt
Society for the Protection and Care of Wildlife	undated	H. Marie Brashear President
Tetra Technologies, Inc. via Rutan & Tucker, LLP (6 submissions)	03/14/2012, 03/16/2012 (2), 03/27/2012, 04/03/12	Robert S. Bower
	02/24/2012	Dennis Nakata Paralegal
Twentynine Palms Chamber of Commerce	12/15/2011	Maggie Chaffer President
The Wildlands Conservancy	03/14/2012	Frazier Haney
Willits & Newcomb, Inc.	03/12/2012	Jackie Maxwell President
Zepeda Labor Contracting, Inc.	03/09/2012	Elena Zepada Cota

O_Ameron 1

Ameron

Ameron International Corporation
Water Transmission Group
10681 Foothill Blvd., Suite 450
Rancho Cucamonga, CA 91730
PHONE 909 944 4100
FAX 909 944 4113
www.ameronpipe.com

March 9, 2012

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

Subject: Cadiz Valley Water Conservation and Recovery Project

Dear Mr. Barnes,

Ameron International Corporation has been manufacturing pipe since 1907. We have been in operation in San Bernardino County since 1962 manufacturing both steel and concrete pressure pipe. As one of the leading pipe manufacturers in the United States our products have been used around the world. Our parent company, NOV, which acquired Ameron last year is one of the largest oil service companies in the world with over 48,000 employees in 53 countries

We are very excited to support the Cadiz Valley Water Conservation and Recovery Project as an innovative water use opportunity for Southern California.

Any project built in California will have naysayers and critics but it is our understanding that the Draft Environmental Impact Report for the Cadiz project has answers to every question raised about its possible effect on the desert. The Draft EIR concludes that the construction and operation of the project will not have negative effects on the environment.

The project will however have a very positive effect on water reliability and job creation. The Cadiz project team has indicated its support for using local vendors and suppliers. Our San Bernardino County facilities employ over 200 union workers. This project would help to employ these workers for several months during the manufacturing and construction of the required 43 mile pipeline.

We would purchase steel for this project from California Steel Industries, also based in San Bernardino County. This project would have a very positive economic impact for many companies such as Ameron and CSI who are ready to get to work.

I fully support this project as a manufacturer, resident, and taxpayer of California.

Thank you for the opportunity to provide comments on this project.

1

Sincerely,

Dennis E. Shearer, P.E.
District Sales Manager

O_Best Western

Best Western
Colorado River Inn

2371 West Broadway
Needles, California 92363
760/326-4552 • Fax 760/326-4562
E-mail: info@coloradoriverhotels.com
For Reservations Call 1-800-Western

January 26, 2012

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

I am writing to support the Cadiz Valley Water Conservation Recovery and Storage Project Environmental Impact Report. As a member of the Board of Directors of the Needles Chamber of Commerce and General Manager of the Best Western Colorado River Inn and Rio del Sol Inn, I support the comments made in the letter submitted by the Chamber. I also would like to add my personal support for the project.

Cadiz Inc. is a responsible corporate citizen in the Mojave Desert. They own the largest private lands in the area, and run a large organic farm. Building on their proven track record of taking care of their land, the project is designed to be sustainable and environmentally safe.

The need for the project has grown as demand for water from the Colorado River has grown. Our community depends on the River for recreation and economic vitality. We are supportive of the Cadiz project that will create a new source of water for Southern California from a watershed that does not rely on the River.

The Draft Environmental Impact Report has verified many geological and groundwater facts about the area and proves that the project will work. Making use of this clean renewable water in a sustainable way makes sense to me.

In closing the economic impact of the continuation of this project on Needles, CA is vital to the future of this town that is the Route 66 gateway to this great state.

I support the project.

1

Sincerely,

Philip C Crouch, CHA
General Manager

O_BNSF

David T. Rankin
Senior General Attorney

BNSF Railway Company
P.O. Box 961039
Fort Worth, TX 76161
2500 Lou Menk Drive
Fort Worth, TX 76161
T: 817-352-2383
F: 817-352-2398
david.rankin@bnsf.com

VIA UPS OVERNIGHT DELIVERY
VIA E-mail (cadizproject@esassoc.com)

February 10, 2012

Santa Margarita Water District
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Suite 1100
Los Angeles, CA 90017

RE: Cadiz Valley Water Conservation, Recovery and Storage Project
EIR 2011031002

Dear Mr. Barnes:

This letter is in response to the above referenced draft environmental impact report. Based on the draft EIR, the proposed project appears to encroach upon right of way owned by BNSF Railway. BNSF is unaware of any agreement or other instrument that would entitled the project sponsor to use BNSF right of way. 1

The right of way in question includes BNSF's Los Angeles-Chicago transcontinental route. On average approximately 70 trains per day traverse over the right of way carrying goods in interstate commerce. In addition to the property concerns stated above, BNSF submits that a subsidence monitoring study and plan, including actions to be taken to avoid impacts to the track structure if subsidence occurs, for any portion of the project near BNSF's right of way should be included as a condition of approval of the project. 2

Respectfully submitted,

David T. Rankin
Senior General Attorney

cc: Robert Boileau
Tom Schmidt
David Schneider

JOSEPH E. BONADIMAN & ASSOCIATES, INC.
CIVIL ENGINEERING G.I.S. LAND SURVEYING
JOSEPH E. BONADIMAN, P.E. 1903-1990
CHARLES F. BONADIMAN, L.S. 1898-1988
70 Years
OF PROFESSIONAL SERVICE

March 13, 2012

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

Dear Mr. Barnes:

I have known Cadiz Inc. and visited the property in the East Mojave Desert for many years. I am a civil engineer and every year our Firm conducts a subsidence survey on site for compliance with the company's permitting for the organic farm. Based on my knowledge and experience of the property, the company, and the water resources, I am a strong supporter of the Cadiz Valley Water Conservation, Recovery, and Storage Project. Please consider these comments as part of the Environmental Impact Report for the project.

I know firsthand that the company is a good steward of the desert and a responsible corporate citizen. The concept and design of the Cadiz water project originate from the company's respect for the land and the environment. As a conservation project, it will capture clean drinkable water that otherwise would be lost to evaporation from the nearby Cadiz and Bristol Dry Lakes. The project saves clean drinking water by pumping the groundwater before it can become contaminated by the sodium chloride and calcium chloride under the dry lakes. This would put the water to beneficial use and is an appropriate use of the water resource.

I support the project design and engineering. The watershed is as large as the State of Rhode Island, but the only areas that will have significant drawdown are in the vicinity of the wellfield, on Cadiz owned property. This area will continue to be monitored for subsidence and any other potential impact from withdrawal of water. This approach is responsible, particularly given the railroad and gas line crossings in the area.

The wellfield and pipeline will be built on private pre-disturbed land and have no impacts on sensitive habitats. Constructing the pipeline on an active railroad right of way rather than on public land will limit the risk of harm to native habitat. This pipeline route shows good stewardship of the desert.

By using Infil 3.0, the latest groundwater model from the United States Geological Survey, the project's hydrologists have determined that the aquifer will continue to be recharged with an average of 32,000 Acre-feet per year of water from precipitation in the mountains.

The Draft EIR has found the project will not cause harm to the desert environment. This report has looked at the areas of historical concern about the potential for use of this aquifer and has found that none will be adversely affected by the project. For example, springs will not be affected because there is no connection to the aquifer under the wellfield. Dust won't be generated because the chemistry of dry lakes forms a crust when dry. The Draft EIR takes a

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234 North Arrowhead Avenue, San Bernardino, CA 92408-1013
(909)885-3806 ~ Fax (909)381-1721 ~ www.bonadiman.com

O_Bonadiman

careful and close look at the potential for impacts from construction or operations and finds no long-term unmitigable impacts.

To further guarantee that the project is operated sustainably, a state of the art monitoring plan will verify that there is no impact and identify intervention if needed.

The Draft EIR also includes the review of the project's Groundwater Stewardship Committee of independent outside experts. This panel found that water can be pumped safely and sustainably to improve the reliability of the Southern California water supply.

I applaud the extensive scientific and technical studies and peer reviews done for the project, and I support it.

1

Thank you,

Joseph S.C. Bonadiman, Ph.D., P.E.

O_CBD

CENTER *for* BIOLOGICAL DIVERSITY *Because life is good.*

VIA email

March 14, 2012

Tom Barnes
ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
FAX: 213-599-4301
Email: cadizproject@esassoc.com

RE: Cadiz Valley Water Conservation, Recovery, and Storage Project Draft Environmental Impact Report State Clearinghouse #2011031002

Request to Include and Review 2000-2002 Cadiz EIR/EIS, MWDSC Board Disapproval, and Related Documents

Dear Mr. Barnes,

As the Santa Margarita Water District considers its decision whether or not to approve the Cadiz Water Project pursuant to the California Environmental Quality Act (CEQA), it is important that the District and the public be made fully aware of the history of the project in its previous iteration. A previous version of this project was strongly criticized by local, state and federal leaders, then disapproved by the Metropolitan Water District of Southern California ("MWDSC") on October 8, 2002, and cancelled shortly thereafter. See the October, 8, 2002 MWDSC press release, attached.

As a result, we ask the Board to include in the administrative record, and to review in making its CEQA approval, the following information:

1. The complete EIR/EIS for the previous version of the project, available at http://www.pacinst.org/reports/cadiz/, as well as all related comments and supporting documentation submitted for the DEIR/EIS.

2. MWDSC decision to disapprove and cancel Cadiz project.

As a part of this review, we request consideration of the following recommendations made by the MWDSC staff regarding this project, as indicated on Item 9-5 of the October 8, 2002 MWDSC meeting agenda, attached and copied in part below:

> **9-5** Review Record of Decision and action on the right-of-way grant for the Cadiz Groundwater Storage and Dry-Year Supply Program. (WPQ&R)

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Arizona • California • Nevada • New Mexico • Alaska • Oregon • Minnesota • Vermont • Washington • Washington, DC
Adam Lazar, Staff Attorney • 351 California St., Suite 600 • San Francisco, CA 94104
Phone: (415) 436-9682 x320 • Fax: (415) 436-9683 • E-mail: alazar@biologicaldiversity.org

O_CBD

Recommendation:
Staff has concluded that material changes have occurred since the Cadiz Project was approved for investigation. Staff's recommendation is Option #2, and that further board action on the project be deferred for the following reasons:
1. Uncertainty over the availability of surplus water arising from unexpected hydrological conditions and the near term and potentially longer term threat of suspension of the Interim Surplus Guidelines.
2. The growing realization that significant quantities of native groundwater may not be available for export from this project as a result of public opposition and the limitations of the groundwater monitoring and management program. This adversely affects previous estimates of dry year water availability and project water supply costs.
3. The demand for Colorado River water supply for our blend treatment plants to maintain compliance with the new federal disinfectant by-product standards. This regulatory compliance imperative, over the next 10 years, may reduce our flexibility to store Colorado River water in the planned Cadiz and other off-aqueduct storage programs.
4. Increased capital costs above the $150 million estimate, as verified by independent consultant Black & Veatch requiring further time for negotiations with Cadiz Inc. should the Board desire to move forward.
5. The money that is planned to be spent on the Cadiz Project may be needed elsewhere to acquire water supplies that are not dependent upon surplus Colorado River water and the availability of disputed local groundwater supplies.
6. The position of our outside counsel and our Chief Financial Officer, that the proposed contract as negotiated places substantial financial risk on Metropolitan due to: increased capital and operating costs; higher per unit water supply and storage costs due to the uncertain native and surplus water supplies noted above; increased potential for environmental compliance cost and/or environmental litigation; and the difficulty of fully insulating Metropolitan from a Cadiz default.
[…]

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See 2002 Board Meeting Agenda, Attached. The BLM notice of cancellation is also included. I have also attached an editorial, applauding MWDSC's cancellation of the project, from the *Sacramento Bee,* and two additional articles summarizing the project's 2002 disapproval by MWDSC Board and "a key committee" from the *Los Angeles Times.* Thank you for consideration of these additional materials.

Sincerely,

Adam Lazar

Attachments

Attachments

1. MWDSC Board Meeting Agenda, October 8, 2002
2. MWDSC Press Release, Cadiz Project Cancelled, October 10, 2002
3. BLM Newsbytes: Storage Project Cancelled, October 2002
4. Los Angeles Times, *MWD Cancels Desert Storage Project*, October 9, 2002
5. Los Angeles Times, *MWD Told Mojave Plan Is All Wet*, October 8, 2002
6. Sacramento Bee, *Dead In the Desert (Editorial)*, October 10, 2002

O_CBD

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

MWD MEETING AGENDA

Regular Board Meeting

October 8, 2002

10:00 a.m. -- Board Room

Tuesday, October 8, 2002 Meeting Schedule		
8-8:30 a.m.	Rm. 2-413	Dirs. Computer Training
8:30 a.m.*	Rm. 2-456	CO&L
10:00 a.m.*	Board Room	Board Meeting

*Meetings will begin at the posted time or upon the conclusion of the preceding meeting (if later), and meetings will not be held concurrently.

MWD Headquarters Building • 700 N. Alameda Street • Los Angeles, CA 90012

1. **Call to Order**

   (a) Invocation: Rabbi Richard A. Flom, Burbank Temple Emanuel
   (b) Pledge of Allegiance: Director Ergun Bakall

2. **Roll Call**

3. **Determination of a Quorum**

PUBLIC HEARING

Comments on the proposed standby charge for Annexation No. 80 to Calleguas Municipal Water District

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4. **Opportunity for members of the public to address the Board on matters within the Board's jurisdiction.** (As required by Gov. Code § 54954.3(a))

Date of Notice: September 26, 2002

5. OTHER MATTERS

A. Approval of the Minutes of the Meeting for September 10, 2002. (A copy has been mailed to each Director)
Any additions, corrections, or omissions

B. Presentation of ten-year service pin to Vice Chairman William G. Luddy, representing City of Los Angeles

C. Adopt motion to adjourn the November Board Meeting to November 19, 2002 (due to Veterans Day). (Committee meetings on November 18 and 19, 2002)

D. Report of Nominating Committee
(a) Nomination of Board Chairman
(b) Election

E. Committee appointments. (Exec.)

F. Chairman's Monthly Activity Report

6. DEPARTMENT HEADS' REPORTS

A. Chief Executive Officer's Reports:

i. Oral report on Colorado River matters. (LC&P)

ii. Oral report on Bay-Delta and State Water Project matters. (LC&P, WPQ&R)

iii. Chief Executive Officer's summary of Metropolitan's activities for the month of September. **(Written report to be sent separately)**

B. General Counsel's summary of Legal Department activities for the month of September. **(Written report to be sent separately)**

C. General Auditor's summary of activities for the month of September

D. Ethics Officer's summary of activities for the month of September

7. ORAL REPORTS OF STANDING COMMITTEES

7-1 Executive Committee (Phillip J. Pace, Chair)
7-3 Budget, Finance and Investment (Jorge G. Castro, Chair)
7-4 Communications, Outreach and Legislation (Anthony R. Fellow, Chair)
7-5 Engineering and Operations (Marion V. Ashley, Chair)
7-6 Legal, Claims and Personnel (Langdon W. Owen, Chair)
7-7 Water Planning, Quality and Resources (Gary A. Morse, Chair)

8. CONSENT CALENDAR ITEMS -- ACTION

8-1 Approve risk management policy for purchase of Colorado River Aqueduct supplemental energy requirements, and amend Administrative Code. (BF&I, E&O)

Recommendation:

Option #1:

Adopt the CEQA determination and
a. Approve the Colorado River Aqueduct Supplemental Energy Risk Management Policy; and
b. Approve the changes to Metropolitan's Administrative Code.

8-2 Authorize $20.5 million in budgeted CIP funds to implement Phase 1 of the Water System Control Master Plan (Approps. 15397, 15398 and 15399). (E&O)

Recommendation:

Option #1:

Adopt the CEQA determination and authorize funds in the amount of $11.0 million for the Control System Enhancement Program (Approp. 15397), $8.10 million for the Distribution System Control and Equipment Upgrade Program (Approp. 15398), and $1.40 million for the Treatment Plants Control and Equipment Upgrade Program (Approp. 15399).

8-4 Authorize entering into an agreement for the Conjunctive Use Storage Project with Three Valleys Municipal Water District under Proposition 13. (WPQ&R)

Recommendation:

Option #1:

Adopt the CEQA determination and authorize the CEO with the approval of the General Counsel to enter into agreement based on the Program Term Sheet for the Live Oak Basin Conjunctive Use Project with Three Valleys Municipal Water District and the city of La Verne.

8-5 Appropriate $1.25 million and enter into an agreement, not to exceed $750,000, to provide consulting design services for preliminary design and environmental documentation preparation of Phase I of the East Marina at the Diamond Valley Lake (Approp. 15401). (DVR 9/17)

Recommendation:

Option #1:

Adopt the CEQA determination and
a. Appropriate $1.25 million and authorize the preliminary design and preparation of environmental documentation for Phase I facilities at the DVL East Marina; and
b. Authorize award of agreement for design services to the successful bidder in an amount not to exceed $750,000.

8-6 Approve conceptual sanitation plan for recreation within the Diamond Valley Lake watershed. (DVR 9/17)

Recommendation:

Adopt the CEQA determination and approve the conceptual sanitation plan for recreation within the Diamond Valley Lake watershed.

8-7 Appropriate $750,000 and enter into an agreement, not to exceed $575,000, to provide geotechnical studies of the Diamond Valley Lake East Recreation Area. (DVR 9/17)

Recommendation:

Option #1:

Adopt the CEQA determination and
a. Increase Appropriation No. 15334 by $750,000; and
b. Authorize award of agreement for geotechnical services to the named candidate in an amount not to exceed $575,000.

8-8 Approve fiscal year 2002/03 funding for new association memberships with annual dues exceeding $3,000 and ongoing memberships requiring Board approval, not to exceed $450,000. (Exec. 9/17)

Recommendation:

Option #1:

Adopt the CEQA determination and authorize the Chief Executive Officer to pay the above-listed expected membership dues/assessments for calendar year 2003, to be paid in FY 2002/03.

(END OF CONSENT CALENDAR)

9. OTHER BOARD ITEMS – ACTION

9-1 Adopt resolution to approve notice of potential discontinuance of service of surplus water from October 1, 2003 through September 30, 2004. (WPQ&R) **(Two-thirds vote required)**

Recommendation:

Option #1:

Adopt the CEQA determination and the Resolution of the Board of Directors giving notice of potential discontinuance of service of Interim Agricultural Water Program water in 2003.

9-2 Approve an implementation plan for the San Diego Pipeline 6 project. (E&O, WPQ&R) **(To be mailed separately)**

9-3 Adopt California Environmental Quality Act documents and approve a specific plan for the Diamond Valley Lake Park. (DVR 9/17)

Recommendation:

Option #1:

Adopt the CEQA determination and approve the Diamond Valley Lake Park Specific Plan.

9-4 Approve Principles of Agreement for water supply arrangements pursuant to San Luis Rey Indian Water Rights Settlement Act. (LC&P)

Recommendation:

Option #1:

Adopt the CEQA determination and approve the principles of agreement for the water supply arrangements to facilitate implementation of the San Luis Rey Indian Water Rights Settlement Act.

9-5 Review Record of Decision and action on the right-of-way grant for the Cadiz Groundwater Storage and Dry-Year Supply Program. (WPQ&R)

Recommendation:

Staff has concluded that material changes have occurred since the Cadiz Project was approved for investigation. Staff's recommendation is Option #2, and that further board action on the project be deferred for the following reasons:

1. **Uncertainty over the availability of surplus water arising from unexpected hydrological conditions and the near term and potentially longer term threat of suspension of the Interim Surplus Guidelines.**
2. **The growing realization that significant quantities of native groundwater may not be available for export from this project as a result of public opposition and the limitations of the groundwater monitoring and management program. This adversely affects previous estimates of dry year water availability and project water supply costs.**
3. **The demand for Colorado River water supply for our blend treatment plants to maintain compliance with the new federal disinfectant by-product standards. This regulatory compliance imperative, over the next 10 years, may reduce our flexibility to store Colorado River water in the planned Cadiz and other off-aqueduct storage programs.**

4. **Increased capital costs above the $150 million estimate, as verified by independent consultant Black & Veatch requiring further time for negotiations with Cadiz Inc. should the Board desire to move forward.**
5. **The money that is planned to be spent on the Cadiz Project may be needed elsewhere to acquire water supplies that are not dependent upon surplus Colorado River water and the availability of disputed local groundwater supplies.**
6. **The position of our outside counsel and our Chief Financial Officer, that the proposed contract as negotiated places substantial financial risk on Metropolitan due to: increased capital and operating costs; higher per unit water supply and storage costs due to the uncertain native and surplus water supplies noted above; increased potential for environmental compliance cost and/or environmental litigation; and the difficulty of fully insulating Metropolitan from a Cadiz default.**
7. **Although the Cadiz Project is listed in the California Colorado River Water Use Plan as one of the projects under consideration to assist the state in meeting its goal of 4.4 million acre-feet of annual Colorado River water use, it ids not a condition of the QSA or a condition of the Interim Surplus Guidelines, and is not a prerequisite to meeting Metropolitan's long term storage objectives.**

10. BOARD INFORMATION ITEMS

10-1 Status report for the Inland Feeder Program for activities through August 2002. (E&O)
[Any discussion of potential litigation to be heard in closed session. Conference with legal counsel—significant exposure to litigation (two matters); to be heard in closed session pursuant to Gov. Code § 54956.9(b)]

10-2 Preliminary Analysis of State Water Project Calendar Year 2003 Statement of Charges. (BF&I)

11. REPORTS OF SPECIAL COMMITTEES

12. FUTURE AGENDA ITEMS

13. ADJOURNMENT

NOTE: At the discretion of the Board, all items appearing on this agenda and all committee agendas, whether or not expressly listed for action, may be deliberated and may be subject to action by the Board.

Each agenda item with a committee designation will be considered and a recommendation may be made by one or more committees prior to consideration and final action by the full Board of Directors. The committee designation appears in parenthesis at the end of the description of the agenda item e.g. (E&O, BF&I). Committee agendas may be obtained from the Executive Secretary.

Requests for a disability related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting should be made to the Executive Secretary in advance of the meeting to ensure availability of the requested service or accommodation.

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METROPOLITAN WATER DISTRICT of SOUTHERN CALIFORNIA

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October 8, 2002

METROPOLITAN MOVES AHEAD WITH SEAWATER DESALINATION, PIPELINE TO AUGMENT THE REGION'S RELIABLE WATER SUPPLY

Board Elects to Forego Cadiz

Actions to further bolster the reliability of Southern California's water supplies through the region's inevitable dry spells and droughts were taken on two projects today by the Board of Directors of the Metropolitan Water District of Southern California.

"While we're proud of our accomplishments, which have provided the region with dependable water supplies during the worst year for rainfall here in recorded history, we're not resting on our laurels," said Metropolitan Board Chairman Phillip J. Pace.

"These two projects will augment and enhance the dependability of our water for decades to come," Pace said.

A major pipeline that will benefit the rapidly developing area of Temecula, in southwestern Riverside County, and which will eventually be extended to San Diego County, was given the green light. The board authorized $6.5 million for design work and the start of land acquisition for the north reach of San Diego Pipeline No. 6.

And desalting the Pacific Ocean for drinking water was moved forward when a board committee directed staff to investigate tripling the amount of desalinated seawater that Metropolitan would subsidize. Staff members also were told to prepare principles and terms for contracts with the five member agencies that have proposed seawater desalination plants to Metropolitan for subsidies.

When completed in 2006, the north reach of San Diego Pipeline No. 6, an approximately $100 million project, will deliver water from the Colorado River and the State Water Project to the Eastern Municipal Water District and the Western Municipal Water District of Riverside County. They, in turn, will deliver the water to the Rancho California Water District at Temecula, where the ability to store water in an aquifer until it is needed will help reduce the increasing demands on Metropolitan's nearby Skinner Filtration Plant.

On seawater desalination, Metropolitan's goal for developing desalinated water is currently 50,000 acre-feet annually (an acre-foot is about 326,000 gallons, enough water for an average family's needs for two years). Today, the board's Water Planning, Quality and Resources Committee directed staff to investigate the costs and benefits of increasing the target to 150,000 acre-feet annually to enhance the region's buffer against dry spells and droughts. Staff was also directed to identify other recycling and conservation programs that could be accelerated to increase the region's long-term water reliability.

Metropolitan has received proposals to build seawater desalination plants from five of its member agencies: San Diego County Water Authority, Long Beach Water Department, Municipal Water District of Orange County, West Basin Municipal Water District and Los Angeles Department of Water and Power.

On another development, the board elected to forego the Cadiz Water Storage and Supply Project. The action was taken because of dramatically changed conditions on the Colorado River, making it unlikely that there would be sufficient surplus water to store as the proposed program anticipated in the near-term.

###

The Metropolitan Water District of Southern California is a cooperative of 26 cities and water agencies serving 17 million people in six counties. The district imports water from the Colorado River and Northern California to supplement local supplies, and helps its members to develop increased water conservation, recycling, storage, and other resource-management programs.

News.bytes

A publication of
Bureau of Land Management in California

Issue date: 10/10/2002

This week in News.bytes:

- LOS ANGELES CANCELS CADIZ UNDERGROUND WATER SUPPLY PROJECT
- MORE CALIFORNIA WATER ISSUES ON PUBLIC LANDS
- NOT FOR EDUCATORS ONLY:
  - PLANT OF THE WEEK - Stebbin's madia
  - WILDLIFE TRIVIA: Kangaroo rats
- RECREATION ON PUBLIC LANDS: Focus on northern California
  - "Lost Coast trail is not for the faint of heart"
  - "Nation's system of old rail beds makes great trails"
  - Samoa Dunes OHV benefit event
- BRACING FOR MORE WILDFIRE: "It could be a disaster"
- VOLUNTEERS NEEDED: Bishop, Needles areas celebrate cooler National Public Lands Day
- PRESERVING THE COACHELLA VALLEY
- GLAMIS IMPERIAL GOLD MINE: controversy, issue update
- WILD HORSES and BURROS: adoptions, comments sought
- BLM LAW ENFORCEMENT ISSUES
- HEADLINES AND HIGHLIGHTS, including:
  - BLM and contractors recognized for environmental solution
  - Monument open house
  - Samoa Dunes benefit OHV event
  - Preparing for next dunes season
  - BLM rejuvenates wildlife habitat
- SELECTED UPCOMING EVENTS

LOS ANGELES CANCELS CADIZ UNDERGROUND WATER SUPPLY PROJECT

Los Angeles Metropolitan Water District board votes to cancel water supply project that would pump excess water under the Mojave Desert in wet years, and withdraw more in dry years, to serve southern California customers. Board cites environmental and financial risks. BLM had issued conditional right-of-way for the project's pipeline across public lands.
(Note: Many articles on this subject appeared in California and national media. This edition of News.bytes links to several of them.)

"MWD CANCELS DESERT STORAGE PROJECT" (Los Angeles Times, 10/09/2002)
"Board: The complex plan to keep Colorado River water underground is seen as risky, opposed by environmentalists."
http://www.latimes.com/news/local/la-me-mwd9oct09,story

"A WATER PLAN FOR SOUTH STATE EVAPORATES" (Sacramento Bee, 10/09/2002)
"An audacious and controversial Southern California water project died Tuesday, a major defeat for the British-born entrepreneur who promoted the plan and cultivated politicians such as Gov. Gray Davis in an effort to see it through."
http://www.sacbee.com/content/politics/story/4722227p-5739499c.html

"EDITORIAL: DEAD IN THE DESERT" (Sacramento Bee, 10/10/01)
Editorial: "This was one of the loonier water ideas Southern California has ever come up with -- to pay a politically connected entrepreneur millions upon millions of dollars to pump a corner of the Mojave Desert. Yes, the arid Mojave."
http://www.sacbee.com/content/opinion/editorials/story/4736192p-5752103c.html

"DESERT WATER PLAN DIES" (San Bernardino County Sun, 10/08/2002)
"Citing concerns about the environment, escalating costs and an uncertain water supply, the Metropolitan Water District board of directors Tuesday killed a controversial plan to store and pump water beneath the Mojave Desert."
http://www.sbsun.com/Stories/0,1413,208%257E12588%257E911996,00.html#

"CADIZ: BEYOND THE HEADLINE" (San Bernardino County Sun, 10/09/2002)
Newspaper's summary of the issues in the water district's decision.
http://www.sbsun.com/Stories/0,1413,208%257E12588%257E911978,00.html

"MWD's VOTE ENDANGERS CADIZ'S FUTURE" (Los Angeles Times, 10/09/2002)
"The demise Tuesday of Cadiz Inc.'s plan to build a multimillion-dollar water storage project in the Mojave Desert places the company under a huge financial strain that raises the question of whether it can survive."
http://www.latimes.com/business/la-fi-cadiz9oct09,story

"CADIZ GROUNDWATER STORAGE AND DRY-YEAR SUPPLY PROGRAM" (BLM California Issue Update, 10/9/02)
"The Cadiz Groundwater Storage and Dry-Year Supply Program is a proposal ... to use the groundwater basin underlying part of the Cadiz and Fenner Valleys in San Bernardino County for storage of water from the Colorado River for later recovery and transfer of indigenous groundwater under specified conditions for use in dry years to supply water for southern Californians."
(Note: see comment on "secure server" under Selected Upcoming Events below)
https://doi1.ios.doi.gov/newsbytes.nsf/siteurl/59527581?OpenDocument

MORE CALIFORNIA WATER ISSUES

"COUNTY PUSHES AQUIFER PROTECTION" (San Bernardino County Sun, 10/9/02)
Though the Cadiz underground water project may be canceled, local officials are worried about what they see as raids on their underground water -- including expansion of nearby areas in Nevada.

http://www.sbsun.com/Stories/0,1413,208%257E12588%257E914155,00.html

"POSTMUS PUSHES AQUIFER PROPOSAL" (Victorville Daily Press, 10/08/2002)
San Bernardino County supervisor proposes rule to protect area groundwater, to be voted on at Oct. 22 meeting. The Desert Groundwater Management Ordinance would "require the development of a proper management and monitoring plan by any large water extractor in an unregulated, undeveloped desert groundwater basin..."
(Note: the comma (,) at the end of this URL does not transmit to some email clients. You may need to copy and paste the following URL into your browser's "Address" or "Location" bar.)
http://www.vvdailypress.com/cgi-bin/newspro/viewnews.cgi?newsid1034091491,71640,

"DESPITE OBSTACLES, OFFICIALS SAY SoCal WATER SUPPLY IS SECURE" (San Francisco Chronicle, 10/09/2002)
"Even though the state's largest water district has rejected a major water storage plan, officials said they still will be able to provide enough water for Southern California."
http://www.sfgate.com/cgi-bin/article.cgi?file=/news/archive/2002/10/09/state1916EDT7190.DTL

"WATER-GATHERING ISSUES" (Mammoth Times, 10/10/2002)
Small community in Eastern Sierra says water diversion structure, built by Los Angeles Department of Water and Power on BLM-managed land, has reduced the flow of water to their properties. Some residents cite increased fire hazard, question legality of water diversion and status of BLM permit for a structure. Some hope for amicable solution with the water district.
http://www.mammothtimes.com/times2002/WaterRights10-10doc.html

"U.S. FILTER DETAILS PLAN IT SAYS WILL SAVE WATER, HELP SPECIES" (Palm Springs Desert Sun, 10/09/2002)
"A broken dike in 1905 created what is now known as the Salton Sea. North America's largest water company thinks a new dike would halt the maligned sea's ongoing decline -- and satiate the thirst of millions of urban Californians at the same time." (Also includes links to their earlier articles on the Salton Sea. BLM California has been involved in transfers of public land to help preserve habitat bordering the Salton Sea.)
http://www.thedesertsun.com/news/stories/local/1034120186.shtml

NOT FOR EDUCATORS ONLY:

PLANT OF THE WEEK - Stebbin's madia

Slender erect annual, stems 2 to 10 inches (5 to 25 cm) tall, branching near base and above, leaves linear, 1/2 to 1 inch (12 to 25 mm) long mostly crowned at stem bases and branches with inrolled margins, bright yellow daisy-like flowers with yellow anthers.
http://www.ca.blm.gov/redding/redmast.html

WILDLIFE TRIVIA QUESTION OF THE WEEK:

As in the famous TV show, this is posed as an answer -- you supply the question. And the answer is, "Merriam's kangaroo rat and Fresno kangaroo rat."
(Okay, here it is as a question, after all: "What distinction do these two share, among kangaroo rats on BLM California-managed lands?")

RECREATION ON PUBLIC LANDS: Northern California

"LOST COAST TRAIL IS NOT FOR THE FAINT OF HEART" (Contra Costa Times, 10/06/2002)

Feature article: ""We were soon to discover the rugged terrain that defeated road builders can leave you exhausted from boot-grabbing wet sand, scaling wet rocks and boulders and rogue waves that can send you dashing for refuge with a 40-pound pack on your back .... I now clearly understand why Highway 1 turns several miles inland here. When Caltrans builders reached the Lost Coast, they abandoned hope of conquering the area."
http://www.bayarea.com/mld/bayarea/living/health/fitness/4225200.htm

Related: **"KING RANGE NATIONAL CONSERVATION AREA TRAILS"** (BLM California Web site)
Includes the Lost Coast Trail.
http://www.ca.blm.gov/arcata/krncatrails.html

"NATION'S SYSTEM OF OLD RAIL BEDS MAKES GREAT TRAILS" (Redding Record-Searchlight, 10/06/2002)

"It's still not too late to celebrate the Rails to Trails Festival in Susanville. Sure, the event [concluded Sunday] with a 25-mile bike ride from Westwood to Susanville, but the Bizz Johnson Trail is open every day -- and it can handle mountain bikes, hikers, bird watchers and even snowshoers."
http://www.redding.com/outdoors/stories/20021007ou048.shtml

Related: **"BIZZ JOHSON TRAIL"** (BLM California Web site)
The trail winds 25.4 miles from Susanville to Mason Station, and follows the Susan River for 16 of its miles. Managed by BLM California's Eagle Lake Field Office and Lassen National Forest.
http://www.ca.blm.gov/eaglelake/bizztrail.html

"KIWANIS CLUB WILL HOLD BENEFIT RACE AT SAMOA DUNES" (BLM California news release, 10/08/2002)
The Humboldt Bay Kiwanis Club will hold a fund-raising off-highway-vehicle event at the Samoa Dunes Recreation Area on Saturday, Oct. 12. The Bureau of Land Management (BLM), which manages the recreation site, approved a permit for the "Sand Flea Grand Prix." The non-profit Kiwanis Club will use money raised to continue community service

programs. O_CBD
http://www.ca.blm.gov/news/2002/10/nr/NCnews02_samoarace/Conv.htm

BRACING FOR MORE WILDFIRE

"FIRE OFFICIALS BRACE FOR SANTA ANA WINDS" (Inland Valley Daily Bulletin, 10/05/2002)
"... state and federal officials on Friday warned that the most dangerous months of the worst fire season on record are still ahead .... Mountain communities such as Lake Arrowhead or Crestline could be wiped out before firefighters can get a handle on a Santa Ana wind-driven blaze." " Says one official, "If we can't put a fire out in 30 minutes, we'll have major fire. If we have a wind event and a fire, it will be a disaster."
http://www.dailybulletin.com/Stories/0,1413,203%257E21481%257E905627,00.html

"TIME RUNS OUT FOR INLAND FORESTS" (Riverside Press-Enterprise, 10/9/02)
"Trees are dying so rapidly in mountain resorts of the San Bernardino National Forest [bordering BLM-managed Santa Rosa and San Jacinto Mountains National Monument} that fire officials and residents are warning that the area soon could turn from natural wonder into national disaster." Says one: "Lake Arrowhead is going to burn down."
http://www.pe.com/localnews/stories/PE_NEWS_natrees09,57f99,html

"MORE PUBLIC LAND IS PUT OFF LIMITS" (Riverside Press-Enterprise, 10/10/01)
Not directly affecting public lands managed by BLM California -- but fire potential in Southern California is so high, more national forest and state park lands are closing to the public.
http://www.pe.com/localnews/stories/PE_NEWS_naclose10,a14a7,html

VOLUNTEERS NEEDED: Bishop, Needles areas celebrate cooler National Public Lands Day

That's "cooler" in terms of the weather – later dates mean volunteers won't have as much heat to contend with as they work on projects.

"EAST MOJAVE CLEANUP SCHEDULED" (Needles Desert Star, 10/09/2002)
About 150 volunteers needed to make substantial impact on East Mojave Trail cleanup, Oct. 19. "Participants are asked to bring leather work gloves, a hat, sunscreen, a lunch, a canteen, a lawn chair, empty boxes and a smile." (Also wear sturdy shoes such as hiking boots.)
http://news.mywebpal.com/news_tool_v2.cfm?show=localnews&pnpID=638&NewsID=373423&CategoryID=1393&on=0

Related: **"NATIONAL PUBLIC LANDS DAY 2002"** (BLM California Web site)
BLM California's Needles Field Office will hold their Public Lands Day event Oct. 19, so that volunteers will have less hot weather to cope with. Visit their newly-updated Web pages to learn more – and to learn how to become a Nationally Known Photographer!
http://www.ca.blm.gov/needles/npld2002.html

"EASTERN SIERRA RESIDENTS INVITED TO IMPROVE THEIR 'BACKYARD" O_CBD
(BLM California news release, 10/08/2002)
Local folks in the eastern Sierra are invited to join thousands of others across the country volunteering to cleanup the land. The Bureau of Land Management and U.S. Forest Service are hosting cleanup and planting projects in the Bishop area on October 19, 2002, in honor of National Public Lands Day. The Access Fund, Leave No Trace, and the Nation...
http://www.ca.blm.gov/news/2002/10/nr/CCnews02_BishopNPLD/Conv.htm

COACHELLA VALLEY: Preserving resources

"SHIFTING SAND DUNES ROLL ACROSS PROPERTY LINES, ROADS" (Riverside Press-Enterprise, 10/08/2002)
Coachella Valley Preserve, joint project of several agencies including BLM California.
http://www.pe.com/breakingnews/local/PE_NEWS_ndlizard,a136b,html

"COACHELLA VALLEY PRESERVE: Watchable Wildlife site" (BLM California Web site)
A part of the Coachella Valley jointly managed by several partners, including BLM California's South Coast/Palm Springs Field Office.
http://www.ca.blm.gov/caso/wf-coachella.html

"PROTECTING THE LAND" (Palm Springs Desert Sun, 10/6/02)
Friends of the Coachella Valley founded in 1987 "to acquire lands in and around the Coachella Valley to protect the wildlife, scenic, scientific, cultural and recreational land values."
http://www.thedesertsun.com/news/stories/features/1033873517.shtml

GLAMIS GOLD MINE: controversy, issue update

"BOXER CALLS FOR PROBE OF MINE PERMIT" (Washington Post, 10/05/2002)
Glamis, Inc. gold mine proposal: Senator asks Inspector General to determine whether the decisions on the mine "were influenced by officials who are too closely linked" to the mining industry and the company seeking the permit.
http://www.washingtonpost.com/wp-dyn/articles/A45718-2002Oct4.html

GLAMIS IMPERIAL GOLD MINE, CA
"The Imperial Project Mine, an open-pit gold mining operation in Imperial County, California is proposed by Glamis Imperial Corporation. A Record of Decision on the EIS/EIR, denying the Plan of Operations, was signed by former Secretary Bruce Babbitt on January 17, 2001. However, as recommended by Solicitor William Myers' opinion dated October 23, 2001, Secretary Gale Norton rescinded the denial decision on November 23, 2001, and the plan of operations is now being reconsidered by BLM."
(Note: see comment on "secure server" under Selected Upcoming Events below)
https://doi1.ios.doi.gov/newsbytes.nsf/siteurl/21738156?OpenDocument

"BLM DETERMINES GLAMIS-IMPERIAL MINING CLAIMS ARE VALID" (BLM California news release, 9/27/02)
Earlier news release states that BLM California action conducted a "validity examination" to determine if the company's mining claims were valid. BLM must still evaluate the company's proposed plan of operations.
http://www.ca.blm.gov/news/2002/09/nr/SOnews12_Glamis_FinalValidity/Conv.htm

WILD HORSES AND BURROS

"FREE HORSE TRAINING DEMONSTRATIONS COMING TO EUREKA" (BLM California news release, 10/01/2002)
North Coast horse fanciers can get free tips on horse gentling and training techniques, when the U. S. Bureau of Land Management hosts a wild horse and burro adoption event Saturday and Sunday, Oct. 19 and 20, at the Redwood Acres Fairgrounds in Eureka.
http://www.ca.blm.gov/news/2002/10/nr/NCnews01_eureka_training_oct02/Conv.htm

"ANIMAL ADOPTION EVENT NETS NEW HOMES FOR HORSES" (North County Times, 10/09/2002)
Of 80 mustangs and 20 burros at the Ramona Information Days for Equestrians last weekend, 61 horses and 13 burros were adopted to qualified homes. Highest bid was $660 for a 2-year-old, second highest was for a slightly trained 5-year-old; the rest went for the $125 minimum bid....
http://www.nctimes.net/news/2002/20021009/55226.html

"PUBLIC COMMENTS SOUGHT ON HORSE, BURRO CENTER" (Reno Gazette-Journal, 10/04/2002)
Proposed center in Carson City, Nevada area would be interpretive center where visitors could learn about wild horse and how they are managed, and offer a limited number of horse for adoption. Organizers also see it as a tourist attraction.
http://www.rgj.com/news/stories/html/2002/10/04/25314.php

"WILD HORSE AND BURRO ADVISORY BOARD MEETING TO BE HELD BY BUREAU OF LAND MANAGEMENT" (BLM California news release, 10/08/2002)
BLM's Wild Horse and Burro Advisory Board will hold a meeting October 28-29, 2002 in Salt Lake City, Utah. The Advisory Board will discuss matters pertaining to management and protection of wild free-roaming horses and burros on the Nation's public lands.
http://www.blm.gov/nhp/news/releases/pages/2002/pr021007_whb.htm

BLM LAW ENFORCEMENT ISSUES

"PRACTICING FOR QUICK RESPONSE IN THE DUNES" (Imperial Valley Press, 10/03/2002)
BLM and other law enforcement and medical agencies prepare for this year's off-road recreation season at the Imperial Sand Dunes, to avoid last year's problems. "Last

Thanksgiving, 40 officers tried to control an estimated 190,000 dunes visitors."
http://ivpressonline.com/archives/index.inn?loc=detail&doc=/2002/October/03-1743-news05.txt

"FOREST CRACKS DOWN ON ILLEGAL OHV USE" (Mammoth Times, 10/10/2002)
Officials say most off-highway vehicle users follow the rules – but as the sport gets more popular, there are more who do not. BLM teams up with forest and state law enforcement, with support of local recreation groups, to increase patrols in popular areas of the Eastern Sierra. Their goal: reduce damage to natural resources.
http://www.mammothtimes.com/times2002/OHV_Crackdown10-10.html

HEADLINES AND HIGHLIGHTS

BLM AND CONTRACTORS RECOGNIZED FOR ENVIRONMENTAL SOLUTION
The Association of Environmental Professionals (AEP), San Diego Chapter recognized BLM and partners as finalists under the "Outstanding Environmental Solution" category, at their 2002 Awards. The BLM contracted with URS Corporation and Gallegos & Associates to prepare a GIS data base, biological monitoring plan, and cultural resource report for BLM's portion of the San Diego Multiple Species Conservation Program -- to protect 85 species in a preserve area of 170,000 acres. BLM's portion -- over 28,000 acres -- includes Otay Mountain Wilderness.
The nomination read, in part: "This project represents a unique solution ... over 30 public, private, and educational agencies were contacted and a complete GIS database was compiled and constructed to lay the foundation for the cultural and biological monitoring plans. Over 125 layers were incorporated into a functioning, east-to-use database. {Before GIS] ... studies of this type would have taken many hours of field research, analysis, and documentation. By using GIS technology, the planning efforts were advanced because data layers such as species, habitats, vegetation, and climate could be evaluated simultaneously. The GIS database is installed in all local BLM offices, allowing biologists, archaeologists, and planners easy access for key decision making for the Otay/Kuchamaa Management Area."

"ARCHAEOLOGISTS AND TRIBES TARGET SITES' PRESERVATION" (Palm Springs Desert Sun, 10/05/2002)
"Sunshine, mild winters and abundant fresh water made ... early civilization possible in the desert Southwest. American Indians and archaeologists ...hope... modern advancement in the Southern California and Arizona deserts won't erase the lessons left behind by ancestors." Says BLM archaeologist at meeting: ""People see the desert and think it is a wasteland .... What they don't understand is the desert is one of the most sensitive environments we have."
http://www.thedesertsun.com/news/stories/local/1033780653.shtml

"LAND BUREAU REJUVENATES WILDLIFE HABITAT" (San Bernardino County Sun, 10/06/2002)
Riparian (river and stream bank) restoration efforts in Afton Canyon.
http://www.sbsun.com/Stories/0,1413,208%257E12588%257E907514,00.html

"OPEN HOUSE SLATED TO CELEBRATE 2nd ANNIVERSARY, CREATION OF THE SANTA ROSA AND SAN JACINTO MOUNTAINS NATIONAL MONUMENT"
(BLM California news release, 10/07/2002)
An open house is planned for Saturday, October 26, from 9 a.m. to noon to celebrate the 2nd anniversary of the creation of the Santa Rosa and San Jacinto Mountains National Monument. It will be held at the monument's visitor center on Highway 74 in Palm Desert. The event is free and open to the public.
http://www.ca.blm.gov/news/2002/10/nr/SRSJMNMnews01_2ndanniversay/Conv.htm

"CONGRESS UNLIKELY TO ACT ON FOREST PASS BY YEAR'S END" (Ventura County Star, 10/09/2002)
"...A Congress that has remained largely split on the Recreation Fee Demonstration Program's future" last year extended the pilot program through 9/30/04. Two bills introduce this year would have made the fee program permanent, but groups continue to lobby Congress for and against it. BLM is among federal agencies in the fee demo program.
http://www.insidevc.com/vcs/national/article/0,1375,VCS_123_1467867,00.html

"WATER DISTRICT HIRES WASHINGTON LOBBYISTS" (Riverside Press-Enterprise, 10/04/2002)
Water district backs bill to move high-voltage San Diego Gas & Electric power line (Valley Rainbow Interconnect) route out of Temecula Valley and onto public land in the Cleveland National Forest. BLM would handle right-of-way permits across public forest land.
http://www.pe.com/localnews/southwest/stories/PE_NEWS_nslines04,f307.html

"BLM ADVISORY GROUP TO MEET IN EASTERN SIERRA" (BLM California news release, 10/01/2002)
A citizen advisory group to the BLM will meet in the eastern Sierra next week. The Resource Advisory Council for Central California will tour the Lone Pine Film Festival on Friday, October 11th, and meet in the Patio Room at the fairgrounds in Bishop on Saturday, October 12.
http://www.ca.blm.gov/news/2002/10/nr/CCnews01_ccrac_meet1002/Conv.htm

"SUPERVISORS TELL BLM 'NO MORE LAND'" (Siskiyou Daily News, 10/03/2002)
Siskiyou County Supervisors say they want no more of the county's land going from private to public ownership, with loss of property tax revenues. Spurred by latest swap in the works: five miles of PacifiCorp/Scottish Power lands along Klamath River intended for management by BLM California or BLM Oregon.
http://www.siskiyoudaily.com/archives/index.inn?loc=detail&doc=/2002/October/03-3440-news4.txt

"PROTECTION DEBATED FOR ONE OF LAST WILD RIVERS" (Los Angeles Times, 10/07/2002)
"Environment: Bid for U.S. safeguards faces opposition from power companies, sportsmen .... California Wild Heritage Act of 2002 would protect 2.5 million acres of

federal land from invasive development and give portions of 22 rivers protection under the Wild and Scenic Rivers Act." The bill would affect a number of BLM-managed areas.
http://www.latimes.com/news/local/la-me-clavey7oct07,story

"MURPHY RETURNING TO POST" (Los Angeles Daily News, Santa Clarita edition, 10/01/2002)
Santa Clarita's first intergovernmental relations officer returns to post he left in 1998 -- and "is expected to take the lead in Santa Clarita's ongoing fight against a planned sand and gravel mine in Soledad Canyon." (Cemex gravel operation received permit from BLM)
http://www.dailynews.com/Stories/0,1413,200%257E20949%257E896152,00.html

ANSWER TO THIS WEEK'S WILDLIFE TRIVIA QUESTION:

Merriam's kangaroo rat and Fresno kangaroo rat.
And the correct **QUESTION** is:
"What are the two SMALLEST kangaroo rats found on BLM California lands?"

Learn more about these two animals on the BLM California wildlife database.
(Note: see comment on "secure server" under Selected Upcoming Events below)
Fresno kangaroo rat:
https://doi1.ios.doi.gov/blmcawildlife.nsf/siteurl/82276494?OpenDocument
Merriam's kangaroo rat
https://doi1.ios.doi.gov/blmcawildlife.nsf/siteurl/594645?OpenDocument

SELECTED UPCOMING EVENTS

(Note: the Upcoming Events Web site is now on a more secure server, and your browser may state that "You are about to view pages over a secure connection" and ask you to "Trust a Security Certificate" from the Department of Interior that hosts this site. To view the pages, you must select "Yes" or "OK" for both questions.)

10/10/2002 - Fort Sage Bird Study Public Meeting
Susanville
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/17968414?OpenDocument

10/11/2002 - Cache Creek Management Plan Public Meeting
Lakeport
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/66894027?OpenDocument

10/11/2002 - Central California Advisory Council public meeting
Bishop
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/13190662?OpenDocument

10/12/2002 - Samoa Dunes Recreation Area - Kiwanis Club OHV event
Eureka

https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/39352255?OpenDocument

10/15/2002 - Cache Creek Management Plan Public Meetings
Woodland
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/67853972?OpenDocument

10/16/2002 - Cache Creek Management Plan Public Meeting
Colusa
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/46930190?OpenDocument

10/17/2002 - Northeast California Advisory Council meeting
Carson City, NV
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/67111010?OpenDocument

10/18/2002 - Wild Horses Arrive at the Redwood Acres Fairgrounds
Eureka
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/1974823?OpenDocument

10/19/2002 - Wild Horse and Burro Adoption
Eureka
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/31323873?OpenDocument

10/19/2002 - Needles - Eagle Pass Road clean-up
East Mojave Heritage Trail
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/547952?OpenDocument

10/19/2002 - Historic Falk Town Hike
Headwaters Forest Reserve
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/38009156?OpenDocument

10/23/2002 - Northwest California Resource Advisory Council meeting
Weaverville
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/29995881?OpenDocument

10/24/2002 - Ridgecrest Steering Committee
BLM Ridgecrest Field Office
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/75728543?OpenDocument

10/26/2002 - Historic Falk Town Site Hike
Headwaters Forest Reserve
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/47200733?OpenDocument

10/26/2002 - Santa Rosa and San Jacinto Mountains National Monument 2nd Anniversary Open House
Palm Desert
https://doi1.ios.doi.gov/blmEvents.nsf/siteurl/78730602?OpenDocument

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News.bytes published by
Bureau of Land Management
California State Office
2800 Cottage Way, Suite W-1834
Sacramento, Ca 95825
(916) 978-4600
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The Region

MWD Cancels Desert Storage Project

Board: The complex plan to keep Colorado River water underground is seen as risky, opposed by environmentalists. The vote is a blow for Davis backer and his Cadiz Inc.

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October 09, 2002 | MICHAEL A. HILTZIK | TIMES STAFF WRITER

The Metropolitan Water District Tuesday canceled the controversial Cadiz program, a multimillion-dollar project to store water under the desert that was once seen as a key to Southern California's water supply future but had become an environmental and political lightning rod.

The narrow vote by the district's Board of Directors provoked a brief round of applause from a boardroom audience that was heavily populated by environmentalists and public-interest activists who had made the proposal a statewide issue.

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"It's great when a public agency actually does the right thing and turns down a project like this that would have been very unsound," said Simeon Herskovits, an attorney for the Western Environmental Law Center. The Taos, N.M., organization represents a coalition of environmental groups opposed to the project.

Also in the audience was the project's main sponsor, Keith Brackpool, a leading financial backer of Gov. Gray Davis and an advisor to the governor on statewide water issues.

Brackpool's company, Santa Monica-based Cadiz Inc., stood to earn $500 million to $1 billion in revenue over the 50-year term of the project, but now faces a doubtful future.

Tuesday's vote represents a personal embarrassment for Brackpool, a British-born investment professional who made his public reputation in California by proselytizing about the need for new approaches to the state's water supply crisis.

Davis, who received more than $235,000 in campaign contributions from Brackpool and the money-losing Cadiz, placed Brackpool and other Cadiz officials on statewide advisory panels on natural resources.

In one last personal appeal Tuesday, Brackpool strove to assure the board that the numerous lingering environmental and economic questions about the project could be successfully addressed.

FROM THE ARCHIVES

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He reminded the board that the federal government had given its final environmental approval to the project Aug. 29, after five years of costly environmental studies.

"Do we really want to throw the baby out with the bathwater less than 60 days after we received all those federal approvals?" he asked.

But responses from several board members suggested that they had become weary of debating a project about which too many environmental questions remained unresolved, along with new questions about the practicality of the proposal.

"The Cadiz program doesn't represent reliability at this point," said Timothy Brick, a board member representing the city of Pasadena. "It represents risk."

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The innovative and complex project envisioned storing up to 1.5-million acre-feet of surplus Colorado River water in an aquifer under a Mojave Desert tract owned by Cadiz for extraction in dry years.

The company also stood to earn a profit by selling the MWD as much as 1.5 million acre-feet of indigenous ground water already flowing through the aquifer. The MWD and Cadiz were to share the $150-million capital cost, most of it devoted to construction of a 35-mile pipeline between the MWD's Colorado River aqueduct and the Mojave site.

Critics had argued that ground water extraction on the anticipated scale threatened permanent damage to the fragile desert ecosystem. Although the Interior Department ruled in August that a proposed network of testing wells around the site would deliver adequate warning of impending damage, few environmentalists agreed.

Among the strongest critics was Sen. Dianne Feinstein (D-Calif.), who said she feared that the project would threaten the nearby Mojave National Preserve and who asked the MWD to reject the proposal.

In any event, the district's enthusiasm for the project had ebbed markedly since it was first presented to the district in 1997. At that time, the MWD was just beginning to grapple with the implications of a looming cutback in the water it received from the Colorado River. Any program to husband the Colorado resources seemed promising.

Over the last two years, however, a severe drought on the Colorado has sharply reduced the district's expectations of the surplus it will receive over the next 12 to 15 years, making it uncertain whether there will be enough water to store at Cadiz to justify the project's expense. Continuing environmental opposition could also have slashed the volume of ground water that could have been extracted from the site.

The deteriorating financial condition of Cadiz, meanwhile, undermined its suitability as a business partner with the district.

"At a minimum, it is simply not timely for us to be making a decision to proceed with this project," MWD Chief Executive Ronald R. Gastelum told the board before its vote.

The motion to cancel the program passed with 50.25% of the board's weighted votes in favor, a razor-thin margin over the 50% needed, with the largest bloc coming from Los Angeles County board members. Cast in opposition were 44.22% of the votes, including votes from San Diego and Orange County members. The balance of the votes were held by board members not in attendance. Under the MWD system, the 37 board members are entitled to weighted votes based on the size and valuation of the 26 local and municipal water districts they represent.

The motion prevailed over a single alternative: a plan, favored by Gastelum and the district's professional staff, to defer approval of the project indefinitely. That vote failed 47.11% to 47.36%.

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MWD Told Mojave Plan Is All Wet

Resources: Committee recommends killing the Cadiz storage project for Colorado River water.

October 08, 2002 | MICHAEL A. HILTZIK | TIMES STAFF WRITER

In a surprise development, a key committee of the Metropolitan Water District board recommended Monday that the district kill the controversial Cadiz water project, a $150-million plan to store surplus Colorado River water under the Mojave Desert.

The MWD's Water Planning, Quality and Resources Committee voted 6 to 3 to recommend that the district's full board "not proceed with the project." The vote went further than a recommendation from the MWD staff, which had only proposed that the district indefinitely defer the project.

The full board, made up of 37 members representing more than 26 local and regional water districts, will take up the question at its regular monthly meeting today.

Whether the board will follow the committee's recommendation is unclear. The board is not obligated to accept the committee's recommendation. Moreover, while each board member has a single vote on the committee, their votes on the full board are weighted according to their districts' original investment in the MWD infrastructure. Two of the committee votes to kill the project, however, came from representatives of Los Angeles County, which has the largest weighted vote on the full board.

A board rejection would deal a mortal blow to the project, which has been under consideration for five years but has generated fierce opposition on environmental and fiscal grounds.

After the vote, Santa Monica-based Cadiz Inc. urged the board to continue considering the project.

"Given the need for reliable water supplies and given that the program has received all federal approvals, we respectfully suggest that the public interest is best served by an open, public review of the environmental documentation prepared by MWD staff and consultants," the company said in a prepared statement.

"A great deal of public and private resources have been expended. To not complete the evaluation and review would not best serve the public interest."

Cancellation of the project would be a serious defeat for Cadiz's chief executive, Keith Brackpool, a key financial supporter of Gov. Gray Davis and an advisor to the governor on state water policy. Brackpool conceived the water project and ushered it through five years of state and federal environmental reviews.

Under the project's original plans, Cadiz and the MWD would share the cost of constructing a 35-mile pipeline to carry water between the MWD's Colorado River Aqueduct and Cadiz's storage site in the Mojave Desert north of Palm Springs.

Under the tentative partnership terms, the MWD was to deliver an upfront payment of more than $54 million to Cadiz upon final approval of the project.

The plan called for the MWD to store as much as 1.5 million acre-feet of surplus Colorado River water in an aquifer under the site and would have given the district the right to buy from Cadiz another 1.5 million acre-feet of naturally occurring groundwater from the aquifer. Cadiz stood to earn $500 million to $1 billion from the plan over 50 years. One acre-foot is roughly enough water to serve two average households for a year.

On Aug. 29, the Interior Department gave environmental approval for the sale to the MWD of the 35-mile right of way needed to build the pipeline.

But opponents have raised numerous questions about it. Water district sources have said that cost estimates for the project have risen, which would require further negotiations with the company.

Environmental critics contend that extraction of groundwater on the scale that Cadiz projects could subject the delicate Mojave Desert ecosystem to irreversible damage. Among those who have called on the MWD to cancel the program are U.S. Sen. Dianne Feinstein (D-Calif.) and Rep. Jerry Lewis (R-Redlands), whose district includes the site.

The most potent argument against the project recently has been that the continuing drought has rendered the availability of sufficient surplus water to fill the storage site doubtful. That was one of the main reasons that MWD Chief Executive Ronald R. Gastelum cited last month when he recommended that the board indefinitely defer the project.

Because of the drought, MWD officials say their expectations of available surplus over the next 15 years--even under average rainfall conditions--have been cut to 4 million acre-feet from as much as 9 million. That's not enough to justify the construction of major storage project, MWD officials say.

Gastelum also said that Cadiz's uncertain financial condition increased the financial risks that would be borne by the MWD.

District officials have long been concerned that the funds that MWD paid to Cadiz could be attached by the company's creditors, leaving the company without the wherewithal to meet its partnership obligations.

When Gastelum recommended to the board that the project be deferred, he said that one of the unresolved issues in the district's negotiations with the company is "the difficulty of fully insulating Metropolitan from a Cadiz default."

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Opinion EDITORIALS

Editorial: Dead in the desert

A water deal lacked a key liquid asset

Bee Editorial Staff
Published 2:15 a.m. PDT Thursday, October 10, 2002

This was one of the loonier water ideas Southern California has ever come up with -- to pay a politically connected entrepreneur millions upon millions of dollars to pump a corner of the Mojave Desert. Yes, the arid Mojave.

Total payout: more than a half-billion dollars (valued in today's currency) over a half-century. With a Rolodex of lobbyists and leaders that only money can buy, the company named Cadiz Inc. seemed to have it all. Everything, that is, except the water.

And that's what did this deal in. Or did it? The West's most intriguing water story didn't disappoint all the way to its apparent end. The same agency that initially embraced this deal, the Metropolitan Water District of Southern California, ended up killing it in one of the closest votes in its 56-year history. Rather than accept a right of way over federal desert property to build a water pipeline, MWD voted to walk away. With this courageous and correct move, the much-ballyhooed field of water marketing woke up to reality. No water, no deal.

Whether the plan is to store water underground or simply pump like mad from the native supply, there has got to be solid science to back it up. These banks can leak (water can migrate underground, or puddle on top). And aquifers have limits to pumping that depend on how quickly nature replenishes the supply.

The Cadiz proposal, as initially reviewed by the U.S. Geological Survey, didn't pass either test. The proposed "solution" was to build the $150 million project and then see what happens. But an important thing happened inside the MWD board. It began to focus more on water than politics and all of Cadiz's friends,

from Gov. Gray Davis to former Interior Secretary Bruce Babbitt to outgoing state Sen. Jim Costa of Fresno.

It may have been Costa who actually did in the Cadiz deal. He recently publicly warned MWD that he may look kindly on dismembering the agency if it walked away from deals. He didn't cite Cadiz by name. He didn't have to. Some MWD members got the message, and it was cited by one as the reason to kill this deal. Beware of Costa, Davis, Babbitt or any other of the many pals of Cadiz if they dare try anything to resurrect this dumb desert deal.

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O_DesertCycle

March 8, 2012

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

Re: Cadiz Valley Water Conservation, Recovery and Storage Project

Dear Mr. Barnes:

As owners of a business selling parts, accessories and service for ATVs, bikes, and personal watercraft in Twentynine Palms California, we know first hand that protection of the desert is important. Our customers are residents and recreational users of the desert. We value the open space and the unique environment we have in the Mojave Desert.

The Cadiz Valley Water Conservation, Recovery and Storage Project promises to safely and conservatively use water from beneath the desert for Southern California. We support this project because it has been designed with desert protection in mind.

The amount of water proposed to be pumped out of the aquifer is limited and will be kept to that amount by the size of the pipeline. The location of the pipeline along an active railroad line will mean less disruption of pristine desert lands. This is good planning.

The Chamber of Commerce of Twentynine Palms has also given its support to the project because it is good for the local economy. More jobs in this area would be a very good development for our community.

For these reasons, we support the Cadiz Valley Water Conservation, Recovery and Storage Project.

1

Sincerely,

Desert Cycle Works

O_Fairfield Inn 1

25 January 2012

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

Dear Mr. Barnes:

I am writing to support the Cadiz Valley Water Conservation Recovery and Storage Project Environmental Impact Report. My name is Rob Fleck and I am the Director of Sales here at the Fairfield Inn & Suites by Marriott in Twentynine Palms. Twentynine Palms is the nearest neighboring city of the project. We strongly support the investment of the company and the project in the 29 Palms community.

Guests of our hotel come to the area for contractor work, vacations and recreational activities in the Joshua Tree National Park. Some of these activities include: hiking, biking, rock climbing, camping, etc. We are tourism oriented and do not feel that this project would cause any damage to our beautiful desert landscape.

Cadiz Inc. has farmed in the Valley for many years. To have the community support on this project is very important. Cadiz Inc. is a Chamber of Commerce member that is in good standing within the community. The company and project have the support of the Twentynine Palms Chamber of Commerce.

The studies and reports included in the draft environmental impact report show that the water can be safely used as a water supply. The project will not endanger any plants or animals in the desert. Using the water in a sustainable way will be good for the local community and the state of California.

As a representative of the Fairfield Inn& Suites, I support the project.

1

Sincerely,

Rob Fleck
Director of Sales
760-361-5000

March 9, 2012

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

Dear Mr. Barnes:

I support the Cadiz Valley Water Conservation, Recovery and Storage Project. This project is a good investment in the high desert economy and can be built without harming the desert.

R.E. Goodspeed and Sons Distributing is a third generation family owned company that has been in business in Hesperia for over 35 years. We have been through good economic times and bad. Just like California has wet years and dry years, we know you have to hope for the best and plan for the worst to make it over the long haul.

The Cadiz water project will help residential and business water customers have stable prices and reliable water supplies whatever weather and the economy bring. California needs to plan ahead for dry years. We need to make good use of the water that's available locally. We can get through the next drought by storing water from wet years. The Cadiz project will help make that possible.

In the high desert, the project will create jobs and improve the tax base in San Bernardino County. We support the job creation and economic development aspects of this project and we ask you for your support in permitting this project.

1

Sincerely,

Thomas Goodspeed
President

O_Layne 1

LayneChristensenCompany
WATER RESOURCES DIVISION

March 9, 2012

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

Dear Mr. Barnes,

The Cadiz Valley Water Conservation, Recovery and Storage Project represents good science and good economics for San Bernardino County, and Layne Christensen Company has been proud to be a partner in the validation of the project.

Layne Christensen has a major facility in Redlands, within San Bernardino County. We have been in the well drilling business for decades, and have sent crews all around the world.

The Cadiz project is a technically sound proposal. Extensive scientific and technical research, including test wells drilled by Layne Christensen's local rigs and crews, has validated the project. Over the past several years, Layne Christensen provided five different drilling methods in order to gather the scientific data to verify the amount, location, and quality of water in this area.

There is no doubt that a huge water source is available at Cadiz. As a matter of fact, one of the test wells produced 1,500 gallons a minute with no draw down, meaning a huge quantity of water is stored in this aquifer. One of our executives has remarked that it was the most productive well he had seen in 45 years.

There are billions of gallons of water, between 17 -34 million acre-feet, stored in the aquifer in the Cadiz and Fenner Valleys. The total water withdrawal after 50 years would be less than 10% of the water in the watershed's vast aquifer system. Fresh water would continually enter the aquifer via recharge from precipitation at higher elevations, so the actual take of water would be even lower.

This water can be put to beneficial use without negative impacts from the draw down. The greatest draw down is likely to be seen in the vicinity of the wellfield, on land owned by Cadiz Inc. and the farther reaches of the watershed will not have any observable drawdown. The wellfield will not have any impact on water flow to spring in the mountains that are found more than ten miles away.

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O_Layne 1

With locally manufactured pipe and components by local workers, the Cadiz project also represents a significant economic investment in San Bernardino County. Because we support both the science and the economics, our company and employees have come out publically to support the project at comment meetings.

For these reasons, we have been and continue to be strong supporters of the Cadiz Valley Water Conservation, Recovery, and Storage Project

1

Thank you for your consideration and attention.

Sincerely,

Robert C. Minella
Regional General Manager
Layne Christensen Company

1717 Park Avenue • Redlands, CA 92373 • Phone: (909) 390-2833 • www.LayneChristensen.com

O_LASalad1

Los Angeles Salad Company

March 8, 2012

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

Dear Mr. Barnes;

Los Angeles Salad Company would like to submit comments on the Cadiz Valley Water Conservation, Recovery and Storage Project in addition to our remarks given at the comment meeting held last month.

We are based in the City of Industry. We grow, pack and distribute a wide range of fresh vegetables. Over the past five years we have worked with Cadiz, Incorporated and their organic farm. Growing organic produce is a major commitment to stewardship of the land and providing consumers with a high quality product.

To be certified organic, a farm must meet stringent guidelines. For example, no chemical pesticides or fertilizers may be used. Organic farming of lemons and dried on the vine raisins isn't the easiest way to grow these crops, but it is the Cadiz Inc. way. Going organic helps keep their land and the water under the land free of chemicals as well. The Cadiz farm also uses drip irrigation to conserve water. 1

In our experience, the Cadiz farm and the people who work there have always demonstrated a true respect and pride in the land and the water. They have designed this water project with the same respect, limiting the use of undisturbed desert land and maximizing the conservation of water.

Based on our experience with Cadiz as operator of the farm, we believe they would take the same care that they take with the growing of organic vegetables in construction of the water project.

Los Angeles Salad fully supports the Cadiz Water Project and the efforts taken to ensure that it is operated sustainably and with respect for the land and the environment.

Thank you for your consideration.

Sincerely,

Robert Hana
C.E.O.

600 So. Sixth Ave. • City of Industry, CA 91746 • ph 626-322-9000 • fx 626-322-9002

LOZEAU DRURY LLP
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richard@lozeaudrury.com

BY ELECTRONIC MAIL AND US MAIL

December 12, 2011

Mr. John Schatz, General Manager
Santa Margarita Water District Board of Directors
Santa Margarita Water District Administration Office
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688
Email: custservice@smwd.com

CC: Tom Barnes
ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
Email: cadizproject@esassoc.com

RE: CEQA and Land Use Notice Request for Cadiz Valley Water Conservation, Recovery, and Storage Project (State Clearinghouse No: 2011031002)

Dear Mr. Schatz, Mr. Barnes:

I am writing on behalf of Laborers International Union of North America, and its members living in San Bernardino County ("Commenters") to request that the Santa Margarita Water District ("District") put us on its notice list for any and all notices issued under California Planning and Zoning Law and/or the California Environmental Quality Act ("CEQA"), referring or related to the Cadiz Valley Water Conservation, Recovery, and Storage Project (State Clearinghouse No: 2011031002), a groundwater extraction project to be executed in two phases: Phase I, the Conservation and Recovery Component; Phase II is the Imported Water Storage Component, during which the Conservation and Recovery Component would be constructed to capture and conserve the average annual natural recharge in the Fenner and northern Bristol Valleys that would otherwise discharge to the Bristol and Cadiz Dry Lakes. The Project would construct extraction wells (wellfield) on property owned by Cadiz and a 42-mile underground water conveyance pipeline within an active railroad right-of-way that intersects the Colorado River Aqueduct (CRA). Phase II, the Imported Water Storage Component, would make available up to one million acre-feet (MAF) of groundwater storage space to be used as part of a conjunctive use project, conveying Colorado River water to recharge basins in the Fenner Valley to percolate into the ground for storage and future withdrawal as a dry-year supply (collectively, "Cadiz Project").

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O_Lozeau Drury / LIUNA Local 783 1

In particular, we hereby request that the District send by mail or electronic mail to our firm at the address below notice of any and all actions or hearings related to activities undertaken, authorized, approved, permitted, licensed, or certified by the District and any of its subdivisions, and/or supported, in whole or in part, through contracts, grants, subsidies, loans or other forms of assistance from the District, including, but not limited to the following:

- Notice of any public hearing in connection with the Project as required by California Planning and Zoning Law pursuant to Government Code Section 65091.
- Any and all notices prepared pursuant to the California Environmental Quality Act ("CEQA"), including, but not limited to:
  - Notices of any public hearing held pursuant to CEQA.
  - Notices of determination that an Environmental Impact Report ("EIR") or supplemental EIR is required for a project, prepared pursuant to Public Resources Code Section 21080.4.
  - Notices of availability of an EIR or a negative declaration for a project prepared pursuant to Public Resources Code Section 21152 and Section 15087 of Title 14 of the California Code of Regulations.
  - Notices of approval and/or determination to carry out a project, prepared pursuant to Public Resources Code Section 21152 or any other provision of law.
  - Notice of approval or certification of any EIR or negative declaration prepared pursuant to Public Resources Code Section 21152 or any other provision of law.
  - Notice of exemption from CEQA prepared pursuant to Public Resources Code section 21152 or any other provision of law.
  - Notice of any Final EIR prepared pursuant to CEQA.

Please note that we are requesting notices of CEQA actions and notices of any public hearings to be held under any provision of Title 7 of the California Government Code governing California Planning and Zoning Law. This request is filed pursuant to Public Resources Code Sections 21092.2, and 21167(f) and Government Code Section 65092, which require local agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

Please send notice by electronic mail to:

Richard Drury
Lozeau Drury LLP
410 12th Street, Suite 250
Oakland, CA 94607
richard@lozeaudrury.com; christina@lozeaudrury.com

1

Please call should you have any questions. Thank you for your attention to this matter.

Sincerely,

Richard Drury
Christina Caro

LOZEAU DRURY LLP
T 510.836.4200
F 510.836.4205
410 12th Street, Suite 250
Oakland, Ca 94607
www.lozeaudrury.com
richard@lozeaudrury.com

BY FACSIMILE, ELECTRONIC MAIL AND US MAIL

January 11, 2012

Mr. Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
FAX: 213-599-4301
Email: cadizproject@esassoc.com

Mr. John Schatz, General Manager
Santa Margarita Water District Board of Directors
Santa Margarita Water District Administration Office
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688
Email: cadizproject@smwd.com; custservice@smwd.com

RE: Draft Environmental Impact Report: Cadiz Valley Water Conservation, Recovery, and Storage Project (State Clearinghouse No: 2011031002)

Dear Mr. Barnes, Mr. Schatz:

I am writing on behalf of Laborers International Union of North America, Laborers Local Union 783, and its members living in San Bernardino County ("LIUNA" or "Commenters") regarding the Cadiz Valley Water Conservation, Recovery, and Storage Project (State Clearinghouse No: 2011031002), a groundwater extraction project to be executed in two phases: Phase I, the Conservation and Recovery Component; Phase II is the Imported Water Storage Component, during which the Conservation and Recovery Component would be constructed to capture and conserve the average annual natural recharge in the Fenner and northern Bristol Valleys that would otherwise discharge to the Bristol and Cadiz Dry Lakes. The Project would construct extraction wells (wellfield) on property owned by Cadiz and a 42-mile underground water conveyance pipeline within an active railroad right-of-way that intersects the Colorado River Aqueduct ("CRA"). Phase II, the Imported Water Storage Component, would make available up to one million acre-feet ("MAF") of groundwater storage space to be used as part of a conjunctive use project, conveying Colorado River water to recharge basins in the Fenner Valley to percolate into the ground for storage and future withdrawal as a dry-year supply (collectively, "Cadiz Project").

LIUNA hereby requests and urges the Santa Margarita Water District ("District") to fully comply with the California Environmental Quality Act ("CEQA"), Public Resources Code § 21000 et seq., in all aspects of the Cadiz Project, including but not limited to, District preparation and consideration of any and all CEQA documents prepared for the Project, including the Draft Environmental Impact Report ("Draft EIR") and any other CEQA documents prepared for the

1

O_Lozeau Drury / LIUNA Local 783 2

Cadiz Project, District responses to any and all comments submitted by responsible agencies, members of the public, or others on the Cadiz Project, and District consideration of any and all applications for licenses, permits, or any other notices or approvals sought for the Cadiz Project.

1

LIUNA expressly reserves the right to submit additional comments on the Cadiz Project in conjunction with the Final Environmental Impact Report ("Final EIR") for the Project or any other future actions taken with regard to the Project.

2

LIUNA has previously filed with the District a request to be placed on the notice list for any and all CEQA or other land use actions, notices, or hearings related to the Cadiz Project, and reiterates that request here. We also specifically request that the District place us on its notice list to inform us of any other meetings, comment periods, or other actions taken with regard to the Draft and Final EIRs for the Project.

3

Please send notices by electronic mail and U.S. Mail to:

Richard Drury
Christina Caro
Lozeau Drury LLP
410 12th Street, Suite 250
Oakland, CA 94607
richard@lozeaudrury.com; christina@lozeaudrury.com

Please call should you have any questions. Thank you for your attention to this matter.

Sincerely,

Richard Drury
Christina Caro
Attorneys for Laborers International Union of North America, Laborers Local Union 783

1/24/2012

Santa Margarita Water District and Cadiz, Inc.
24 January 2012
MDHCA Public Comments on Cadiz Valley Water Project Draft EIR
Presented by Chris Ervin, Mojave Desert Heritage and Cultural Association

CSERVIN@COX.NET
714-824-9948

Good evening. My name is Chris Ervin. I am speaking on behalf of the Mojave Desert Heritage and Cultural Association, a non-profit incorporated in the State of California. We are a volunteer cultural heritage institution located in the community of Goffs on the eastern side of the Fenner Watershed. Our organization is dedicated to preserving the natural and cultural history of the Mojave Desert.

The MDHCA operates a 75-acre cultural center in Goffs and has over 700 members. We are open to the public; maintain a 100-year-old schoolhouse listed on the national register of historic places; operate a research center, and have published over two dozen books on California desert history. The MDHCA's existence depends on the water we pump from our two wells. The strategic plans for our organization extend into perpetuity, so we are naturally concerned about any potential impacts to our groundwater posed by the Cadiz Valley project. 1

Although the Draft Environment Impact Report we're here to discuss includes comments made by the MDHCA last year at the time of the Notice of Publication, we continue to have concerns, three of which I will address:

1. The DEIR indicates that a non-profit California mutual water company comprised of the participating water agencies will be responsible for the management and reporting of the project monitoring wells. The MDHCA reiterates its prior comment that well monitoring and reporting should be the responsibility of an impartial third party. As long as monitoring and reporting is under the control of a project-created entity, there is the appearance of a conflict of interest. 2

O_MDHCA 1

2. Section 4.9.3 of the DEIR indicates the "project may be deemed to have a significant effect on the environment with respect to hydrology and water quality if it would substantially deplete or interfere with the production rate of pre-existing nearby wells" and "not support existing land uses for which permits have been granted." Unfortunately, nowhere in the DEIR is the phrase, "pre-existing nearby wells" defined. Although Goffs is located 40 miles northeast of the Cadiz project site, it is within the Fenner Watershed. We are concerned that if our groundwater is negatively impacted by the project that any complaints we might lodge with Cadiz could be dismissed because our wells are characterized as not being "nearby." 3

3. Cadiz has not recognized the need to directly notify the large number of property owners within the influence of its project. Cultural institutions have a commitment to give back to their communities. In the desert, distances are great and neighbors spread out, but the desert is not empty. It is in recognition of this aspect that the MDHCA highlights the following concern regarding our neighbors.

   It may be difficult to tell from the vantage point of a high rise in downtown Los Angeles, but there are over eleven hundred owners of desert property two hundred miles away in the Fenner Watershed. These private property owners reside in more than twenty states and as far east as New England. Some of these land owners have existing wells that could be impacted by this project, and all of them have the right to drill for water on their properties. 4

   The DEIR may have addressed the absolute minimum requirements to reach these property owners by placing public notices in local newspapers, but most of these properties are second homes or investments and the owners are not served by area newspapers. By not directly notifying every property

owner within the watersheds scheduled to be drained, the project has deprived a large constituency of the opportunity to provide public comments. 4

Due to the above stated reasons, the MDHCA feels the Cadiz Valley Water project poses a threat to our groundwater resources, and therefore the existence of our Goffs Cultural Center. If we lose our water and our community, twenty years of volunteer labor and over two million dollars in donations to preserve the largest collection of materials devoted to the history of the Mojave Desert would be lost. 5

Thank you.

Mojave Desert Land Trust
Preserving land to enjoy forever
61732 29 Palms Hwy, Joshua Tree, CA 92252 Ph 760.366.5440 Fax 888.869.4981 www.mojavedesertlandtrust.org

March 9, 2012

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

SUBJECT: **Comments on the Cadiz Valley Water Conservation, Recovery, and Storage Project Draft Environmental Impact Report State Clearinghouse #2011031002**

Dear Mr. Barnes:

Thank you for this opportunity to submit comments regarding the Cadiz Valley Water Conservation, Recovery, and Storage Project ("project") Draft Environmental Impact Report ("DEIR").

I am writing on behalf of The California Desert Land Conservancy, dba Mojave Desert Land Trust (MDLT), a 501(c)(3) conservation organization. MDLT's mission is to protect the California Desert's ecosystems and its scenic and cultural resource values through land acquisition, volunteer stewardship, restoration, education and outreach, as well as collaboration with federal, state and local agencies and organizations. Our conservation and habitat restoration work includes partnerships with the National Park Service, the Bureau of Land Management (BLM), the California Department of Fish and Game, the Department of Defense and private foundations.

MDLT is a major stakeholder and owner of lands within the California desert. MDLT has invested more than $18,000,000 to acquire 37,000 acres of land for conservation. These conservation investments include:

- 23,600 acres within three (3) desert national parks (most of which is located within the Mojave National Preserve)
- 6,300 acres within dozens of designated Wilderness areas managed by the BLM (including Old Woman Mountains, Turtle Mountains, Sheephole Valley, and Cadiz Dunes which surround the project area)
- 3,300 acres within the Chuckwalla Desert Wildlife Management Area (DWMA) – critical tortoise habitat
- 2,100 acres within wildlife linkage areas to protect connectivity between these large natural areas

O_MDLT

The purpose of our work is to remove development threats and other incompatible uses, and to preserve the biological, scenic and cultural resources of sensitive desert ecosystems. Through conveyance of these lands to the United States, our investments also provide more efficient ecosystem management by their respective agencies (National Park Service and the BLM).

In consideration of our investments, and the private and public donations given to us to protect these lands, we are compelled to question and comment on the significant impacts of the Cadiz project.

We believe that the volume of water planned for extraction out of the California desert would far outweigh any "benefits" this project may claim to provide. Furthermore, the benefits claimed by the project proponents would not even be provided to residents of San Bernardino County, yet these same residents, stakeholders, and agencies would bear the permanent brunt of those impacts, which are not sustainable but irreversible.

The biological resources impacted by the project would reach far beyond the project area that could include the Mojave National Preserve, the surrounding Wilderness areas managed by the BLM, and the connectivity or wildlife linkages connecting them that listed species require to survive. The potential impacts to natural water resources beyond the project area are too severe to ignore, given the fragile and sensitive nature of natural springs and seeps even without a significant and long-term water extraction. 1

The DEIR does not adequately nor appropriately analyze impacts to groundwater and other biological resources. The impacts to the threatened desert tortoise and big horn sheep should be seriously considered. That consideration should also expand to include the cumulative impacts of the massive take of habitat from renewable energy development at the same time.

The project's location within important linkages between Mojave National Preserve and several designated Wilderness areas is problematic. In addition, it is nearly adjacent to a recovery unit (DWMA) containing critical tortoise habitat. The air quality, water availability and quality, and wildlife habit values would not be able to be sustained by the fragile ecosystem due to the impacts of this project. 2

The DEIR fails to include updated studies for several special-status wildlife species, including: the Mojave fringe-toed lizard, (DEIR, p 4.4-47,) burrowing owl, (DEIR, p. 4.4-47,) and American Badger. (DEIR, 4.4-48.) The DEIR fails to provide adequate baseline information for a number of wildlife species and therefore is unable to adequately evaluate the impacts to them.

Project proponents claim that the project is "sustainable" yet the arid environment of the desert is clearly not able to recharge an aquifer. This claim of "sustainability" simply does not make sense, especially in light of the fact that the water extracted from San Bernardino County would not benefit San Bernardino County, but would benefit Santa Margarita Water Agency (SMWA), Three Valleys Municipal Water District, Suburban Water System, Golden State Water Company, Jurupa Community Services, and California Water Service Company. 3

O_MDLT

The project's lead agency should not be the same agency that will obviously benefit from the project's completion. San Bernardino County should be the lead agency in permitting and reviewing this project, and public hearings held in San Bernardino County should determine the outcome and mitigation providing the public with input into what will be a significant and long-term take of their resources. 3

The project proponents claim that water is "saved" by the project because it might reduce evaporative losses when water ponds on the surface during some wet periods. *Yet, it is precisely this water that local ecosystems rely upon for survival.*

Water in the desert is a rare thing, and the desert pools, ephemeral seeps, natural springs, and playas support delicate ecosystems dependent on the ability of groundwater to reach the surface. This project would draw down that groundwater, leading to the inevitable disappearance of surface water with highly uncertain, poorly understood, but almost certainly negative ecological consequences. 4

As a major landowner and business paying significant property taxes, land management costs, and generating dozens of jobs through our conservation work, and as a conservation partner to state and federal agencies, we believe that this project would affect and negatively impact our investments and our future work. The project would affect the quality of air, water and wildlife habitat for many miles beyond the project area, and that fact significantly affects our investments, our donors, and our ability to receive future donations and grants for our work. The quality of wildlife habitat and its biological resources weigh heavily on our ability to qualify for grant and other funding for our work *which provides a sustained and significant public benefit*. 5

Our precious water and other biological resources must not be allowed to be taken for short-term gain. A complete CEQA/NEPA review is required. The earlier Cadiz project was rejected 10 years ago after undergoing a combined CEQA/NEPA review. It was a bad idea then, and it's an even worse idea now given climate change affects on the desert, and a massive renewable energy take of tortoise and other sensitive species' habits at the same time. 6

Thank you for the opportunity to submit our comments. We look forward to a much improved and proper approval and review process for this project.

Sincerely,

Nancy Karl
Executive Director

O_MBREDC

MORONGO BASIN REGIONAL
M·B·R·E·D·C
ECONOMIC DEVELOPMENT CONSORTIUM

March 9, 2012

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

Dear Mr. Barnes:

The Morongo Basin Regional Economic Development Consortium agreed in January 2012 to support the Cadiz Valley Water Conservation, Recovery, and Storage Project.

The Consortium is a diverse group of people representing local business, education, nonprofit, and other sectors who share a concern for the economic vitality of the Morongo Basin. Our mission includes support for job creation and workforce development in the area communities such as Morongo Valley, Homestead Valley, Yucca Valley, Joshua Tree, and Twentynine Palms.

During our January meeting, we learned about the Cadiz Valley Water project's expected economic impact for the County of San Bernardino as analyzed by Dr. John Husing, the very well respected Inland Empire economist. In particular, we are excited by the potential job creation of the project, which has the capacity of creating a number of direct and indirect jobs over a four year period of time. By creating jobs in construction and manufacturing of the pipeline and wellfield, the project will directly benefit the Morongo Basin communities.

Dr. Husing found that San Bernardino County companies can manufacture the pipe, and there is an available local workforce for construction. His report describes the IMPLAN model used by economists in determining the economic impact of funds, and his model took into account the high rate of unemployment in the County. More broadly, Dr. Husing found the project will have a ripple effect of benefits for the area, which includes a four year total of more than $878 million in economic activity to be generated by the project.

The total permanent tax revenue increase for San Bernardino County is estimated at more than $5 million per year by Dr. Husing. Building the tax base also will infuse needed funds and resources into local government services.

1

P.O. Box 1398
Joshua Tree, CA 92252

760/366-3791

O_MBREDC

The Cadiz Inc. ranch has been a successful local operation and good community partner in local events. Our board was very interested to learn of the plans for the Cadiz Valley Water project, and on behalf of the board of the Morongo Basin Regional Economic Development Consortium, I submit this letter of support for the project.

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Sincerely,

Alan Rasmussen
Chair

O_Myrick Research Proj

From: Miller, Michele
To: Tom Barnes; Nicolle Ianelli Steiner
Subject: FW: Request for Cadiz EIR
Date: Tuesday, December 06, 2011 11:41:55 AM

Hi,

Just received this request. I can follow up with Mr. Lightburn's request and mail him one of our copies we received.
Also, I will keep a list of folks from whom we receive requests.

From: john lightburn [mailto:shady_myrick@yahoo.com]
Sent: Tuesday, December 06, 2011 11:24 AM
To: Miller, Michele
Subject: Request for Cadiz EIR

Michele, I am with the F. M. "Shady" Myrick Research Project, located at Goffs. By way of this communication, we are requesting that we be sent a hard-copy of the Cadiz Project EIR and all other related materials.

Please send to:

John Lightburn
Shady Myrick Research Project
c/o Mojave Desert Heritage and Cultural Association
37198 Lanfair Rd. #G-15
Essex, California, 92332-9786

We would also like to be added to you mailing lists as an interested party wishing to comment on this project.

Please send all correspondence, informationals, and notices to this email address:

1

Thank you to your response to our request.

John Lightburn, Project Director
310-220-5752

VIA email and FedEx

March 13, 2012

Tom Barnes
ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
FAX: 213-599-4301
Email: cadizproject@esassoc.com

RE: Comments on the Cadiz Valley Water Conservation, Recovery, and Storage Project Draft Environmental Impact Report State Clearinghouse #2011031002

Submitted on behalf of:
Center for Biological Diversity:
National Parks Conservation Association
California Wilderness Coalition
San Bernardino Valley Audubon Society
Sierra Club Desert Committee
Mojave Desert Land Trust
Sierra Club
Morongo Basin Conservation Association
Defenders of Wildlife
Desert Tortoise Council
Sierra Club Desert Committee, San Gorgonio Chapter, and National Organization
Southern California Watershed Alliance
Desal Response Group
Desert Survivors

O_NPCA-CBD et al.

Dear Mr. Barnes:

On behalf of the Center for Biological Diversity ("CBD"), the National Parks Conservation Association ("NPCA"), the California Wilderness Coalition (CWC), San Bernardino Valley Audubon Society, Sierra Club Desert Committee, the Mojave Desert Land Trust, the Morongo Basin Conservation Association, Defenders of Wildlife, the Desert Tortoise Council, the San Gorgonio Chapter of the Sierra Club, Southern California Watershed Alliance, Desal Response Group and Desert Survivors, we appreciate and welcome the opportunity to comment on the Cadiz Valley Water Conservation, Recovery, and Storage Project ("Cadiz Water Project," "Proposed Project" or "Project") Draft Environmental Impact Report ("DEIR").

For the reasons set forth below, commenters request that a new DEIR be prepared for the Proposed Project under the lead agency of San Bernardino County. Also, the right-of-way ("ROW") for the Proposed Project requires Bureau of Land Management ("BLM") approval, and the Proposed Project, therefore, requires full review under the National Environmental Policy Act ("NEPA"), 42 U.S.C. section 4321 *et seq.* We urge the appropriate state agencies to coordinate with the appropriate federal agencies to prepare a joint EIR/DEIS for the Proposed Project that complies with both state and federal law. 1 2

NPCA is a non-profit organization whose mission is to protect and enhance America's national parks for present and future generations. NPCA has 450,000 members nationwide and over 45,000 California members, and works with elected officials, the media, and communities to foster stewardship of our national treasures. NPCA has three offices in the Mojave Desert: Joshua Tree, Barstow, and Las Vegas.

The Center for Biological Diversity ("CBD") is a national, nonprofit conservation organization with more than 320,000 members and online activists dedicated to protecting endangered species and wild places. Due to the proposed project's significant impacts to deserts and to the development of suburban sprawl, CBD has followed the proposed project closely in its various iterations through the years, and has utilized its staff biologist to review the relevant impacts on plants and wildlife.

The California Wilderness Coalition ("CWC") protects the natural landscapes that make California unique, providing clean air and water, a home to wildlife, and a place for recreation and spiritual renewal. With 3,000 members, CWC is the only organization dedicated to protecting and restoring California's wild places and native biodiversity on a statewide level. Since 1976, we have empowered local communities and conservationists to be the voice for wild California.

The San Bernardino Valley Audubon Society (SBVAS) is a chapter of the National Audubon Society, which has about half a million members nationwide. The chapter itself has approximately 1800 members who reside in the inland empire. Audubon members regularly visit the Mojave desert for birdwatching, photography, and the appreciation of nature.

The Sierra Club is a national nonprofit organization of approximately 1.3 million members and supporters dedicated to exploring, enjoying, and protecting the wild places of the

earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. Sierra Club's Desert Committee includes members that focus on conservation of deserts of the southwest, including California. The San Gorgonio chapter focuses on conservation issues throughout San Bernardino County, California.

Mojave Desert Land Trust conserves land with important biological, cultural and scenic values. Our work helps to secure the biodiversity, beauty, and integrity of healthy desert ecosystems for future generations to enjoy. We have 1,300 land trust members, and as a major landowner in the California desert, we have acquired more than 37,000 acres of important desert habitat through acquisition, restoration, land stewardship and strategic partnerships with state and federal agencies.

The Morongo Basin Conservation Association (MBCA) advocates for a healthy desert environment that nurtures our rural character, cultural wealth, and economic well-being. We have over 400 members and supporters.

Defenders of Wildlife ("Defenders") is a national environmental organization with 1.1 million members and supporters in the U.S., including 109,000 in California. Defenders is dedicated to protecting all wild animals and plants in their natural communities. To this end, Defenders employs science, public education and participation, media, legislative advocacy, litigation and proactive on-the-ground solutions in order to prevent the extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

The Desert Tortoise Council is a private, non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of this species. Established in 1976 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council regularly provides information to individuals, organizations and regulatory agencies on matters potentially affecting the desert tortoise within its historical range.

The Southern California Watershed Alliance works on steelhead restoration, dam removal, and jobs through water conservation programs with community based-organizations throughout the Southern CA Bight, from Point Conception to southern point south of Ensenada, Baja CA, Mexico.

The Desal Response Group works on the environmental response to ocean water desalination proposals in CA and northern Baja California by promoting the alternative portfolio of water reclamation, onsite water reuse, serious water demand programs, stormwater and urban runoff capture and treatment, rainwater catchment, and greywater.

Desert Survivors is a non-profit organization with the mission of experiencing, sharing and protecting desert wilderness. Recognizing that the places they love to explore will not remain wild unless they give others the opportunity to experience them, Desert Survivors is committed to actively monitoring and preserving desert wilderness. In addition to its advocacy

O_NPCA-CBD et al.

work, Desert Survivors leads free backpacking trips and car camps for people of all levels of skill and fitness, as well as offering courses in beginning backpacking. Desert Survivors has 700+ members, primarily in California and Nevada

Dr. James Andre is an individual with 19 years experience in desert ecology in his position as Director of the UC Granite Mountains Desert Research Center.

I. EXECUTIVE SUMMARY

The DEIR for the Proposed Project falls woefully short of meeting the core requirements of CEQA. We also have serious concerns about the Proposed Project's potential to degrade federally protected National Park Service ("NPS") and BLM lands, and the region's fragile desert ecosystem. Unfortunately, these concerns remain largely invisible in the DEIR. 3

The DEIR fails to comply with CEQA in many important respects, including:

Improper Lead Agency

Santa Margarita Water District ("SMWD") is not the proper Lead Agency for the Proposed Project under CEQA. SMWD neither designed nor plans to build the Proposed Project, and the location of the dry lakes forming the heart of the Proposed Project—and thus many of its major environmental impacts—are in eastern San Bernardino county, well outside of SMWD's boundaries in Orange County. In fact, the precise scope of SMWD's ownership and operational roles are entirely unclear (see our comments on Chapter 1 below). Nor does SMWD provide any project "approval" beyond that of the other project participants (other than approval of the EIR itself). Moreover, SMWD does not have the requisite regional perspective and broad expertise to weigh the interests of the Proposed Project proponents, including SMWD itself, against the interests of the diverse stakeholders potentially adversely affected by the Project, particularly San Bernardino County, where most of the direct impacts are located. That SMWD will also be a beneficiary of Project water further undermines its status as an objective judge of the DEIR's adequacy. 4

Since the vast majority of direct impacts will be experienced in San Bernardino county, and since San Bernardino county is responsible for either issuing a groundwater permit or approving an exemption, the County is the proper lead agency under CEQA. The missing memoranda of understanding and suspect payments between SMWD, Cadiz and San Bernardino county create the frightening prospect of approving up to two million acre-feet of groundwater extraction from the County without so much as a hearing in that County-- a woeful abdication of authority. As it stands, citizens of San Bernardino county are most likely unaware that they are on the verge of issuing an exemption to a permit for withdrawing up to 2 million acre-feet—a fatal oversight on the County's part. The County's secondary approval as a "responsible agency" of a groundwater management plan that will effectively exempt this project from permitting is likewise unacceptable. Even then, the County is not even listed currently as a responsible agency—it is a mystery how the County could "approve" the GMMMP as a non-participant in the project. Nor is any mention made in the DEIR of the fact that the County is being *paid* by the Santa Margarita Water District to carry out its CEQA duties, which remain

largely invisible in the present EIR. What, exactly, are these duties, and why is the County being paid for them? The County must be held accountable for the loss of so much water in its jurisdiction and the associated impacts; having the County act in its proper role as CEQA lead agency for this project is a first, critical step. 4

Omission of Responsible Agencies

The Metropolitan Water District of Southern California and the Regional Water Quality Control Board are agencies with discretionary permitting authority over this project, and both should have been considered responsible agencies in this EIR. Overall, the EIR appears to have randomly chosen three small water districts as the lead and responsible agencies; the inclusion and exclusion from this EIR of agencies appears to be arbitrary at best. 5

Misleading Project Objective and Description

The DEIR's flawed project objective and description deprive the public and decision makers of the informed participation and decision making required by CEQA. The project has been divided into two components, but only one component, the groundwater export component, is adequately analyzed in the DEIR. Leaving the recharge/storage component at a less thorough "project level" of analysis than the export component violates CEQA's requirement to accurately describe the proposed project, to adequately evaluate all reasonably foreseeable impacts, and to include the entire scope of the project in the review. The Proposed Project's fundamental premise—that mining water at rates three to ten times the estimated aquifer recharge rate is sustainable, and in fact amounts to water "conservation"—is upside down, misleading, and wholly unsupported by data and analysis included in the DEIR. By its own design, the Proposed Project will pump an average of 50,000 acre-feet per year ("AFY") (approximately 16.25 billion gallons per year) for 50 years. Even describing the project as exporting an average of 50,000 AFY appears to be arbitrary, as there is no firm limit, by statute, regulation, or binding agreement, on what the project could export. The result would leave the aquifer with a deficit of between 1.1 and 2.1 million acre-feet of water. Labeling this massive withdrawal and export of groundwater as "conservation" is without basis in law or policy and stretches the limits of credulity. 6

Beyond the errors of omission and inconsistency explained below, the DEIR misrepresents the true nature of the Proposed Project. The actual project goal—aggressively mining water from a desert aquifer—is hidden behind green buzzwords like sustainability, conservation, and beneficial use. The Proposed Project exchanges a constitutionally-protected public good for private gain. Until the project objective matches the true project purpose, the DEIR will remain fundamentally flawed under CEQA.

Misapplied Concepts of "Conservation" and "Beneficial Use"

The DEIR claims that this project furthers the California Constitution's emphasis on water conservation and beneficial use. However, mining an aquifer and leaving it with significantly less water than when the Proposed Project would start, and causing major environmental impacts in the process, is not a reasonable understanding of "conservation." 7

Likewise, the DEIR's claim that exported water will be "beneficially used" appears to be based on the theory that consumptive use is the highest and greatest purpose of any water supply; this claim reflects an utterly incorrect understanding of the "beneficial use" concept and is grounded in neither law nor common sense. 7

Inadequate Alternatives Analysis

Similarly, the Proposed Project's objectives are so narrowly framed that a meaningful alternatives analysis is impossible because "conservation" as a project objective is only achieved through water exports. The DEIR fails to adequately discuss alternatives that would meet the meaning of the "conservation" element of the Proposed Project's title without exporting tens of thousands of acre-feet of water, or the stated objective of providing "sustainable operations" without massive drawdown of the aquifer. 8

Failure to Describe Potential Impacts to Water Supply, Water Quality, Waters of the U.S., Wildlife, and Air Quality and "Piecemealing" of the Proposed Project

Finally, the Proposed Project's potential impacts, particularly with regards to hydrogeology, air qualify, and wildlife, are inadequately discussed in the DEIR. The water impacts are systematically underestimated. Hydrologically, the cone of depression would be a major impact created by 50 years of pumping during the Proposed Project's lifetime, and would continue to expand well after pumping stopped—possibly for decades. Due to the long-term cone of depression, major project impacts, including subsidence and airborne dust, could not be arrested once pumping stopped, making mitigation largely ineffective. Likewise, major impacts to water quality from the storage/recharge component of the Proposed Project are given only cursory treatment in the DEIR. The DEIR also provides insufficient discussion of the impacts to sensitive plants and wildlife, and fails to sufficiently account for a likely significant increase in dust pollution due to the drying-out of Cadiz and Bristol dry lakes. 9 10 11

The DEIR assumes that the project will have no effect on waters of the U.S., but this is not true. The revised jurisdictional delineation of Cadiz and Bristol dry lakes erroneously changed the jurisdictional status of these dry lakes and found them to be non-jurisdictional. That jurisdictional delineation is unsupportable and should not be relied on by the project proponent. In fact, these dry lakes and their tributaries are jurisdicational waters of the U.S. and the impacts of the project on these dry lakes and their tributaries is subject to Clean Water Act permit requirements and Army Corps of Engineers jurisdiction. 12

The DEIR also systematically avoids analysis of the impacts on water quality of importing turbid, highly impure Colorado River or State Water Project water, and intermingling it with pristine groundwater, even though this project component is highly likely and has been studied at length. The only way to estimate the impacts of this imported water on existing water quality is through testing of the three sources and providing a detailed side-by-side comparison to evaluate the potential for groundwater degradation. This has not been done, which is a glaring and unacceptable flaw in the EIR. Degradation of groundwater is prohibited by the state antidegradation policy, State Resolution 68-16, which this project appears to violate. The omission of groundwater quality analysis is incorrectly excused by classifying the 13

import/recharge component as a "program-level impact"—a misguided and critically flawed interpretation of CEQA that has caused illegal "piecemealing" of project components and impacts in the DEIR. Even if the import/recharge component is only "reasonably foreseeable," it should have been thoroughly evaluated in the DEIR, but was not. 13

Failure to Describe Indirect, Cumulative and Growth-Inducing Impacts

This project proposes to mine 50,000 acre-feet of water per year and deliver most of it to suburban Los Angeles and Orange County. At the standard rate of .5 acre-feet per year for a household of four, that amount of water is enough for 400,000 people, or 100,000 additional households. Assuming a very high rate of 1,000 homes per development, that's enough water for at least 100 new subdivisions in LA and Orange Counties. However, the far-reaching impacts of providing 100 new subdivisions-worth of water are largely ignored in the DEIR. The impacts within the recipient water districts on new developments are indirect, cumulative and growth-inducing, and should have been properly analyzed in these different sections accordingly. A proper analysis would break down the impacts by project participant of the likely new projects that will use this water supply for each participant, and the subsequent environmental impacts of those new projects, including but not limited to the projected impacts to wildlife, noise, air pollution, and climate change caused by those reasonably anticipated developments. Along these lines, any project that has already identified the Cadiz water project as its proposed water supply must be identified in the EIR, along with anticipated impacts caused by such a project. 14

A second indirect effect is the impacts for the recharge pipes: a contract has been firmed for a natural gas line to transmit water, yet the impacts from this pipeline are also absent from the DEIR. 15

Non-Compliance with Groundwater Management Ordinance and Statute

In addition to the above CEQA violations, the Groundwater Management, Monitoring and Mitigation Plan does not comply with the San Bernardino County Desert Groundwater Management Ordinance § 33.06552, or the state groundwater management statute, California Water Code § 10753 et seq. The GMMMP does not comply with county and state law for reasons including but not limited to: inadequate notice of its publication, inadequate public hearings, the inability of the GMMMP, as implemented, to adequately monitor groundwater and to adhere to the "safe yield" and "aquifer health" limitations; failure to sufficiently analyze and to provide sufficient monitoring and mitigation for the storage and recharge component of the project; failure to include a specific funding program for mitigation and monitoring; the plan's allowance for groundwater quality degradation; and providing insufficient information regarding the relationship between the expected storage/recharge component of the project and how this component contributes to the management of the groundwater basin. (Cal. Water Code §§ 10753, 10753.2, 10753.4, 10753.5, 10753.6, 10753.7; San Bernardino County Code §§ 33.06552, 33.06553). As such, the document fails to qualify as a legally adequate GMMMP under law. 16

II. PROPER LEAD AGENCY

A. Santa Margarita Water District Is Illegally Acting As Lead Agency for the Proposed Project

The DEIR is fundamentally flawed because it was prepared under the supervision of the improper Lead Agency under CEQA and California Law. As such, any approval of this EIR is unlawful. As the county with the greatest direct impacts from this project, and as the only agency with primary permitting authority over the groundwater extraction, San Bernardino County is the proper lead agency for this project. San Bernardino County may not approve the DEIR's groundwater management plan, and thereby exempt the project from its primary permitting authority, by approving the plan as a responsible agency for this project—that responsibility necessarily lies with the lead agency. Santa Margarita Water District is nothing more than a project participant and, at best, a responsible agency: the agency lies far from the primary impact zone and has no primary permitting authority, and it will not implement, manage or carry out a significant portion of the project. 17

Further, both the Santa Ana Regional Water Quality Control Board, who supervises and must certify water quality, and the Metropolitan Water District of Southern California, who played and continues to play a central role in the project, are improperly excluded as a responsible agencies under CEQA. 18

B. San Bernardino County is the Proper Lead Agency for the Project

Role of Lead Agency

The lead agency is defined at Public Resources Code § 21067 as "the public agency with the principal responsibility for carrying out or approving a project which may have a significant effect on the environment." The CEQA Guidelines provide detailed criteria for choice of lead agency: for a private project such as Cadiz, lead agency is the one with the greatest responsibility for supervising or approving the project as a whole. (14 Cal. Code Regs. § 15051(b); *Eller Media Co. v. Community Redev. Agency* (2003) 108 Cal. App. 4th 25, 38). Further, where a project proponent is a private company or other non-governmental entity, the "lead agency will normally be the agency with general governmental powers, such as a city or county, rather than an agency with a single or limited purpose such as an air pollution district . . . ." CEQA Guidelines § 15051(b)(1). 19

Both of these legal requirements mean San Bernardino County must act as lead agency for this project.

Role of San Bernardino County

The project proponent is being sponsored by a private enterprise, the Cadiz Corporation. Pursuant to CEQA Guideline § 15051, the lead agency should therefore be a general agency with broad scope and powers, such as a city or county, and not a specialized district. Under § 15051, San Bernardino County is the clearest choice for lead agency, because of the participating agencies, San Bernardino County is best characterized as the agency with broad scope and

powers to approve this project, which will impose wide-ranging impacts on the dry lakes of eastern San Bernardino County, the Mojave National Preserve ("Preserve"), and nearby wilderness areas.

Under the same CEQA guideline provision, San Bernardino County is the proper lead agency because it has the principal responsibility for approving the project. This is because of all the agencies with permitting authority over this project, only San Bernardino County has primary permitting authority, that is, the discretion to approve or disapprove the export of the groundwater, through its Desert Groundwater Management Ordinance, San Bernardino County Code § 33.06551 et seq. The Ordinance's authority implements, supplements and augments the groundwater management authority provided to the county under the Groundwater Management Act, Cal. Water Code § 10750 et seq. Between these two laws, only San Bernardino County has the ability to prohibit the drilling and operation of this project, making it the agency with the primary responsibility for approving the project.

Under the County's Desert Groundwater Management Ordinance, the pumping of groundwater in the project area requires a county-issued permit. (§ 33.06554 and DEIR 4.8-45) Despite the promised extraction of up to 2 million acre-feet of groundwater, the County appears to be intent on exempting the project from its permitting authority, by entering into a Memorandum of Understanding with the project proponent and approving a groundwater management, monitoring and mitigation plan (DEIR 4.8-45; Appendix B-1, Groundwater Management, Monitoring, and Mitigation Plan ("GMMMP") at p.15, § 1.4.3.) .) It is unclear whether the County has entered into an MOU at this time, but if it has not, then the project must apply for a groundwater management permit. If there has been an MOU, then its absence and lack of description robs the public of a key piece of decision-making information. In order to provide the public with sufficient decision-making background, all MOU's between the participating agencies related to the Cadiz project should be included in the administrative record.

Despite its having primary permitting authority, San Bernardino County is not even listed in most of the DEIR as a responsible agency,. Not having the County even as a responsible agency is an obvious, fundamental flaw of the EIR. The only indication that the County is a responsible agency is on Page 15 of the GMMMP, which indicates that the County's approval of the GMMMP is discretionary and subject to CEQA approval "with the County acting as a responsible agency." (GMMP § 1.4.3) Yet even if the County ultimately participates as a responsible agency, such relatively minor participation constitutes a legally flawed role; with primary permitting authority, including the primary authority to *exempt* the project, the County must act as lead agency for this project. The County cannot abdicate its role as primary permitting authority by acting, at best, as a responsible agency for the project.

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Missing MOU and Cost-Sharing Agreement

It appears from the language of the DEIR and GMMMP that at least one MOU has already been entered into, although there are conflicting reports for what purpose. This view is supported by a SMWD memorandum referencing the MOU in October, 2011. The existence of at least one MOU suggests that San Bernardino County is going to be paid $135,000 for reviewing technical data, even though it is not listed as a responsible or lead agency for the

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project., However, it is unclear what conditions are to be studied by whom, and perhaps more critically, what export and import limitations, if any are included in the MOU. Until the MOU and cost sharing agreement approved by SMWD and San Bernardino County are included in the record, and thoroughly discussed in the EIR, the document lacks crucial information allowing the public to make an informed decision and is legally flawed under CEQA.

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Further, San Bernardino County has construction permitting authority on the project. This permitting authority is omitted from the list of permit approvals required in DEIR Section 3.8, p. 3-54. If the project is approved, even assuming the groundwater ordinance exemption, this authority would be another primary project approval after groundwater permitting or exemption. Under both groundwater management and permitting authorities, the County is clearly the proper lead agency with the requisite scope over project approvals under CEQA.

There are further policy reasons for choosing San Bernardino County as lead agency. The County, and its elected officials, should have the primary decision-making authority over whether to allow their public groundwater resource to be extracted and profited from on a massive scale. As it stands, the County will not even hold a hearing on the project that promises to export 2+ million acre-feet from the area and make millions from a public resource. That water belongs to the people of San Bernardino, and they deserve a right to control the conditions of the transfer through the use of the County as the lead agency for the project.

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C. SMWD Is, At Best, A Responsible Agency

Role of Responsible Agency

A responsible agency is defined at Public Resources Code as a "public agency, other than a lead agency which has responsibility for carrying out or approving a project." (Pub. Resources Code § 21069). Thus the definition of responsible agency is one of omission: agencies with permitting authority and/or responsibility for carrying out the project, but not with the expertise, broad scope, or primary permitting authority of the lead agency. As such, SMWD is, at best, a responsible agency and not the lead agency for the project.

Role of Santa Margarita Water District

In contrast to the primary permitting authority and broad scope of interests represented by the County of San Bernardino, SMWD is a small agency with no apparent primary permitting authority beyond this CEQA approval. Further, SMWD has neither the requisite perspective nor expertise to assess the far-reaching environmental impacts discussed in the DEIR, or the ability to properly balance the interests of the Proposed Project proponents (including SMWD itself) against the interest of protecting the diverse ecosystems and communities that the Proposed Project would affect. Nor can this local agency properly analyze the regional impacts to air quality caused by the prospect of 100,000 new households that may be created by this water. Even if it did have primary permitting authority (which it does not), without broad perspective and expertise SMWD cannot meet CEQA's requirement for a lead agency capable of neutral, unbiased decision making and broad perspective.

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SMWD's strongest argument for lead agency status is that it has already entered into an Option Agreement for the "largest portion of water supply" that the Proposed Project would provide. (DEIR, p. 1-9.) That SMWD will act as the project's largest *customer* is irrelevant for determining which agency has primary permitting authority or sufficient scope and expertise to act as lead agency. While San Bernardino County has broad jurisdiction over the area which receives the majority of direct impacts from the proposed project, as well as primary permitting authority over groundwater extraction and construction, SMWD has none of the above. 22

Missing MOU Hides Critical Information from Public Review

Further, SMWD is also apparently sharing CEQA costs with Cadiz. (DEIR 1-9) The DEIR provides inadequate information about the nature of this relationship as well as SMWD's ownership interest and operating role in operating the Proposed Project . The DEIR's lack of transparency regarding the nature of SMWD's MOU and Option Agreement and the CEQA cost-sharing agreement raises serious concerns. SMWD must disclose the nature of its ownership interest, what operational role it would play, the nature of the Option Agreement, and the conditions under which CEQA costs are being shared with and/or reimbursed by Cadiz. In addition, these key documents, including all cost-sharing agreements and transfers of funds for project-related purposes, should all be publically available and included in the EIR's administrative record.[1] 23

Other Agencies Should Be Included As Responsible Agencies

Role of Colorado River Regional Water Quality Control Board

By the terms of the DEIR (3-54), the Colorado River Regional Water Quality Control Board must provide a variety of permits for the proposed project including water quality certification and waste discharge requirements. These approvals are discretionary approvals, so that the RWQCB meets the definition of "Responsible Agency" under CEQA. Further, the proposed project attempts to get CEQA approval through approval of the current project EIR for the storage/recharge component of this project as a "component level," without proper analysis, even though the storage/recharge component will unquestionably impact existing water quality in the aquifer, regardless of source. As a result, the Colorado River RWQCB should have been named and consulted as a responsible agency on the project, and consulted accordingly. Without the Regional Board as responsible agency, the EIR approval will be invalid. 24

Role of Metropolitan Water District of Southern California ("MWDSC")

MWDSC was the original project proponent in the project's previous iteration, and shares primary responsibility for conception of the current project as well. MWDSC's infrastructure and participation facilitates both delivery of the water from the project, and importation of the

[1] Commenters are in the process of submitting public records act requests for all Memoranda Of Understanding between Cadiz, SMWD and San Bernardino regarding the project, as well as the relevant cost sharing agreement and a record of all transfers of payments between these agencies. All such documentation must be publically available and part of the decision-making record for the EIR.

water from the Colorado river aqueduct for the recharge/storage component of the project. Even if the water comes from the State Water Project, MWDSC is the only agency affiliated with the project who is an SWP contractor, again making MWDSC's role central. MWDSC played and continues to play a vital role in the planning, coordination and eventual implementation of the project. As such, MWDSC should have been included as a responsible agency under CEQA for the project, and the failure to have MWDSC participate and approve as such means the EIR approval will be invalid. 24

III. SECTION-BY-SECTION COMMENTS

1. Executive Summary

Failure to Sufficiently Analyze the Natural Gas Pipelines that Would Be Used for Water Conveyance in the Imported Water Storage Component ("Phase II")

Pages 1-11, 3-41, 3-42: The DEIR does not adequately analyze the water conveyance portion of the Imported Water Storage Component ("Phase II"), including particular components that have been identified outside the DEIR process in detail beyond the descriptions provided in the EIR, such as Cadiz's intent to purchase specific natural gas pipelines for water conveyance. *See* Cadiz Press Release, *Cadiz Advances Plans to Convert 300 Miles of Natural Gas Pipelines for Water Conveyance* (Feb. 29, 2012) (available at http://cadizinc.com/2012/02/29/press-release-cadiz-advances/) ("Cadiz Natural Gas Press Release"). The DEIR asserts that the Imported Water Storage Component is "still under conceptual development." (DEIR, p. 1-11.) However, the potential means of water conveyance seems to have advanced beyond conceptual development. Cadiz acquired an option to purchase specific gas pipelines in September of 2011, including a 220-mile pipeline owned by El Paso Natural Gas ("EPNG"). *See* Cadiz Natural Gas Press Release. The DEIR asserts only that there are various natural gas pipelines that could be used for conveyance in the Imported Water Storage Component, yet does not mention the option agreement to purchase any of these pipelines. (*See* DEIR, pp. 3-41, 3-42.) On February 28 of 2012, Cadiz made a $1 million payment to EPNG to extend the terms of the option agreement through March of 2013. *See* Cadiz Natural Gas Press Release. In light of the option agreement, and the recent payment to extend its terms, the EIR must analyze in detail the water conveyance portion of the Imported Water Storage Component. Cadiz's actions indicate that the intended use of natural gas pipelines for water conveyance is not speculative and must not be analyzed at the programmatic level, but rather at the project level. Along the same lines, all tentative proposals and agreements with MWDSC or other water agencies to import and store water should be disclosed and analyzed for impacts. 25

In addition, the revised DEIR must explain whether the natural gas pipelines for which Cadiz has the option agreement are intended to be used as part of the Groundwater Conservation and Recovery Component ("Phase I"). The Cadiz Natural Gas Press Release does not explain when the pipelines would be used nor for which Phase of the Proposed Project Cadiz intends to use them. If the pipelines would be used in Phase I, either in addition to or instead of the Colorado River Aquaduct, then the Phase I environmental analysis in the revised DEIR must analyze the potential environmental effects of such pipeline use.

Failure to Provide Consistent Data on Amount of Water to Be Extracted

Page ES-2: The DEIR states that the Proposed Project would retrieve up to 2 million acre-feet of stored water. However, page ES-3 states that the Proposed Project would extract an average of 50,000 AFY for fifty years—a total of 2.5 million acre-feet. The EIR must explain this half-million acre-foot discrepancy.

It is also unclear what permitting requirement would limit the water exports to 50,000 acre-feet per year. The EIR must identify what binding permit requirements would limit this export amount to the level indicated in the DEIR, or to any amount, for that matter. Without such information, the DEIR appears to be setting an arbitrary export level and one that may be far below actual anticipated exports. 26

Failure to Specify Duration of the Proposed Project Beyond 50 Years

Page ES-3: The DEIR states that the Proposed Project term may be extended for a limited time to allow the Proposed Project operator to comply with water delivery contracts. This limited time appears indefinite Without a 50-year limit, there is no constraint to prevent such contracts from becoming an end run around the 50-year duration of the Proposed Project. Without a firm 50-year limit, the evaluation of impacts in the DEIR is arbitrarily limited and constrained, and must be revised to correspond to the actual period in which the project may continue to operate. Conversely, in order to rely on a 50-year analysis, the EIR must specify the legal basis for a maximum time frame beyond which water delivery contracts are void/unenforceable, and justify how this time frame was determined. 27

Chapter 2 – Project Background

Failure to Properly Characterize the "Green Compact" as an Unenforceable Instrument

Page 2-5: The DEIR refers to the MOU between Cadiz and the Natural Heritage Institute ("NHI") as a "Green Compact" to "ensure sustainable management of approximately 70 square miles of Cadiz Property . . . ." However, the DEIR appears to mischaracterize the enforceability or binding nature of the MOU. In fact, the MOU appears to be an unenforceable instrument that in no way "ensures" sustainable management. As an initial matter, the EIR must accurately represent the character of the MOU and its inability to "ensure" sustainability. 28

Next, the DEIR explains that "NHI has committed to assist Cadiz in designing groundwater banking projects, identifying Project Participants, and auditing the management of

Cadiz-owned property in keeping with the Green Compact." (DEIR, p. 2-5.) However, the DEIR fails to adequately explain, that NHI's role is purely advisory and subject to attracting necessary funding.[2] NHI may well work hand-in-hand with Cadiz throughout the entire Proposed Project as suggested in the DEIR, but the "Green Compact" itself provides no such assurances. Misrepresenting the enforceability of the "Green Compact" is misleading to the public and the agency decision makers, and thwarts the informational goals of CEQA. 28

The EIR must explain that the "Green Compact" is an unenforceable document and that NHI's role is purely advisory and dependent on funding. As the "Green Compact" has been in force since 2009, the EIR should also explain what, if any, actions Cadiz has taken and will take as a direct result of the "Green Compact."

Chapter 3 – Project Description

The project description is insufficient because the DEIR inaccurately describes the Proposed Project one with primary goals of "conservation" and water "savings," rather than water extraction; the roles of the FVMWC and Metropolitan are insufficiently described; the electrical power component is inconsistently described; and the project objectives are misleading. These failings hinder the public's ability to analyze and comment upon the Proposed Project's potential impacts. 29

Failure to Properly Characterize the Proposed Project's "Fundamental Purpose"

Page ES-3: The DEIR states that the "*fundamental purpose of the Project* is to save substantial quantities of groundwater that are presently wasted and lost to evaporation by natural processes." This description misuses the word "save," which typically indicates that a resource will not be used now, but rather set aside for later use. "Save" also implies that some future harm is being presently averted. First, stating that this water mining project's purpose is to "save" water—when it would leave the aquifer with a deficit of 1.1–2.1 million acre-feet of water over 50 years—is misleading. Second, claiming that water is "saved" because evaporation is inhibited implies that evaporation itself is a harm, which requires a logical connection not supplied in the DEIR. 30

The "Fundamental purpose" of this project is described as "to save substantial quantities of groundwater that are wasted and lost by evaporation to the natural process." However, this does not appear to be the primary purpose of the project, because the very next paragraph provides what does appear to be the fundamental purpose: "The Project makes available a reliable water supply for Southern California Project Participants, to supplement or replace existing supplies and enhance dry-year supply reliability." This second purpose actually appears to be the primary purpose of the project, because there would be numerous means to satisfy the primary alternative besides the Cadiz export-recharge scheme, and because the purported project

[2] *See* Cadiz Press Release, *Cadiz Signs 'Green Compact' with Natural Heritage Institute* (May 14, 2009) (available at http://www.n-h-i.org/whats-new/press-item/select_category/7/article/natural-heritage-institute-and-cadiz-sign-green-compact.html?tx_ttnews[backPid]=217&cHash=5aca3543db).

purpose would not be pursued absent the water supply for Project Participants. This last point is evident because Metropolitan Water District previously withdrew its support for the project in its previous iteration, and the project itself was put on hold—not because it could not "conserve" the water in some other way, but because the impacts from the project were too great. See, e.g., Appendix B, comments by Western Envrionmental Law Center, on the impacts of the project as previously proposed by MWDSC.[3]

Further, to "save" groundwater by exporting does not appear to be a legally valid definition of "saving" groundwater. There is no precedent, legally or intuitively, for the concept of conservation-by-use, except in the upside-down world of this DEIR. Nor do any of the project participants claim that when they receive the water they will "save" it either. To the contrary, the presumption is that the water to be directed to the participants' customers for "beneficial use." The concept of "saving" the water by pumping it to water districts for customers' consumption is contrary to law and common sense.

The new EIR must revise the Proposed Project's "fundamental purpose" to indicate that the overall goal of the Proposed Project is to mine the desert aquifer and sell that water to Southern California water providers. Similarly, the EIR must make clear that the water that would be stored is for the purpose of selling it to Southern California water providers. This is also one of the main contentions of expert hydrogeologist John Bredehoeft.

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Failure to Include Analysis of Groundwater Storage/Recharge on the Project Level

The Cadiz Water Project has always featured two parts in its various iterations: one part for groundwater export and the other for imported water storage and recharge. However, the DEIR claims that the proposed project is actually two components that can be evaluated in this EIR at different levels of detail under CEQA. According to the DEIR:

> "The Project has two components that would be implemented by the FVMWC. The first component—the Groundwater Conservation and Recovery Component—is ready for detailed analysis and implementation. The second component—the Imported Water Storage Component— is under development and would be implemented following completion of the first component. The first Component, analyzed in this Draft EIR at a "project-level," is required to set the stage for proceeding with the second Component, which is analyzed at a "program-level." (1-3)

As stated, the DEIR divides the proposed project into a "project-level" component and a "program-level" component, and then argues that the second component need only be evaluated in detail after the first component is implemented. (1-3) In doing so, the Cadiz DEIR fails to evaluate the project at the required level of detail under CEQA.

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[3] The DEIR has also made no attempt to explain how the many serious flaws in the 2001 EIR/EIS have been corrected in the 2011 iteration. See WELC Comments, Appendix B for more information on problems with the previous EIR.

The project's multiple parts should be evaluated as a single project under CEQA, with a single EIR that evaluates the full impacts of the entire project at the "project level." The DEIR's deferring or "tiering" analysis of impacts is only permitted for secondary impacts, such as "to evaluate or formulate mitigation for 'site specific effects such as aesthetics or parking." *Environmental Protection Information Center v. Cal. Dep't of Forestry and Fire Protection* (2008) 44 Cal. 4th 459, 503. The impacts being deferred in the present case are not these types of small, isolated impacts; rather, the impacts comprise the entire second half of the same project being deferred—and in fact, constitute one of the largest environmental impacts of the entire project. This failure to evaluate all impacts equally and consistently by excluding highly likely project components constitutes illegal "piecemealing" of the project under CEQA.

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The recharge/storage component will self-evidently impose major water quality impacts on the aquifer, while the import and conveyance facilities will all carry impacts of their own. These water quality impacts must be discussed in detail and assessed against the state policy against degradation of high-quality waters. Of course, the EIR does evaluate the recharge/storage in various limited contexts, just not in terms of their environmental impacts. The EIR cannot have it both ways: either the recharge/storage component is an integral part of the project and requires full, "program level" CEQA review in the present EIR, or it is a separate project that requires a separate and complete CEQA review. Demotion of the components' status does not exempt it from adequate environmental review under CEQA.

The Proposed Project Objective to Support ARZC Operations Is Speculative

Page ES-3: The DEIR states an objective, to "Support operational water needs of the Arizona and California Railroad ("ARZC") in the Project area." That this objective appears to be included in the Proposed Project's stated objectives solely to avoid federal approval to locate the pipeline within the ARZC right-of-way (thereby avoiding NEPA and other federal environmental review) is concerning. As discussed in greater detail in the Land Use & Planning section of this comment letter, it does not appear that Proposed Project operations depend on providing water to the ARZC, and the pipeline could be constructed without the provision of such services. Further, it is dubious whether the proposed fire hydrants actually qualify as a "railroad purpose" because most fires in such circumstances could not be extinguished by application of pure water. Beyond obtaining the BLM NEPA exemption, the future ARZC need for the Proposed Project's water is highly speculative and inadequately supported in the DEIR.

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Failure to Provide an Accurate Project Description By Not Explaining How the Word "Conservation" in the Project Title is Consistent with the California Constitution's Water Conservation Goal

Page 3-4: The DEIR quotes the California Constitution:

> "[B]ecause of the conditions prevailing in this State the *general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable*, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is

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> to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."

California Constitution, Article X, Section 2 (emphasis added in DEIR).

The DEIR improperly emphasizes the goal of putting state waters to their fullest beneficial use, without specifically noting that the "unreasonable method of use of water" is to be prevented, and that water "conservation" is an equal goal. The Proposed Project's name, "Cadiz Valley Groundwater Conservation, Recovery, and Storage Project" places conservation first. By claiming that the Proposed Project's goal is "conservation"—here, simply extraction and sale by another name—and consistent with the state's constitution, the DEIR mischaracterizes the Proposed Project. The DEIR does not explain how, if at all, the word "conservation," as used in the state constitution, contemplates the extraction and sale of groundwater at a pumping rate far beyond the aquifer's estimated recharge rate. "Conservation" is not a synonym for "extraction" or "sale."

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The Proposed Project's title is a key aspect of the project description. CEQA requires that project descriptions be accurate and not minimize the environmental effects of a project. Describing the Proposed Project as being fundamentally about conservation is inaccurate and masks the effect of leaving a more than one million acre-foot water deficit.

> Only through an accurate view of the project may affected outsiders and public decision makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. An accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR.

County of Inyo v. City of Los Angeles, 71 Cal.App.3d 185, 192 (1977).

The EIR must explain precisely how the conservation goals of the California Constitution are met by the "conservation" measures included in the Proposed Project, particularly how pumping water at a rate that leaves a water deficit in the aquifer is in fact water "conservation."

Improper Application of "Beneficial Use"

A similar problem occurs with the DEIR's casual use of the term "beneficial use." "Beneficial use" as required by both the California Constitution and Water Code is an official Water Board determination required to issue appropriative water rights. In the present context, the DEIR presumes the water will be used "beneficially" because otherwise some of it would evaporate. By this definition, only the water that would otherwise evaporate would be considered beneficially used; since only a fraction of the total would in fact evaporate, the remainder would presumptively not be beneficially used. However, "Beneficial use" is not measured by its non-use, but by what it is used for. Water sitting underground is not in and of itself a non-beneficial use, and conversely, the mere use of the water is not beneficial use without knowing what that water is intended for. So in the sense that the term is used in water law, the act of withdrawing the water from the ground is not presumptively a beneficial use. Reasonable and beneficial use is not set by an absolute standard, but depends on the facts and the

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circumstances of each case. (*See, e.g., People ex rel. State Water Resources Control Bd. v. Forni*, 54 Cal. App. 3d 743, 750 (Cal. App. 1st Dist. 1976.)

Most fundamentally, the "beneficial use" of the water is not in the least bit at issue in the EIR because "beneficial use" is a threshold question to be determined by the State Water Resources Control Board for permits allowing the appropriation of surface water rights. The requirement for reasonable and beneficial use of a water right is set forth in Article 10, Section 2 of the California Constitution and Cal. Water Code § 100. Therefore, "beneficial use" in the traditional sense is irrelevant, because the DEIR lack sufficient analysis of what projects the water will be used for.

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Failure to Adequately Explain the Role of the Fenner Valley Mutual Water Company ("FVMWC")

Page 3-14: The DEIR provides only a brief description of the FVMWC, stating that it is an unregulated, non-profit California mutual water company that would deliver water at cost to its shareholders. The use of a non-profit to deliver the Proposed Project water creates the implication that the entire Proposed Project is a non-profit enterprise. The DEIR does not explain whether the FVMWC shareholders would in turn sell the water, and whether they would do so at a profit, nor does the DEIR contemplate the impacts of running the project as a profit-making enterprise. That Cadiz seeks to make a profit is certainly understandable; that this objective may be hidden behind a non-profit mutual water company has the potential to mislead and prevent the public and decision makers from reasoned, informed review. The entity responsible for delivering Proposed Project water is in fact a key component of the Proposed Project. An incomplete or inadequate description of the FVMWC has the potential to taint the project description and preclude meaningful analysis of environmental impacts, project alternatives, and mitigation measures.

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Failure to Consistently Describe the Proposed Project's Electrical Power Component

The project description must be accurate. *See County of Inyo*, 71 Cal.App.3d at 199. The DEIR states on page 3-40 that power would be distributed to well pads either underground *or* on overhead poles; likewise, page 3-23 states that "power lines would either be underground *or* overhead." (emphasis added). On page 3-26, the DEIR states that for well pads, "connecting utilities, including electric . . . would be buried underground within the roadway easements." The environmental effects would be different under each scenario and this decision cannot be left until a later design phase. Reasoned, informed public review and agency decision making is precluded where such a fundamental element of the power distribution system—the location of power lines—is left unclear or unspecified.

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Failure to Include the General Economic Characteristics of the Project in the Proposed Project Description

CEQA Guidelines section 15124(c) requires the project description to include the general economic characteristics of a project. Although an economic analysis is included in the DEIR appendices, it is misleading to locate all economic information in the appendix without a

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reference. Many readers and commentators would not be aware that the economic information is in the appendices without a reference in the Project Description chapter. Moreover, Table ES-2 states that the socioeconomic impacts of the Proposed Project are "beneficial." This claim is too difficult to assess without a description of the general economic characteristics of the Proposed Project in the Project Description chapter. Public review and accountability would be improved and facilitated by including the general economic characteristics of the project in the Proposed Project Description chapter.

The cost and benefit assumptions used in the DEIR and the Economic Impacts Report provided by John D. Husing (DEIR Appendix I); is highly flawed for numerous reasons.

The Economic Impacts Report assumes 100% of expenditures stay in the local economy, an excessive figure. Even if the pipe manufacturer, etc., is located in the county, the manufacturer of the steel in the pipe, etc., is not. And even if the owner of the pipe manufacturer is in the county, and every worker lives in the county, they will still buy some things from outside the county or go on vacation outside the county or invest some of their savings outside the county.

We do not know the appropriate 'local retention' of spending, but are suspect of anything higher than 80%, and someone who uses IMPLAN regularly, such as Dr. Husing, would surely know. The economic impact reports done for the Imperial Irrigation District to San Diego Water Authority water transfer would be a reasonable comparison, and should have been reviewed. These impact reports are incorporated here by reference as they are in the public domain and should have been reviewed by the preparers of the DEIR for review committee for social impacts of the transfer.

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The study assumes that all the new facilities and underlying land will be privately owned and therefore taxable, but the specific tax liabilities for the land are unknown, and the project's transfer of ownership to FVMWC which is apparently styled as a "non-profit" would appear to exempt it from taxation. Likewise, tax liability does not appear to lie where some public agencies are involved. This is a two-edged sword. If the proponents say everything will be privately owned, then a private cost of capital will be involved, which is much higher than a public investor would have to pay on the municipal bond market. For example, 17-23% (private) versus 4-6% (municipal). So in order to justify tax revenue to the 'supplier' counties, the proponents in essence have to defend a higher than necessary debt service cost to the paying public entities on the 'demand' end. If they say the facilities or land will be partially or entirely publicly owned, the debt service cost may be lower, but so also will be the taxable base for tax revenue purposes.

The assumption that the taxable value of the new infrastructure will be equal to the investment cost is worth investigating. Counties usually assess taxable value of real property based on the market. So the value of these facilities will depend on whether there is a market for them. That will only be the case if the water purchasing entities allow the investing entities to sell the facilities without their approval, which they would be foolish to do. If there is no market, because the facilities cannot be sold except under limited circumstances, the value of the facilities will need to be determined in some other way (e.g., the present value of net cash flow).

The Economic Impacts Report is one-sided because it looks only at increased spending. But the money comes from someplace and must be repaid. Even if it comes from global capital markets, the buyers of the water must repay it, plus interest. That takes money out of a different local economy, reducing spending for something else; and therefore creating negative direct, indirect, and induced jobs in that other local economy (e.g., southern Orange County). The net impact is what society should care about overall.

We are also critical of the cost from the anticipated evaporation of that recharge/storage water would drive up costs of the project, were that water to evaporate at the same rate as the water supposedly evaporating from the dry lakes' surfaces. It appears that the evaporation rates used to justify the "conservation" principle are different from those used to justify the efficiency and effectiveness of the recharge/storage. If the same rates are used, the cost of the recharge/storage component rises considerably. This increase is left unaccounted for.

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Finally, the assumption of zero opportunity cost for water from the Colorado River Aqueduct (CRA) that is stored is wrong. The cost of that water is not just the cost to take it from the Colorado River to the diversion point (or to get it from the Colorado to Cadiz), but also includes the cost to the MWD and other recipients of replacing that water when it isn't delivered. CRA water is fully used, so diverting it means other water for southern California will need to be brought in from elsewhere. And that replacement water has a cost -- which is the opportunity cost of diverting CRA water to Cadiz for underground storage.

Failure to Include an Assessment of the Proposed Project's Costs to Ratepayers

Any final or revised Environmental Impact Report should thoroughly describe the cost of the proposed project to ratepayers within the participating water districts. This should include the initial cost of the project to ratepayers; long term costs and what costs ratepayers would incur if project proponents are unable to deliver water according to the time frame or amount of current agreements. There should also be an assessment of the cost of obtaining water for the participating water districts from other sources, including an evaluation of ratepayer costs for these different alternatives. Finally, the revised or final Environmental Impact Report should assess the cost that will be incurred by homeowners whose wells may be affected by project pumping and have to establish new wells or improve existing wells.

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Failure to Provide a Lead Agency in the List of Responsible and Trustee Agencies

Page 3-53: SMWD is improperly listed as a project participant and responsible agency. The DEIR should have listed SMWD as the Lead Agency, if SMWD still asserts that it is the proper Lead Agency (see the comments above regarding SMWD's role as Lead Agency).

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Failure to Explain Which Agency Has Construction Permitting Authority

Pages 3-53, 3-54: The DEIR does not explain which agency has construction permitting authority. The DEIR relies on compliance with the California Building Code ("CBC") to assert that some impacts, such as various seismic impacts, would be less than significant. (*See* DEIR, p.

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4.6-33.) The agency with construction permitting authority would be San Bernardino County. A public agency must confirm that the Proposed Project facilities are designed in compliance with the CBC in order to substantiate any claims that impacts would be less than significant. The EIR must explain which agency would confirm compliance with the CBC, and which agency has construction permitting authority over the Proposed Project. 40

Failure to Describe the Relationship between Metropolitan and SMWD

Page 3-34: The project description clearly explains that the use of the CRA, which is owned and operated by Metropolitan, is a necessary component of the Proposed Project. In fact, the Proposed Project fails without the ability to use the CRA. Nevertheless, the DEIR does not adequately describe the relationship between Metropolitan and SMWD. The DEIR does not specify whether any agreements are in place to permit Proposed Project water conveyance through the CRA. Nor are preliminary arrangements, such as a term sheet or memorandum of understanding, included or referenced. The DEIR's claim that the Proposed Project would provide a *reliable* water source for Southern California is unfounded without substantiation that an agreement has been reached with Metropolitan to convey Proposed Project water through the CRA. The EIR must adequately explain the relationship between Metropolitan and SMWD, in particular any arrangements or agreements to convey water through the CRA. 41

Failure to Explain Rationale for Average 50,000 AF Export

The "average export level" of 50,000 AFY is arbitrarily set as the appropriate measure for measuring project impacts, even though there is no permit in place (or required in the future) to limit the exports of groundwater beyond the physical capacity of the system. The DEIR claims that the proposed project has an export system capacity of 105,000 AFY. (4.9-6) Since there is no reason why the project cannot export this amount every year, this should be the amount considered for impacts in the EIR. Yet the project evaluates withdrawals at an "average" rate of 50,000 acre-feet per year. (4.9-5) The DEIR never explains why 50,000 would be the yearly limit, as it does not indicate that the project is required to obtain a legally-binding permit that limits withdrawals to this amount. The DEIR does note that "the State has defined "safe yield" of an aquifer as the amount of water that can be withdrawn without an undesirable result." (4.9-62) This does not constitute a firm limit on exports. Given the probable recharge levels are far lower than that estimated in the DEIR, even 50,000 AFY is not a "safe yield." In other words, there does not appear to be any set limit on pumping. If such a requirement exists, and the project will be legally limited to 50,000 AFY, the DEIR should explain how and by what permit, statute, regulation, MOU, agreement or otherwise limits exports to this level. In addition, the EIR (and underlying studies) must be revised to evaluate impacts at a repeated withdrawal level at system capacity of 105,000 AFY to evaluate the full range of impacts from the project. 42

Chapter 4.1 – Aesthetics

The DEIR fails to adequately analyze the potentially irreparable impacts the Proposed Project would have on the natural aesthetics of multiple areas within the region, including but not limited to the Preserve, the Yucca Valley, and five designated wilderness areas. 43

The DEIR's analysis of aesthetic impacts is flawed in two key respects. First, the analysis defines the affected geographic area far too narrowly. The DEIR performs an overly limited analysis by focusing on the Proposed Project area itself and how the Proposed Project may affect the aesthetics of that small area and the Cadiz Property. (*See* DEIR, p. 4.1-15, "The analysis focuses on the visual character of the Project site and selected views from the surrounding areas.") That analysis is insufficient because it disregards the potential effects that the Proposed Project may have on the sustainability of vegetation, wildlife, and migratory birds *within* the Preserve, the five wilderness areas, and other surrounding and adjoining areas. Consequently, the potential aesthetic impacts within these areas cannot be assessed because the necessary underlying data are missing. For example, the DEIR does not include any photographic documentation beyond several views to and from the Proposed Project area and the ARZC ROW. (*See* DEIR, pp. 4.1-4 to 4.1-12.) The EIR must consider the impacts the Project may have within the Preserve, the five wilderness areas, and other surrounding areas.

Second, the DEIR's analysis is flawed because it focuses only on short-term aesthetic impacts. Specifically, the analysis fails to address whether the Proposed Project would have long-term detrimental effects on the area's aesthetics by potentially impacting the sustainability of multiple resources, including vegetation, wildlife, and migratory birds within the Preserve and other surrounding and adjoining regions. Indeed, the DEIR does not even mention the potentially irreparable long-term effects the Proposed Project may have on scenic resources. The same is true of the many scenic vistas within the Preserve and other adjoining regions. The DEIR focuses on the short-term aesthetic impacts during construction and Project operations on views to and from the Proposed Project area. The aesthetic impacts to vegetation and wildlife that could result from the long-term drawdown of the aquifer are not analyzed. Yet these potential direct and indirect impacts, within the Preserve, wilderness areas, and other surrounding areas, could directly result from Proposed Project operations and, therefore, must be analyzed in the EIR. 43

At a minimum, CEQA requires that the EIR include a more rigorous analysis of the long-term direct and indirect aesthetic effects the Proposed Project would have on the adjoining areas, including the Preserve. It is essential to analyze how the Proposed Project would impact regional vegetation, which is integral to the region's natural aesthetic appeal. The DEIR's analyses do not support the claim that a project with such a dramatic effect on underground water levels will have no impact on the natural aesthetics of the surrounding region without more specifically analyzing how the Proposed Project would affect the surrounding and adjoining areas' scenic resources, scenic vistas, and existing visual character.

Failure to Adequately Consider the Potential Adverse Effects on Scenic Vistas

Page 4.1-15: As a result of the above-mentioned analytical flaws, the DEIR reaches the unfounded conclusion that the impacts to scenic vistas would be "less than significant," and that, therefore, no mitigation measures are required. (*See* DEIR, p. ES-11, Table ES-1.)

As the DEIR points out, there are five wilderness areas within approximately five miles of the Proposed Project. (DEIR, p. 4.1-3.) The Proposed Project's water reallocation would have potentially irreparable long-term effects on the regional vegetation of these areas, as well as

the vegetation within the Preserve. Adverse effects to regional vegetation would result in significant diminution of the aesthetic beauty of countless scenic vistas throughout the region. The EIR must adequately consider and analyze the long-term direct and indirect effects of the Proposed Project on aesthetic resources within the Preserve and the five wilderness areas.

Failure to Adequately Analyze the Proposed Project's Potential Adverse Effects on Scenic Resources

Page 4.1-18: The DEIR concludes without sufficient analytical foundation that there will be "no impact" to scenic resources, including but not limited to trees and rock outcroppings within the Preserve. (*See* DEIR, p. ES-11, Table ES-1.) As a result of this error, the DEIR prematurely concludes that no mitigation measures are required. (*Id.*)

According to the DEIR, "there are no designated State Scenic Highways in the Project vicinity," and "[t]he Project would have no impact on scenic resources within designated State Scenic Highways." (DEIR, p. 4.1-18.) Consequently, the DEIR concludes that the Proposed Project would have no aesthetic impact and, therefore, no mitigation measures are required. (*Id.*) However, as the DEIR points out, there are two eligible State Scenic Highways within close geographic proximity to the Project: Interstate 40 and State Route 62. (DEIR, p. 4.1-14.) The DEIR further points out that these highways, by definition, "[c]onsist[] of a scenic corridor that is comprised of memorable landscape that showcases the natural scenic beauty or agriculture of California . . . ." (*Id.*) By failing to consider the long-term aesthetic impact to these two highways, the DEIR's analysis is incomplete.

Failure to Thoroughly Analyze the Proposed Project's Potential Adverse Effects on the Existing Visual Character of the Regions Surrounding the Proposed Project Site

Page 4.1-18: For the reasons explained above, the DEIR fails to address potential long-term degradation to the existing visual character/quality of surrounding and adjoining areas such as the Preserve, the five wilderness areas, and other surrounding areas.

The DEIR's characterization of these impacts as "less than significant," (DEIR, p. ES-11, Table ES-1,) must be reconsidered in light of the possible long-term effects the Proposed Project will have on vegetation, wildlife, and bird migration in the regions surrounding the Proposed Project. The EIR must analyze the long-term direct and indirect effects to the visual character/quality of surrounding and adjoining areas that 50 years of pumping the aquifer may cause.

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Wellfield Lighting

We are concerned about impacts of wellfield lighting and request that any permanent night lighting associated with the Proposed Project be shielded and controlled by a switch or motion sensor so that the wellfield lights do not remain continuously lighted. The CEQA Guidelines provide that new sources of substantial light that would adversely affect daytime or nighttime views may constitute significant environmental impact. *See* Guidelines, Appendix G. The DEIR states that "there are very few sources

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of night light and glare" in the Project area. (DEIR, p. 4.1-3.) In this largely undeveloped context, any new night lighting has the potential to adversely affect nighttime views. Mitigation Measure AES-2 is insufficient because wellfield lighting could remain "on" indefinitely; some type of timer or motion sensor should be used. The EIR must substantiate that the wellfield lights are controlled such that nighttime views will not be adversely affected.

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Chapter 4.3 – Air Quality

The DEIR's air quality analysis is insufficient for multiple reasons. First, the environmental baseline is not properly established. Second, the potential air quality impacts on the Mojave National Preserve are not adequately analyzed. Likewise, the Proposed Project's air quality impacts resulting from population growth outside of the Mojave Desert Air Quality Management District ("MDAQMD") plan are not properly analyzed. The impact analyses also suffer from internal inconsistencies, reliance on generalizations and assumptions, and inconsistent data sources. Finally, the mitigation measures are insufficient because they either discover the problem once it is too late to be mitigated or improperly shift mitigation responsibility to an unnamed third party. In sum, these problems amount to substantial analytical deficiencies that deprive the public and decision makers of the information required for proper participation and decision making.

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The failure to assess such regional impacts also supports our concern that SMWD is not the proper Lead Agency for the Proposed Project. SMWD lacks the perspective or knowledge to weigh the interests of the Project Proponents with the public's broad environmental interests as they related to the localized air impacts of the project.

The following are detailed comments about the DEIR's air quality analysis deficiencies:

Failure to Properly Establish a Baseline for Airborne Dust

Page 4.3-16: This section states that FVMWC will install two nephelometers pursuant to the GMMMP to establish a baseline data of visibility in the valley. CEQA Guidelines section 15125(a) states that existing conditions, the "baseline," are established at the time the notice of preparation ("NOP") is published. The EIR must explain why the baseline for visibility was not established at that time.

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Failure to Support the Location of the Nephelometers with Data About the Prevailing Winds

Page 4.3-16: We are concerned that the location of the nephelometers is insufficient. Two are provided, downwind from Bristol and Cadiz Dry Lakes. The DEIR does not provide adequate data to determine if nephelometers should also be placed in locations not in the direction of the prevailing wind. The frequency of the prevailing wind direction (e.g., 50% or 70%) is not included in the DEIR. The EIR should include a

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wind rose, or some other representation of wind direction and frequency, to justify locating nephelometers only downwind from the two dry lakes.

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Failure to Analyze Air Quality Impacts in the Mojave National Preserve

Page 4.3-18: The DEIR does not adequately justify the 10-mile radius for sensitive receptors. The Preserve is approximately 15 miles north of the Proposed Project area. We are concerned that the Proposed Project may deteriorate the air quality at the Preserve, an area visited by groups who are likely affected by air pollution. (*See* DEIR, p. 4.3-5.) The DEIR should have treated the Preserve as a sensitive receptor and analyzed the Proposed Project's air quality impacts at the Preserve.

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Failure to Properly Analyze Proposed Project's Impacts on Air Quality Management Plans Outside of the MDAQMD.

Pages 4.3-10 to 4.3-11: This impact analysis is incorrectly limited to the MDAQMD air quality management plan. An EIR must identify and describe direct and indirect effects of the project in the area that is affected by the project. *See* Cal. Pub. Res. Code § 21060.5; Guidelines § 15126.2(a). The Proposed Project is regional and the affected area includes water service areas beyond the MDAQMD plan area. The EIR needs to assess, in more detail than the DEIR in Chapter 6 and Appendix J, whether the Proposed Project would cause significant population or employment growth wherever Project water would be provided, and whether such growth would cause concentrations of air pollutants and would be consistent with growth forecasts. The EIR must also assess the Proposed Project's potential cumulative impacts on regional growth and corresponding air quality. While these impacts may be seen as indirect and/or cumulative, their discussion also belongs in air quality. Once again, the scope of this required analysis indicates that SMWD is likely not the appropriate Lead Agency because its perspective and expertise is limited to a single sub-region of Southern California.

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Failure to Sufficiently Analyze the Potential for the Dry Lake Beds to Generate Dust

Page 4.3-15: This section makes an absolute statement that the "reduction in groundwater levels beneath the Dry Lake would not alter the Dry Lake surface conditions or increase dust emissions in the Valley." However, this statement conflicts with two statements in preceding paragraphs. First, the text explains that the salts on the dry lake beds "tend to" form a hard crust. Merely tending to form a crust does not rise to an absolute assurance that a crust will be formed. Second, the purported crust is described as "generally resistant to wind erosion." Again, this falls short of an absolute assurance. Third, the surface crusting mechanism is said to "minimize[] airborne dust," not preclude it altogether. The EIR must explain how these general surface characteristics rise to a categorical assertion that dust will not be increased in the Valley.

The DEIR should also explain the relationship between the Proposed Project's effects on the Bristol Dry Lake and the description of the regional setting on page 4.3-4, which states that periodic high wind events lift sand and dust from the edges of Bristol

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Dry Lake. That sand is the source of the Cadiz Dunes at the south end of Cadiz Valley. Page 4.3-15 asserts that the surface of this same dry lake is resistant to erosion and will form a crust-like surface when dry. The edges of Bristol Dry Lake are very likely the driest portion of the lake under current conditions. If the surface of the entire dry lake becomes like the edges now are, then it seems that periodic high winds would lift sand and dust from the entire dry lake surface. The EIR must explain how the reduction in groundwater levels will not lead to all of Bristol Dry Lake exhibiting the same sandy/dusty conditions that the lake's edges now suffer.

Likewise, the DEIR relies on HydroBio's report, *Fugitive Dust and Effects from Changing Water Table at Bristol and Cadiz Playas, San Bernardino County, California* (Aug. 30, 2011), which makes general assertions and hypotheses regarding dust at Bristol Playa. The executive summary admits that Bristol Playa produces fugitive dust erosion by high wind. The report only hypothesizes that the severity of Bristol Playa dust will diminish over time, and that changes in groundwater levels will "likely" have no effect on the amount of fugitive dust. These conclusions are not absolute and leave open a notable possibility that fugitive dust will increase due to groundwater level reduction.

This DEIR section fails to properly describe the effects of the drawdown caused by Proposed Project pumping. The text states that the "effect of the drawdown would extend toward Bristol and Cadiz Dry Lakes." However, the effects would extend all the way to the dry lakes, not just *toward* them. Evapotranspiration at the lakes would cease altogether. Indeed, the fundamental purpose of the Proposed Project is to "save" water from evaporation at the dry lakes.

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The DEIR posits that two non-native plant species help to control dust, but the HydroBio report overlooks the fact that the non-native plant species purported to have changed the sand balance in the Cadiz Valley actually do not function as hypothesized. All of the species identified (Mediterranean grass, Sahara mustard, filaree, red chess, cheatgrass and Russian thistle are annual species and are not present throughout the year. Therefore, while sand balance may be influenced by these species during their growing season (spring), the movement of sand during the remaining seasons is minimally influenced by these species because their biomass is no longer present. Additionally annual plant growth in the California deserts is precipitation driven, and in some years with inadequate rainfall, annual plants simply do not germinate or grow. Their absence therefore does not change the sand balance.

Failure to Properly Characterize Potential Airborne Dust as PM10

Pages 4.3-15 to 4.3-16: This section describes airborne dust from the dry lakes as only a visibility concern. We are concerned that the dry lake beds could become an additional source of PM10 particulate matter. Table 4.3-2 shows that the Mojave Desert Air Basin (MDAB) is in nonattainment for PM10 under federal and state standards. The DEIR's treatment of airborne dust as only a visibility concern inadequately addresses potential effects of the dust to increase total PM10 particulates. The EIR fails to take into account the potential cumulative effect of potential airborne dust from the dry lakes.

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Reasoned and informed review and decision making is precluded where potential effects are improperly characterized. 51

Failure to Explain Why PM10 Declined in 2009 and 2010 in the Proposed Project's Vicinity

Page 4.3-5: This section states that PM10 declined in 2009 and 2010 in the Proposed Project's vicinity. Without providing any reasons to explain the decline, a reasoned review of how the Proposed Project may affect PM10 levels, and the total cumulative effects, is not feasible. 52

Failure to Provide Consistent Ozone and PM10 Data Sources

Table 4.3-3: The DEIR provides data on ozone at Joshua Tree National Monument and PM10 at Victorville, without explaining why two different monitoring locations were listed. The EIR should explain why only one of the two listed locations was used to measure both pollutants. 53

Failure to Quantify the Cumulative Impacts on Air Quality from the Proposed Project and the Department of Energy's Planned Solar Project

Pages 4.3-20 to 4.3-21: Without any quantification, merely asserting that the cumulative impacts during construction would be significant and unavoidable does not provide sufficient information for public review or for agency decision makers to determine whether to approve the Proposed Project with a Statement of Overriding Considerations. *See* Guidelines § 17321. The revised EIR must estimate the cumulative impact of the Proposed Project and the planned federal solar project on air quality. 54

Failure to Properly Mitigate the Potential Impacts of Airborne Dust from the Dry Lakes

Page 4.3-16, Table 4.3-7: Because the Proposed Project would pump at a far greater rate than the natural recharge of the aquifer, the impacts of the Proposed Project could extend even after pumping stops. We are concerned that as presented, the Proposed Project's mitigation measures would only identify the problem after it is too late to correct and damage is irreparable. Dust caused by dry soil would not be mitigated by discontinuing pumping, for example, because the soil moisture would not be restored until the natural recharge occurs, which could take decades. The EIR must adequately explain how discontinuing pumping would mitigate a problem whose causes would not cease to exist upon cessation of pumping. 55

In addition, the DEIR does not state who will perform the annual visual observations of the soil. What qualifications must this person have? What criteria will be used to determine the soil texture and susceptibility to wind erosion? The DEIR also fails to explain the procedures and criteria that will be used during visual inspections. The EIR should explain how FVMWC has the required expert knowledge to perform

such inspections when the FVMWC does not include any independent experts, such as representatives from NPS or USGS.

We are concerned that yearly inspections are insufficient. Given the ever-expanding nature of the cone of depression, significant soil drying may occur in one year. The EIR must justify the one-year inspection intervals. 55

Failure to Properly Mitigate Construction Dust

Page 4.3-17: We recognize the need for dust abatement during construction and support suppression in an ecologically sound manner. However, the use of water in conjunction with construction disturbance encourages the establishment of weedy exotic vegetation and leads to possible invasion into other communities (especially such naturally disturbed vegetation types as dunes and sand fields). When dust abatement is performed, watering should not be used as a technique. 56

Failure to Explain the Basis for Mitigation Measure AQ-3

Page 4.3-17: Mitigation measure AQ-3 promised that "idling engines shall be shut down when not in use for over 30 minutes." Allowing idling engines to run for 30 minutes is excessive. The EIR must explain how 30 minutes was selected, and why a shorter time frame is not feasible. 57

Failure to Properly Mitigate Potential Dust Omissions from Fallowed Fields

Page 4.3-14: This section provides that mitigation will be carried out by the agricultural operator. If fields are fallowed as a result of the Proposed Project, then mitigation must not be pawned off to an unnamed third party. Rather, mitigation measures must be *fully enforceable* through conditions, agreements, or other means. *See* Guidelines § 15126.4(a)(2). The EIR must include mitigation measures for potentially fallowed fields and establish that the Proposed Project operator is responsible for implementing the mitigation measures. 58

Failure to Properly Analyze Mobile Source Pollution

Page 4.3-13: This section makes the conclusory statement that daily emissions from on-road vehicles would be substantially less than the significance thresholds without any supporting data. The EIR must substantiate this claim with an estimate of the number of trips per day and the pollution generated by each trip. 59

Chapter 4.4 -- Biological Resources 60

The DEIR fails to adequately and appropriately analyze impacts to biological resources. It fails to include updated studies for several special-status wildlife species, including: the Mojave fringe-toed lizard, (DEIR, p 4.4-47,) burrowing owl, (DEIR, p. 4.4-47,) and American

Badger. (DEIR, 4.4-48.) The Project's proposal to conduct these surveys after the EIR is certified (and sometimes only 2 weeks prior to construction) is unacceptable and stands as a failure to adequately evaluate impacts under CEQA in the current EIR, given the sensitive nature of these biological resources.

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Wildlife

The DEIR fails to provide adequate baseline information for a number of wildlife species and therefore in unable to adequately evaluate the impacts to them.

1. Desert Tortoise

The desert tortoise has lived in the western deserts for tens of thousands of years. In the 1970's their populations were noted to decline. Subsequently, the species was listed as threatened by the State of California in 1989 and by the U.S. Fish and Wildlife Service in 1990, which then issued a Recovery Plan for the tortoise in 1994. The U.S. Fish and Wildlife Service recently updated the Recovery Plan[4]. Current data indicate a continued decline across the range of the listed species[5] despite its protected status and recovery actions.

The original and Updated Recovery Plans both recognize uniqueness in desert tortoise populations in California. This particular subpopulation of tortoise at the proposed project site lies mostly within the Colorado Desert Recovery unit along the boundary with the West Mojave Recovery unit[6]. Recent population genetics studies[7] confirm that the tortoises within the northern part of the Colorado Recovery unit are genetically unique from other tortoises within the same recovery unit (and tortoises to the west). While the proposed project site may have low desert tortoise densities, this particular recovery unit has also been documented to sustain very high declines in population in 2007 (-58%)[8]. The DEIR fails to identify the baseline conditions of the status of desert tortoise on the proposed project site. It fails to identify the actual number of desert tortoise estimated to be on the project site. The EIR needs to provide data-based estimates of desert tortoise population on the project site. From that determination, the EIR then needs to analyze avoidance opportunities, minimization of impacts and if impacts still can not be avoided, the impacts and mitigation. These data and analysis should be included in the REIR

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Basing impact analysis on sitings of animals and scat will woefully underestimate the number of desert tortoise, particularly because of the fact that tortoises spend most of their time underground. For example, recently, desert tortoise numbers were estimated on a different

[4] http://www.fws.gov/nevada/desert_tortoise/documents/recovery_plan/RRP%20for%20the%20Mojave%20Desert%20Tortoise%20-%20May%202011.pdf

[5] http://www.fws.gov/nevada/desert_tortoise/documents/reports/2010/2010_DRAFT_Rangewide_Desert_Tortoise_Population_Monitoring.pdf

[6] http://www.fws.gov/nevada/desert_tortoise/documents/recovery_plan/RRP%20for%20the%20Mojave%20Desert%20Tortoise%20-%20May%202011.pdf

[7] Murphy et al. 2007

[8] http://www.fws.gov/nevada/desert_tortoise/documents/reports/2007_Rangewide_Desert_Tortoise_Population_Monitoring.pdf

project site north of Cadiz Valley, where only 16 desert tortoise were located on site[9]. Population estimates were calculated to be 38 desert tortoise on the site for the purposes of the "take permit" limits issued by the U.S. Fish and Wildlife Service. In subsequent clearance surveys, that limit was quickly exceeded and population estimates were recalculated to be in the range of 368 to 1001 desert tortoise on site[10].

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The DEIR notes that the well field and pipeline parts of the project are "adjacent to but outside" federally designated desert tortoise critical habitat (DEIR at 4.4-19), however the proposed water infiltration basins and a monitoring well are proposed wholly and inappropriately within the boundaries of critical habitat. The DEIR fails to identify any avoidance of critical habitat and instead defaults to impact and mitigation, contrary to CEQA.

The DEIR mentions the Desert Wildlife Management Areas (DWMAs), but fails to evaluate the effects of the proposed project on the Chemihuevi DWMA, which was established by the Bureau of Land Management under the Northern and Eastern Colorado Plan specifically for conservation of desert tortoise. The ARZC right-of-way is located only 100 feet from the Chemehuevi Desert Wildlife Management Area (DWMA). Figure C1 notes that recent evidence of fresh scat of adult tortoises were found within the right-of-way, on both the east and west side of the tracks. (Appendix F-1, DEIR p. 18.) Additionally, a burrow was found within the ARZC right-of-way, and the study concluded that tortoises are likely to make "occasional forays" into the proposed construction impact area. (Appendix F-1, DEIR, p. 18.). The REIR needs to use these data as the basis for impact analysis.

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The DEIR fails to evaluate the impacts of the proposed project site for desert tortoise. In fact, the project appears to lie within a key connectivity area between the Chemihuevi and Ord-Rodman DWMAs and critical habitat units. In fact the proposed project appears to be located within the USFWS-recommended Desert Tortoise Linkages between Critical Habitat/DWMA Units.[11] These connectivity areas for desert tortoise are crucial for the survival and recovery of the species, because the Desert Wildlife Management Areas that have been established for the species are inadequate in size to support the desert tortoise in perpetutity.[12] In addition, the DEIR fails to evaluate the importance of Schuyler Wash to the resident population of desert tortoise and evaluate at the local level the impact of the proposed wellfield and potential spreading basin in Schuyler Wash.

The DEIR recognizes that there are desert tortoise living on the proposed project site (DEIR at 4.4-17), however no information is provided in the DEIR about population numbers that will be affected (as discussed above) and, more over, relies on future development of a "Desert Tortoise Avoidance and Protection Plan" (DEIR at ES-14). This "avoidance and protection" plan needs to be available as part of the DEIR, because only then it is possible for the

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[9] http://www.pe.com/local-news/topics/topics-environment-headlines/20110420-mojave-desert-tortoise-finds-curtail-solar-site-construction.ece

[10] http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/needles/lands_solar.Par.71302.File.dat/ISEGS_Reinitiation,%20Final%20BO.pdf

[11] USFWS 2011

[12] USFWS 2012

public and decision-makers to evaluate "avoidance" and "protection" as well as the impacts. Furthermore, for industrial facilities, the federal and state wildlife agencies typically require that desert tortoise be removed from harms way off site via translocation. The DEIR is unclear if translocation will occur, and only refers to translocation in Appendix F1 (at 43) stating "this project may require that tortoises are moved out of harm's way…". We request that in addition to the on-site desert population calculations (as requested above) that the DEIR clearly identify if desert tortoises will need to be translocated. If so, a desert tortoise translocation plan will need to be provided for public and decision maker review in the REIR. While avoidance of desert tortoise and its habitat should be the proposed project's first priority and is highly preferable because translocation results in significant mortality even over the short-term[13], only a well thought out plan, incorporating the latest techniques can decrease mortality.

The DEIR claims that a Section 7 consultation will be required (DEIR at 3-53), but absent a federal nexus which is not apparent in the DEIR, a federal "take" permit will be required through Section 10 of the federal Endangered Species Act.

The proposed mitigation compensation ratio of 1:1 is inadequate, because the habitat is currently occupied by desert tortoise and appears to lie within a crucial linkage area. Numerous recent projects that impacted occupied desert tortoise habitat have been required by state and federal agencies to mitigate at a 3:1 ratio for impacts to desert tortoise habitat, even though the projects were located outside of critical habitat and DWMA. Therefore, in order to aid in recovery of this declining species, at a minimum a 3:1 mitigation ratio should be proposed as mitigation for the impact to desert tortoise habitat on the proposed project site.

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If tortoises are relocated or translocated, then the relocation and/or translocation areas need to be clearly identified and secured for tortoise conservation *in perpetuity*. This provides assurances that the animals will not have to be moved subsequently if additional projects move forward on the relocation or translocation site(s). In other words, relocation/translocation areas should be protected in perpetuity.

The DEIR's analysis of the desert tortoise in the ARZC right-of-way area indicates that the proposed project will affect desert tortoises. The ARZC right-of-way is located only 100 feet from the Chemehuevi Desert Wildlife Management Area (DWMA), an area designated in 1994 as a desert tortoise critical habitat. (DEIR, p. 4.1-3.) Figure C1 notes that recent evidence of fresh scat of adult tortoises were found within the right-of-way, on both the east and west side of the tracks. (Appendix F-1, DEIR p. 18.) Additionally, a burrow was found within the ARZC right-of-way, and the study concluded that tortoises are likely to make "occasional forays" into the proposed construction impact area. (Appendix F-1, DEIR, p. 18.)

The DEIR's analysis of the desert tortoise in the wellfield and spreading basin areas is inadequate. In the wellfield and spreading basin areas, the DEIR indicates that there is a "regional pattern of occurrence" of tortoises. However, protocol-level surveys were not conducted in these areas. *Cadiz must perform more detailed surveys along the wellfield and*

[13] Berry et al. 2011. at http://www.deserttortoise.org/abstracts/2011DTCSymposiumAbstracts.pdf

spreading basin design processes, as it indicated that it is willing to do. (DEIR, Appendix F1, Desert Tortoise Survey & General Biological Resource Assessment, page 41.)

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2. Desert Bighorn Sheep

The DEIR's analysis of impacts to desert bighorn sheep is woefully inadequate. The DEIR fails to identify the Bighorn Sheep Wildlife Habitat Management Areas as identified and codified in BLM's Northern and Eastern Colorado Plan[14]. The proposed project lies within two important connectivity corridors for desert bighorn sheep: 1) the connection between the Ship and Marble Mountains and 2) the connection between the Old Woman and Iron Mountains. Maintaining connectivity between these identified habitat for desert bighorn sheep is essential particularly in light of climate change. The region from a little north of Chubuck to a bit east of Milligan is particularly concerning because currently sheep can travel freely in this area between the Old Woman Mountains and the Kilbeck Hills and Iron Mountains. CDFG has reports documenting a collared female bighorn sheep in the Old Woman Mountains that crossed over to the Iron Mountains where she bore and reared a lamb and then returned to the Old Woman Mountains. Epps et al. (2010) found that sheep from the Old Woman Mountains have been the source of a natural colonization to the Iron Mountains[15]. The REIR needs to address the impacts of the proposed project on the desert bighorn sheep connectivity.

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Of further and perhaps greater concern is that the DEIR fails to evaluate the impact of the proposed project on the hydrology of the crucial seeps/spring/water sources in the adjacent mountains that are the lifeline to survival of the desert bighorn sheep especially during the hot summer months. The proposed monitoring of ground water is wholly inadequate to evaluate the impact of the proposed project on these irreplaceable resources for desert bighorn sheep and other wildlife that rely on them. In fact, in the absence of any pre-project investigation and data, by the time any effects of pumping are seen, it will be too late to prevent the dewatering. The proposed activities could affect natural water sources in numerous mountain ranges including the Marble, South Bristol, and Old Woman Mountains, yet this analysis is inadequately analyzed in the DEIR. In fact as the DEIR acknowledges "There is no information demonstrating a physical connection of those identified springs in the local mountains to groundwater in the alluvial aquifer where Cadiz's pumping will take place." (DEIR at Appendix H3 at pg 1 or 2697 of pdf). This lack of information is then wrongly used to conclude that "because there is little or no hydraulic connection the Project will not likely have any impact on springs" (ibid), when in fact no information is available. Additionally Appendix H4 – Spring fieldwork is not included in the DEIR.

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Despite the scientific information that shows that the American southwest will be one of the first places to see the effects of climate change[16], and the effects will be a general warming despite different climate change model scenarios[17], and that warming and drying are already

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[14] BLM 2002.
[15] Epps et al. 2010.
[16] http://www.scientificamerican.com/article.cfm?id=desert-southwest-may-be-first
[17] https://www.bluego.org/documents/CEP/Homewood/Cayan%20et%20al%202006.pdf

affecting the distribution of vegetation in the California deserts[18], the DEIR incorrectly identifies that "The effects of climate change on precipitation and recharge in the Bristol, Cadiz, Fenner, and Orange Blossom Wash Watersheds are uncertain" (at 4.7-6).

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3. Mojave fringe-toed lizard/Sand dunes/Sand Transport System

While the DEIR recognizes that impacts will occur to occupied Mojave fringe-toed lizard (at4.4-19), it fails to analyze the sand transport system and the effects that the project will have on this important landscape scale process. Sand transport systems are critical in maintaining sand dune systems which are crucial for a suite of rare and endemic sand dunes species including the Mojave fringe-toed lizard. The project is located within a recognized sand transport corridor.[19]

The lack of studies on the Mojave fringe-toed lizard is of special concern. It is a California Species of Concern and a BLM sensitive species. (DEIR, p. 4.4-19.) Suitable habitat is only present along the pipeline route east of Danby Dry Lake. (DEIR, p. 4.4-19.) Surveys for fringe toed lizards along the ARZC right-of-way have not yet been conducted. Given the proximity of the pipeline route to the loose, windblown sand of the sand dunes (only 100 feet at its closest point), an REIR must include a thorough analysis and be available for public review before the Project moves forward. (DEIR, pp. ES-15, 4.4-11.) *The DEIR must be revised to include an analysis of the direct and indirect effects of the Project, including habitat loss, disruption of movements, breeding, and foraging that is available for the public comment.*

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The DEIR fails to quantify how much habitat for the Mojave fringe-toed lizard would be impacted, or how the project would interfere with the regional sand transport corridor. Likewise, no mitigation is discussed. While Mojave fringe-toed lizards are proposed to be translocated (Bio 8 at 4.4-47), no plan is proposed to be developed, much less included in the DEIR.

The DEIR also fails to evaluate the impacts of the proposed project on Mojave fringe-toed lizard outside of the project site. As Barrows et al. (2006)[20] found, edge effects are significant for fringe-toed lizards and, in addition, the increase in predators associated with developed edges may also have a significant adverse effect on fringe-toed lizards and other species.

4. Desert Kit Fox

The DEIR mentions the desert kit fox (at 4.4-8), but fails to provide data on the presence or absence of the species on site or the locations of natal and other types of dens. Desert kit foxes are "protected furbearing mammals" under California Code of Regulations, Title 14, section 460 and may not be "taken" at any time. As such the DEIR fails to analyze the impacts to this species as required under CEQA. The REIR should identify the density of kit foxes on the proposed project site, including natal and other dens. If passive relocation is identified as an avoidance

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[18] http://www.pnas.org/content/105/33/11823.full
[19] Muhs et al. 2003.
[20] Barrows et al. 2006

strategy, the DEIR must evaluate if suitable habitat occurs nearby and is not already occupied by existing kit foxes.

Other desert industrial facilities currently under construction have had significant kit fox mortality on site[21] despite (or possibly because of) "passive relocation". Additional measures should be included to monitor the dispersal and survival of the kit foxes, to assure that "take" does not occur. "Passive relocation" should not occur to occupied natal dens until after the young have dispersed.

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5. Badger

As with the kit fox, badgers were identified as using the proposed project site (at 4.4-43), but the DEIR fails to provide data or an estimate of the number of badgers that will potentially be impacted by the proposed project. Literature on the highly territorial badger indicates that badger home territories range from 340 to 1,230 hectares[22], therefore it is unclear how many badger territories the proposed project will impact. Badgers are also "protected furbearing mammals" under California Code of Regulations, Title 14, section 460 and may not be "taken" at any time. . As such the DEIR fails to analyze the impacts to this species as required under CEQA. The revised or supplemental DEIR should identify the density of badgers on the proposed project site, including natal and other dens.

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Because passive relocation is identified as an avoidance strategy (4.4-48), the DEIR must evaluate if suitable habitat occurs nearby and is not already occupied by existing badgers. Additional measures should be included to monitor the dispersal and survival of the badger, to assure that "take" does not occur. "Passive relocation" should not occur to occupied natal dens until after the young have dispersed.

6. Burrowing Owl

The DEIR notes that burrowing owls are located in the proposed project area (at 4.4-43). Results from the recent statewide census identified that the southeastern California harbors few Western burrowing owls[23]. Even more worrisome is the documented crash of burrowing owls in their former stronghold in the Imperial Valley. The Imperial Valley has had a recently documented decline of 27% in the past 2 years[24], resulting in an even more dire state for burrowing owls in California. Because burrowing owls are in decline throughout California, and now their "stronghold" is documented to be declining severely, the burrowing owls on this proposed project site become even more important to species conservation efforts. The recirculated or supplemental DEIR needs to evaluate the potential impact of the proposed project on this regional distribution of owls.

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[21] http://cdfgnews.wordpress.com/2012/01/24/dfg-investigates-first-cases-of-canine-distemper-in-wild-desert-kit-foxes/
[22] Long 1973, Goodrich and Buskirk 1998
[23] http://www.birdpop.org/DownloadDocuments/Wilkerson_and_Siegel_2011.pdf
[24] Manning 2009

No habitat acquisition specifically for burrowing owls is identified in the DEIR. Mean burrowing owl foraging territories are 242 hectares in size in uncultivated areas[25], although territories may be larger in arid desert regions. Therefore, additional mitigation acreage needs to be required – calculated using the mean foraging territory size times the number of owls. Using the average foraging territory size for mitigation calculations may not accurately predict the carrying capacity and may *overestimate* the carrying capacity of the proposed project site. Lastly, because the carrying capacity is tied to habitat quality, language should be included that mitigation lands that are acquired for burrowing owl be native habitats on undisturbed lands, not cultivated lands, which are subject to the whims of land use changes. The long-term persistence of burrowing owls lies in their ability to utilize natural landscapes, not human-created ones.

While "passive relocation" does minimize immediate direct take of burrowing owls, ultimately the burrowing owls' available habitat is reduced, and "relocated" birds are forced to compete for resources with other resident burrowing owls and may move into less suitable habitat, which may ultimately result in "take". A Monitoring Plan for the passively relocated birds needs to be included to assure that "take" has not occurred. Additionally if burrowing owl burrows are destroyed, constructed burrows should be identified as mitigation. Typically other projects in the California deserts have been required to construct two burrows for every burrow destroyed.

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7. Golden Eagle

Surveys detected golden eagle on the proposed project site in 1999 (at pg.4.4-19), but the DEIR fails to evaluate the impact to the golden eagle territory(ies). While the project is not likely to impact golden eagles nests, because golden eagles in the desert primarily utilize cliff faces or trees for nesting, neither of which occur on the project site, the fact still remains that the proposed project has the potential to impact foraging habitat. The impact is not analyzed in the DEIR, and needs a thorough review in the REIR.

Large-scale industrial projects in the California deserts are being required to apply for a golden eagle take permit under the Bald and Golden Eagle Act. The proposed project should do so as well.

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8. Cryptobiotic soils and desert pavements

The proposed project is located in the Mojave Desert Air Quality Management District area, which is already in non-attainment for PM-10 particulate matter[26]. The construction of the proposed project further increases emissions of these types of particles because of the disruption and elimination of potentially acres of cryptobiotic soil crusts. Cryptobiotic soil crusts are an essential ecological component in arid lands. They are the "glue" that holds surface soil particles together precluding erosion, provide "safe sites" for seed germination, trap and slowly release soil moisture, and provide CO2 uptake through photosynthesis[27].

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[25] USFWS 2003
[26] http://www.mdaqmd.ca.gov/index.aspx?page=214
[27] Belnap 2003, Belnap et al 2003, Belnap 2006, Belnap et al. 2007

The DEIR mentions on-site cryptobiotic soil crusts (at 4.4-49) but fails to provide a quantitative evaluation of them on the site. The proposed project will disturb an unidentified portion of these soil crusts and cause them to lose their capacity to stabilize soils and trap soil moisture. The DEIR fails to provide any avoidance or minimization measures. It is unclear how many acres of cryptobiotic soils will be removed by the project. The revised or supplemental DEIR must identify the extent of the cryptobiotic soils on site and analyze the potential impacts to these diminutive, but essential desert ecosystem components as a result of this project. The implications of cryptobiotic soil disturbance and the effects on air quality must also be analyzed.

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Additionally, the DEIR does not discuss desert pavements which are another key surface stabilizing feature of desert soils. The DEIR needs to quantify the acreage of desert pavement that occurs in the proposed project area and then evaluate the impacts including to the air quality from disturbance of desert pavement.

Wildlife Connectivity

In addition to the desert tortoise specific connectivity identified above in desert tortoise section, the DEIR fails to adequately evaluate general wildlife connectivity issues and the potential project impacts to connectivity corridors and linkages identified in the propose project area.. Recent desert connectivity studies identify the project area as a key linkage area between the Stepladder Mountains and the Mojave National Preserve[28]. This important issue needs to be thoroughly analyzed in an updated or supplemental EIR.

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Plant Communities

While the DEIR notes that Stabilized or Partially Stabilized Desert Dunes and Stabilized or Partially Stabilized Desert Sand Fields occur on the proposed project site (DEIR at 4.4-4), the description of the species that occur in these communities suggest that they may indeed be rare plant alliances as defined by the California Department of Fish and Game[29], including the *Dicoria canescens - Abronia villosa* (Desert dunes) Alliance. Numerous rare alliances that include species documented on site occur under the broader category of Mojave Wash Scrub (DEIR at 4.4-3 through 4.4-4), yet the DEIR fails to adequately describe the types of Mojave Wash Scrub that occur on site, much less quantify the amount (acreage) as a basis for impact evaluation. Because the DEIR fails to quantify and accurately describe the plant communities, decision makers and the public can not evaluate the impacts to the common or rare plant communities.

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Protected Plants

While the DEIR recognizes the San Bernardino County's Desert Native Plant Protection Ordinance (at pg. 4.4-53), it fails to include all species covered under that ordinance. In fact the

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[28] http://www.scwildlands.org/downloads/DesertLinkageNetworkFINAL.pdf
[29] https://nrmsecure.dfg.ca.gov/FileHandler.ashx?DocumentID=24716&inline=1

ordinance[30] incorporates the State Desert Native Plants Act[31], which includes additional species that were documented on the proposed project site (at Appendix F2) that require permits including:

- All species of the family Cactaceae (cacti), except for the plants listed in subdivisions (b) and (c) of Section 80072
- All species of the genus Cercidium (palo verdes).
- Acacia greggii (catclaw).

While we support the avoidance of plants protected under both the San Bernardino Ordinance and the State Act, the DEIR's Bio mitigation measure 17 states that if avoidance is not possible the plants will be "moved or replanted" (at pg.4.4-53), and then based on this mitigation concludes that the impact is less than significant with mitigation. There are fatal flaws in DEIR's conclusion. First, the DEIR fails to evaluate or identify the number of plants that will be avoided versus the number that will need to be moved or replanted. Secondly, while little information is available on transplantation of desert plants, transplantation of rare plants has over a 90% failure rate.[32] Revegetation of desert lands is notoriously prone to failure[33], suggesting that the mitigation to move and replant species will likely result in mostly mortality rather than survival. Furthermore the potential for moving or replanting a creosote ring is unprecedented and likely unsuccessful. Despite the fact that no inventory of the number of creosote rings was provided in the DEIR, much less the number that would need to be moved or replanted, creosote rings are large, ancient plants, ranging from hundreds to over ten thousand years old[34] and successful transplantation of these ancient deep-rooted species is unlikely. Therefore, based on the mitigation proposed, the impact to these species will indeed be significant. 75

Rare Plants

The DEIR appears to rely on a *draft* rare plant report where surveys were conducted during a single three-day spring season rare plant survey in 2011 to evaluate the presence/absence of rare plants (at Appendix F3). It is unclear from the draft rare plant report (Appendix F3), exactly where the surveys occurred. In the summary it states that "The 2011 rare plant surveys were concentrated within the proposed pipeline route and …… This area is referred to as the "study area" throughout this report. <See comment gca3>" (Appendix F3 at pg.1). In the Methods section of Appendix F3, it states that "The survey area consisted of 100 feet on both sides of the Arizona and California Railroad Company's (ARZC) railroad tracks." (at pg. 10). No other survey data are provided for the remaining portions of the project site – specifically the proposed well field area, much less the proposed infiltration basin site. Therefore the DEIR fails to provide adequate baseline information on the status of rare plants on the proposed project site. 76

[30] https://www.co.san-bernardino.ca.us/countycodes/pdf/89-04.pdf
[31] www.dfg.ca.gov/habcon/plant/cadesertplantact.html
[32] Fiedler 1991
[33] Lovich and Bainbridge 1999
[34] Vasek 1980

O_NPCA-CBD et al.

In addition, the proposed project site is located in an area of the California desert that receives monsoonal precipitation during the summer, prompting germination and flowering of unique summer and fall annuals, some of which are rare. Because the rare plant surveys were only performed in the spring, none of these unique late summer/early fall annuals could ever have been detected. State and federal wildlife agencies recognize the importance of these late summer/early fall surveys and require them for other industrial developments in this part of the California desert. Therefore the absence of botanical surveys in late summer/early fall renders the data on rare plants incomplete.

With incomplete data, the DEIR fails to evaluate the impacts to rare plant species. Absent these essential and comprehensive surveys, the DEIR cannot accurately evaluate the impact to rare plants without first knowing what is on site. These surveys must be performed and the results of these surveys incorporated into the revised or supplemental DEIR. 76

Phreatophytes

Desert phreatophytes are legendary for their deep-rooting, and can utilize groundwater up to 40 feet to 200 feet deep, depending on the species. These phreatophytic communities often occur on the margins of dry lake beds in the Colorado, Sonoran, Mojave, and Great Basin deserts typically below 4,000 feet in elevation, but also along washes and other areas where consistent groundwater is available. These groundwater-dependent plant communities are also sensitive communities recognized by the California Natural Diversity Data Base (CDFG 2003) and BLM. The DEIR fails to actually identify the plant communities that occur around the Bristol and Cadiz lakes, instead focusing on just three plants species. Instead the DEIR relies on remotely sensed analysis, that incorrectly assumes that phreatophytic vegetation is identified by "denser growth, larger plants" (at Appendix F4), which is an incorrect assumption for desert phreatophytic vegetation. Other known phreatophytes that are documented in the proposed project area include the palo verde, smoke tree, and cat's claw, yet these species are not included in the groundwater effects analysis (at Appendix F4). Furthermore, it has been commonly documented that decreasing water tables often result in plant water stress and reduced live biomass in phreatophytes.[35] Therefore the DEIR's analysis of the impact of groundwater pumping on phreatophytic plant communities is flawed because it is based on incorrect assumptions about phreatophytic vegetation. The REIR will need to provide adequate field surveyed data and base the impact analysis on more accurate modeling. 77

The DEIR Fails to Provide Crucial Mitigation Plans for Biological Resources

Several of the mitigation measures in the DEIR call for future plans to be developed including: 78

- Desert Tortoise Avoidance and Protection Plan (ES-14)
- A 5-year Maintenance and Monitoring Plan (ES-15)
- A Habitat Compensation Plan (ES-15)

[35] Naumburg et al. 2005.

- Sensitive-status species and sensitive habitat restoration plan (at ES-15)
- Habitat compensation plan (at ES-15)
- Waters of the State mitigation plan (at ES-17)

All of these plans are key components to evaluating the adequacy of the avoidance, minimization and mitigation to biological resources by the proposed project. Their absence makes it impossible to evaluate the impacts from the proposed project. Each of these plans needs to be included with and thoroughly analyzed in the EIR.

In addition, other key plans are required but not addressed in the DEIR. They include but are not limited to:

- Translocation plan for Mojave fringe-toed lizards;
- An avian and bat protection plan
- Transplantation plan for native trees;
- Desert kit fox and badger "passive relocation" plans;
- Burrowing owl relocation and monitoring plan;
- Raven reduction plan;

As above, without an opportunity for decision makers and the public to review the clear avoidance, minimization and mitigation measures set forth in these plans, it is impossible to evaluate the impacts and adequacy of any proposed measures.

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The Project Must Comply with the Endangered Species Acts

The project is subject to the Endangered Species Act ("Act"), and must fully comply with the Act's provisions. Section 9 of the Endangered Species Act of 1973, and Federal regulations issued pursuant to section 4(d) of the Act, prohibit take of endangered and threatened species without a special exemption. 16 U.S.C. 1531 et seq. Section 7 of the Act requires Federal agencies to consult with the United States Fish and Wildlife Service ("USFWS") should it be determined that their actions may affect federally listed threatened or endangered species. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by USFWS to include significant habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by USFWS as an action that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

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Private landowners, corporations, state or local governments, or other non-Federal landowners who wish to conduct activities on their land that might harm species that are listed as endangered or threatened should develop a Habitat Conservation Plan (HCP), designed to offset any harmful effects the proposed activity might have on the species.

The California Endangered Species Act (CESA) prohibits the taking of an endangered or threatened species except in limited circumstances. Specifically, under section 2081 of the Fish and Game Code, CDFG may grant permits ("ITPs") allowing the taking of an "endangered species, threatened species, and candidate species" if the take is incidental to an otherwise lawful

activity, the impacts are minimized and fully mitigated, and the applicant ensures adequate funding to implement and to monitor compliance with and effectiveness of the mitigation measures. (Fish & G.Code § 2081 (a)-(b).) The DEIR fails to provide adequate information about avoidance or minimization measures for the state threatened desert tortoise. Additionally, it fails to provide clear mitigation in order to evaluate if the fully mitigated standard has been met.

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Inadequate Analysis of Cumulative Impacts to Biological Resources

The cumulative impact analysis for biological resources is wholly inadequate. In addition to the inadequate and inaccurate impact analysis of the proposed project as detailed above, the cumulative analysis, while listing many of the current or reasonably foreseeable future projects still concludes "the impacts of the proposed Project would not contribute considerably to a cumulatively significant impact to biological resources in the eastern California deserts" (at 5-32). However, no quantitative analysis is provided upon which to base that determination. Even with "mitigation", industrial projects result in decreased habitat, and mitigation is not off-setting those impacts.[36] Furthermore, "considerably" is unclearly defined. A much more comprehensive cumulative impact analysis is needed in the REIR.

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Chapter 4.5 – Cultural Resources

Failure to Provide Adequate Information Regarding Field Survey

Pages 4.5-22, 4.5-23: The DEIR outlines a field survey in which surveyors searched for cultural resources by walking on either side of the railroad. However, the DEIR does not detail if or how the surveyors determined whether any subsurface cultural resources exist. Given that cultural resources may be hundreds of years old and easily buried in the desert environment, it is unclear whether any attempt was made to identify possible cultural resources that are not readily visible. The EIR must explain how the surveyors determined whether subsurface cultural resources existed.

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Failure to Provide Analysis of Ineligibility of Cultural Resources

Page 4.5-23: The DEIR subsection entitled "Significance Evaluation of Cultural Resources" identifies forty-one resources located or updated within the pipeline area during the field survey. The DEIR proceeds to outline ten of these resources in Table 4.5-3, but dismisses the remaining thirty-one because "they do not appear to be eligible for listing in the CRHR [California Register of Historic Resources] and are therefore not considered significant under CEQA." The DEIR does not explain why these thirty-one resources are not eligible for listing in the CRHR. The DEIR also misstates the law by stating that a resource not eligible for listing is by default not considered significant under CEQA. While a resource listed in the CRHR is a "historical resource" under CEQA Guidelines § 15064.5(a)(1), unlisted or ineligible resources are not categorically excluded; a lead agency may choose to treat such resources as "historical

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[36] Moilanen et al. 2009; Norton 2008

resources." *Id.* § 15064.5(a)(4). The DEIR's conclusory language and dismissal of the majority of the affected cultural resources without explanation demonstrates a lack of a "sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences." Guidelines § 15151. The EIR must provide relevant information about all affected cultural resources, and explain the criteria used to determine whether a resource is eligible for listing in the CRHR. If a resource is not eligible, the EIR must explain why it was nevertheless not considered significant.

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Failure to Investigate Possible Cultural Resources in the Wellfield Area

Page 4.5-29: The DEIR provides insufficient and incomplete information regarding cultural resources in the wellfield portion of the Proposed Project area. The DEIR details the resources found in the pipeline area, but completely neglects the wellfield area. The DEIR admits that "[l]ess than 10 percent of the wellfield portion of the project area has been previously surveyed. . . . No archeological survey of the wellfield portion of the Project area was conducted as part of this study . . . ." The DEIR continues to note that the condition of previously and potentially eligible resources "have not been confirmed, nor has it been determined the number and types of any cultural resources that might be present in the wellfield portion of the Project area." Without complete information regarding possible cultural resources in the wellfield area, the DEIR has insufficient data to reach the conclusion that all the cultural resource impacts would be "less than significant with mitigation."

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Failure to Adequately Analyze Impacts on Resource CA-SBR-9853H (the ATSF Railroad, Parker Cutoff) and Resource CA-SBR-11583H (the Cadiz-Parker Road)

Page 4.5-40: The DEIR fails to adequately analyze impacts on the ATSF Railroad, Parker Cutoff and the Cadiz-Parker Road that would result from surface and subsurface disturbance during construction. On page 4.5-41, the DEIR notes:

> Potential impacts to significant cultural resources can include both surface disturbance by vegetation removal and by the movement of large construction vehicles and equipment and subsurface disturbance through excavation or grading. Damage or destruction of significant historical resources would be a significant impact.

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However, the DEIR does not sufficiently consider these impacts when evaluating the Proposed Project's effects on the above-named resources. The DEIR states that the proposed pipeline would be constructed "at least 50 feet" from the ATSF railroad, but then qualifies that statement and admits that "in some areas the pipeline may need to cross under the railroad." (DEIR, p. 4.5-40.) Additionally, the DEIR states that there would be "no significant impacts" to the Cadiz-Parker Road although that road would be used during Project construction. The dirt road dates to 1916 and the DEIR does not address that the use of heavy machinery and construction traffic on the Road may have the potential to alter the Road's integrity. The DEIR fails to support its conclusions with adequate analysis. The EIR must specifically explain why using jack and bore or directional drilling construction would not impact the eligibility of the ATSF Railroad, Parker Cutoff for listing in the CRHR. The EIR must also substantiate the conclusory claim that the

Cadiz-Parker Road's eligibility for CRHR listing would not be affected by heavy machinery and construction traffic.

84

Avoidance of Critical Analysis of Archeological Resources

Page 4.5-43: The DEIR has not identified the possible archeological resources that may be affected by the Proposed Project and has instead deferred analysis of the issue, depriving the public and government decision makers of the information needed to make informed decisions about the Project. The DEIR explains that a portion of the Project area, including the wellfield, has not yet been surveyed and would require "a survey and identification of cultural resources" at a later time. An EIR may not "simply defer any statement setting forth a significant environmental effect of a proposed project." *Stanislaus Natural Heritage Project v. County of Stanislaus*, 48 Cal.App.4th 182, 205 (1996). The DEIR recognizes that unidentified resources may be affected. The EIR must identify and address the potential effects of the Proposed Project on those resources.

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Chapter 4.6 – Geology & Soils

The "Geology and Soils" analysis suffers from many of the same defects as the remainder of the DEIR. The analytical models use inappropriate time frames and estimated water recharge rates. Mitigation measures are described as effective when the problems they purport to solve, such as subsidence, are by their very nature unsolvable by the time the problems are discovered. These analytical deficiencies do not support the conclusions reached in this chapter and do not provide support for reasoned and informed decision-making.

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Failure to Use Appropriate Time Frame for Recovery Period

Page 4.6-28: The time frame used by Geoscience in preparing its groundwater flow and transport model is inadequate. The model assumes a recovery period of 50 years, which would begin after the Proposed Project's 50 years of pumping. The impacts from the Proposed Project, however, would continue well beyond the 50-year recovery period. The cone of depression is expected to continue growing even after 50 years of pumping. (*See* DEIR, Appendix H1A, Geoscience Support Services, Inc., *Volume 1: Report – Cadiz Groundwater Modeling and Impact Analysis,* p. 49 (Sep. 1, 2011).) Recovery could take up to 400 years. Under California law, "[d]irect and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and *long-term effects*." Guidelines § 15126.2(a) (emphasis added). The model fails to account for "long-term effects." Accordingly, the EIR must justify the assumption of a recovery period of 50 years.

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Failure to Use a Reasonable Recharge Rate

Page 4.6-28: The Project Scenario unreasonably assumes a recharge rate of approximately 32,000 AFY. Per the hydrology comments in this letter, the best estimate of recharge is approximately 16,000 AFY. The EIR must recharacterize the 16,000 AFY "sensitivity scenario" as the "Project Scenario."

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Failure to Use Proper Annual Pumping Rates in the Groundwater Model

Page 4.6-28: The groundwater model used the average of 50,000 AFY of pumping to determine the effects on the aquifer. However, the Proposed Project would pump between 25,000 and 75,000 AFY. The model's conclusions are therefore unreliable because they do not accurately reflect the yearly fluctuations in pumping. The maximum pumping rate is *three times* the planned minimum, indicating that the Proposed Project's effects on groundwater levels, the freshwater-saline interface, and subsidence in maximum pumping years would vary considerably from the effects in average and minimum pumping years. The environmental effects seem likely to be proportional to the amount of water pumped. By using an average number, the DEIR fails to account for these potential yearly variations, especially in years where significantly more than the average would be pumped. Accordingly, the EIR must substantiate the use of the 50,000 AFY average in the groundwater model. In addition, the EIR must estimate the actual pumping rate for each year of the Proposed Project to provide accurate geological data. 89

Failure to Properly Characterize the Feasibility of Correcting Geologic Impacts

Page 4.6-29: This section states that the action criteria are set for each impact area, "thus insuring [sic] adequate time to implement the corrective actions and avoid significant impact." The DEIR fails to establish what constitutes an adequate time and the effectiveness of each corrective actions. In addition, the DEIR is misleading because it implies that *corrective* actions can in fact be taken. However, some geologic impacts cannot be corrected. Once subsidence has occurred, it cannot be undone. Nor can a landslide or liquefaction be reversed. Because some impacts cannot be corrected, it is impossible to ensure that adequate time even exists to be able to correct the impacts. The EIR must explain how the "adequate time" will be calculated to correct geologic impacts that may be uncorrectable by their nature. 90

Failure to Mitigate the Potential Impacts of Subsidence

Page 4.6-38: Mitigation measure GEO-1 incorrectly asserts that subsidence can be arrested. First, subsidence in itself is an environmental impact. Repairing damaged structures may cure one of the effects of subsidence, but does not arrest subsidence. Revising pumping locations might also be ineffective because subsidence could occur as the result of overall drawdown, not just in isolated areas related to well location. Finally, stopping pumping is unlikely to arrest subsidence because the pumping rate is well beyond the natural recharge rate and the aquifer would take decades to recover. Therefore, the mitigation measures—reduced pumping, revision of pumping locations, stopping all extraction, and repairing damaged structures—would be unlikely to arrest subsidence. Accordingly, the DEIR's conclusion that the impact of subsidence is "less than significant" may not be justified. The EIR must explain precisely how these mitigation measures would arrest subsidence within a reasonable time frame, individually and in concert. 91

Chapter 4.7 – Greenhouse Gas Emissions

The greenhouse gas ("GHG") emissions analysis is insufficient because it unreasonably interprets uncertainty to the benefit of the Proposed Project and fails to explain the parameters of 92

the impact analysis, including which benchmark is adopted. Furthermore, it provides mitigation options that are impossible to gauge in the absence of an adopted benchmark. Although the CEQA Guidelines grant significant discretion to the Lead Agency to choose how to analyze a given project's GHG effects, the agency must "make a good-faith effort, based to extent possible on scientific and factual data." Guidelines § 15064.4(a). It is not in good faith to analyze only one possible scenario, especially considering the uncertainty, to conclude that the Proposed Project is necessary for reliable water delivery in Southern California. 92

Failure to Consistently Describe the Effects of Climate Change on Precipitation and Recharge

Pages 4.7-6 to 4.7-7: This section is internally inconsistent. It acknowledges that the effects of climate change on precipitation and recharge in the Project area watersheds are "uncertain," (DEIR, p. 4.7-6.,) but the uncertainty is then unreasonably resolved in favor of the Proposed Project. It concludes that the "total amount of natural recharge that occurs each year in the basin should be relatively unchanged over the long-term." (DEIR, p. 4.7-7.) That, however, is inconsistent with the "general consensus" that "climate change is expected to shift precipitation and snow melt patterns." (DEIR, p. 4.7-6.) If more winter precipitation is in the "form of rain, instead of snow," it is likely that the seepage rate will also decline. Without addressing the potential decline in seepage rate or discussing other scenarios, the DEIR unreasonably states that "[c]urrent geological assessments of the aquifer system . . . suggest that the Proposed Project's recharge rate is *unlikely to be materially affected* by climate change." (DEIR, p. 4.7-7 (emphasis added).) Finally, the claim that "relatively little has been written about the impacts of climate change on groundwater recharge" is also unsubstantiated. (*Id.*) Given this uncertainty, the EIR should consider more than just one scenario as a result of climate change than the one that favors the Proposed Project. Without a "good-faith effort," the claims of stability are unreliable and cannot inform public participation and decision-making. Guidelines § 15064.4(a). 93

Failure to Explain the Parameters of the Impact Analysis for GHGs

Page 4.7-19: This section does not explain why only measures W-1 through W-5 were selected for review. Although these are the only measures listed under the heading "Water" in Table 4.7-2, other measures might also be applicable. Measure T-4, Vehicle Efficiency Measures, could apply to construction and operation vehicles. Measure I-1, Energy Efficiency and Co-Benefits for Audits for Large Industrial Sources, could apply to the natural gas turbines used to power the wells. The EIR must explain why only measures W-1 through W-5 were chosen for review and in the alternative, consider including other measures. 94

4.9. Hydrology

The DEIR fails to provide an adequate analysis of the current hydrogeologic conditions and reasonably foreseeable impacts of the Proposed Project. The technical models and analyses underlying the DEIR rely to varying degrees on insufficient, unclear, and/or inconsistent data, an opaque process, and improper analysis, which in turn lead to scientifically unsupportable conclusions. The DEIR's impact analysis and monitoring/mitigation planning, which depend on 95

these scientific findings, are therefore unreliable. Further, impacts caused by the storage and recharge components of the Proposed Project receive only cursory treatment. And, by not providing sufficiently reliable information to foster informed public participation and decision-making, the hydrogeological analysis in the DEIR fails to meet the informational requirements of CEQA. 95

The following comments are based on the commissioned expert reports of Dr. John Bredehoeft, an exceedingly well respected hydrogeologist and a contributor of multiple reports on the 2001 project (for 2001 reports, see Appendix B to these comments; incorporated in the present comments by reference), and Andrew Zdon, Principal Hydrogeologist for Johnson Wright environmental consulting. These reports were commissioned by NPCA to facilitate an independent review of the water supply as assessed in the DEIR and underlying studies. Mssrs. Bredehoeft and Zdon's reports are both incorporated fully by reference, and related to the contents of the DEIR below. 96

As a result of the widely differing accounts of groundwater recharge in the proposed project, and the repeated habit of the project proponent to vastly overstate the recharge, a neutral estimate of recharge should be provided by USGS and relied upon to judge impacts. USGS has already provided such an estimate, in fact, and this estimate should be re-confirmed and relied upon as a neutral, independent source. Due to its expertise in groundwater management and estimation, USGS must be directly involved in the entire environmental review process and, if the Proposed Project were to be implemented in any form, monitoring and mitigation. 97

Summary of Water Issues:

1. The estimation of recharge rates is fundamentally flawed because it is at least twice that of any other recharge rate assessed by other experts. The recharge analysis further (i) unreasonably characterizes other experts' estimated recharge rates; (ii) uses old U.S. Geological Survey ("USGS") evapotranspiration data without explaining why newer data is not used; and (iii) does not explain why it uses substantially different hydrologic parameters than the other models. Both independent hydrogeologists contracted by commenters estimated the actual recharge at between 14,000 and 16,000 AFY, and Dr. Bredehoeft suggests that the actual rate may be far lower. With such low recharge rates, both experts agree that the fundamental purpose of this project cannot be conservation and must be considered groundwater mining and export 98

2. The evapotranspiration of water to be exported is grossly overstated; actual evapotranspiration would occur at a small fraction of that estimated in the DEIR. This poor measurement is important because the project's primary stated purpose, conservation, is supposedly measured by the amount of water exported that would otherwise evaporate. Yet the evaporation rate is far lower than the DEIR uses as its rate. If avoided evaporation is the main metric for judging the success of the proposed project 99

and the preferred alternative, then the project is a resounding failure. For supposed justification of the project, the use of a grossly exaggerated rate is unacceptable. 99

3. The cone of depression is improperly measured; the cone caused by pumping will continue to expand for over 100 years—long after pumping stops. The DEIR fails to adequately account for the fact that this continued expansion of the cone of depression will be uncontrollable by groundwater management or other proposed mitigation activities in the basin, and does not adequately discuss or analyze the impacts created from a long-term cone of depression. 100

4. The monitoring and mitigation plan does not have sufficiently defined milestones and decision points to overcome the uncertainty associated with the technical analyses. By the time an impact is discovered, it will likely be too late to mitigate the problem through groundwater management, particularly after pumping has already stopped. For example, the monitoring of the springs is insufficient because visual inspection is unlikely to reveal problems until it is too late to mitigate the damage. 101

5. The monitoring and mitigation plan lacks sufficient independent oversight. Groundwater management will be under the sole direction and control of the Fenner Valley Mutual Water Company ("FVMWC"). Further, the Technical Review Panel does not have any representatives from local stakeholders, such as the BLM or Mojave National Preserve. 102

6. The Geohydrologic Assessment of the Fenner Gap Area (aquifer testing) largely ignores hydrologic data gathered over the last 20 years. Among our concerns are that: (i) data from Cadiz's own wells are largely excluded; (ii) the relationship of the new data to the previously collected data is left unexplained; (iii) there is no evidence that the aquifer testing was performed according to independent standards; (iv) the true static groundwater levels are questionable; and (v) corrections to groundwater elevations for barometric pressure changes are not explained. As a result, the data provided by this aquifer testing are unreliable. Subsequent impact analysis and mitigation planning based on this data and analysis is similarly unreliable and inadequate. 103

7. The groundwater impacts analysis is flawed because the possible subsurface underflow to the south of the upper Fenner Watershed (beneath Mojave National Preserve) is not adequately explained. The projected effects of climate change—most notably reduced rainfall—are not adequately addressed in the impact analysis. Moreover, model impacts are not evaluated after 100 years—even though the cone of depression will continue to expand after 100 years and groundwater storage may take up to 440 years to recover. 104

8. The impacts of the Proposed Project on springs are not sufficiently explained because of missing data and confusing and incomplete analysis. 105

9. The DEIR fails to sufficiently acknowledge and address impacts from the imported groundwater component mixing with the unadulterated groundwater. The DEIR does not explain how this activity will comply with State Resolution 68-16. 106

1. Failure to Properly Estimate the Groundwater Recharge Rates

The estimation of recharge rates included in the report, *Cadiz Groundwater Conservation and Storage Project* ((CH2M Hill, 2010), presented as Appendix A in Volume 2 of *Cadiz* 107

Groundwater Modeling and Impact Analysis (GSSI, Sep. 1, 2011), DEIR, Appendix H1B), results in an unreasonably high estimate, more than double the estimate reached by our two hydrology experts and others, that is not supported by the data and analyses in the DEIR. The rationality of the entire Proposed Project depends largely on the relationship between the annual pumping rate and the recharge rate. Without proper support for the estimated recharge rate in the DEIR, the Proposed Project's impacts cannot be adequately predicted and could extend well beyond 100 years. The DEIR itself posits that recharge could take up to 400 years using the lower recharge estimate. With such a broad potential time span, proper monitoring seems impossible and the effectiveness of proposed mitigation measures is largely speculative.

In 2010, CH2M Hill performed a modeling analysis using the USGS programs INFIL3.0 and MODFLOW to re-evaluate the estimated groundwater recharge that was previously estimated by Geoscience Support Services (1999). Based on these efforts, the average annual "recoverable" water quantities for the Fenner Watershed area are estimated at 30,191 AFY and 2,256 AFY for Orange Blossom Wash (32,447 AFY combined). Both of the hydrogeologists contracted by commenters view this result as grossly overstated.

As part of the hydrogeologist Andrew Zdon's review and analysis, he used a discharge evaluation based on more recent evapotranspiration data than were used in the CH2M Hill analysis. Continuous micrometeorological data collected over a four year period in Death Valley were used to estimate evapotranspiration rates over the area evaluated (DeMeo, et.al. 2003). Our analysis resulted in more consistent and generally improved estimates of groundwater discharge than in previous studies (San Juan, et.al. 2004). The resulting midpoint evapotranspiration rate estimates were 0.13 feet per year (ft/yr) for salt-encrusted playa and 0.15 ft/yr for bare-soil playa. Assuming the 0.15 ft/yr evapotranspiration rate, it can be assumed that there is 8,947 AFY of evapotranspiration losses from the Bristol and Cadiz playas (based on the area in which evapotranspiration takes place in the model). Taking our analysis one step further and adding the estimated annual pumpage from the basin of approximately 5,000 AFY (and assuming that the basin is in hydrologic balance or inflow equals outflow), an estimated recharge of approximately 14,000 AFY (plus the volume of spring discharge) can be inferred from the Johnson-Wright expert report. Of note is that total spring charge has not been estimated in the DEIR. The estimated recharge of approximately 14,000 AFY plus spring discharge is very similar to the best estimate of Davisson (2000, 2012). Dr. Bredehoeft's report estimates recharge at a slightly higher but similar level, 16,000 AFY. However, Bredehoeft also believes the actual rate could be much lower.

As a comparison, the recharge volumes estimated in the DEIR are greater than the natural recharge to the Coastal Plain of Orange County basin (29,000 AFY) (California Department of Water Resources, 2004), and the combined recharge from stream flow in the Bishop Creek to Big Pine Creek region (and inclusive of intermediate streams) of the eastern Sierra Nevada (Danskin, 1991).

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The following are more detailed comments on the recharge estimation report. All citations are to *Cadiz Groundwater Conservation and Storage Project* (CH2M Hill, 2010) unless otherwise indicated.

107

a. CH2M Hill's analysis used old evapotranspiration rates when newer data was available.

(Page 4-17 – Section 4.2.4, Discussion of Groundwater Flow Model Results)

The EIR must explain why it did not use USGS's Death Valley data to determine evapotranspiration rates in the Project area.

108

b. Total spring charge is improperly excluded from this analysis.

The EIR must explain why total spring charge was excluded.

109

c. This analysis misrepresents the work of other experts—Davisson and Rose

(Page 4-8 – Section 4.1.8.1, Comparison to Most Recent Recoverable Water Estimates)

The text states, "INFIL3.0 simulation results compare favorably to GSSI (1999) watershed water balance modeling results and the Davisson and Rose (2000) Maxey-Eakin recoverable water estimate of 29,815 AFY . . . ." Davisson and Rose presented a range of groundwater recharge estimates (referred to as "recoverable water" in the CH2M Hill report) ranging between 7,864 AFY to 29,185 AFY. Personal communications between Mr. Zdon and Davisson (January 18, 2012) indicate that a best estimate of groundwater recharge based on their work would be closer to the regional precipitation-elevation curve of 16,214 AFY. The 29,185 AFY estimate was a maximum estimate. Therefore, the estimated recharge rate developed by CH2M Hill (2010) and Geoscience Support Services (1999) generally represents a two-fold increase in estimated recharge in comparison to other estimates. The EIR must explain why Davisson and Rose's maximum recharge rate was not properly represented, and explain the impacts of this misrepresentation on the findings and conclusions of the recharge analysis. The EIR must also explain the impact of using the properly characterized Davisson and Rose best estimate of recharge (16,241 AFY), particularly how the findings and conclusions would differ.

110

d. The groundwater recharge analysis is opaque and relies on non-disclosed assumptions.

(Page ES-5, Validation of Recoverable Water Estimate, Paragraph 1)

The three-dimensional model described in the DEIR was constructed using the USGS program MODFLOW. Given that calibrated hydraulic conductivity values

111

described appear to vary considerably from those calibrated hydraulic conductivity values described in the Impact Analysis (Geoscience Support Services, 2011), it is unclear on what assumptions the CH2M Hill numerical model was based. The EIR must describe and explain these assumptions.

111

e. The groundwater recharge analysis does not explain how evapotranspiration was modeled.

(Page ES-5, Validation of Recoverable Water Estimate, Paragraph 1)

112

Evapotranspiration losses from the playas play a key role in the hydrologic budget. The EIR must explain how playa evapotranspiration was modeled.

f. The analysis improperly relies on substantial generalizations instead of performing a sensitivity analysis, which enhances uncertainty and unreliability.

(Figures 2-10 through 2-12)

113

The figures indicate that for the purposes of the recharge evaluation, large areas (in the hundreds of square miles) are assumed to have similar characteristics. Given the local landscape, it is clear that substantial generalization is incorporated into these figures and the resulting analyses. More detailed mapping of surface conditions would not likely be feasible under typical project constraints. Therefore, in order to account for these generalizations or unknowns, the INFIL3.0 modeling must be subject to a sensitivity analysis of input parameters (i.e., evaluate the effect of altering input parameters on model results) to evaluate sensitive parameters that may have a high degree of uncertainty leading to overall model uncertainty.

g. The groundwater recharge analysis fails to explain why two different models were used—CH2M Hill and GSSI—and fails to explain why the hydrological parameters of the models are substantially different.

(Page 4-10)

114

Referenced here is a numerical model developed by CH2M Hill that varies substantively from that presented by the GSSI model previously discussed. The EIR must explain the differences between the two models and why the CH2M Hill model (which was apparently completed prior to the GSSI model) is reliable given the substantial differences in hydrologic parameters used, results of sensitivity analyses, and calibration. The EIR must explain the assumptions used in the CH2M model and how they compare to the assumptions used in GSSI's model.

h. There is no evidence that the CH2M Hill Model was performed in accordance with standard practice.

115

(Page 4-10)

115

Standard documentation of numerical groundwater flow modeling efforts, as described by ASTM, Anderson and Woessner (1992), and others, is not provided. The EIR must provide this standard documentation to enable the model to provide substantive support for the estimated groundwater discharge.

i. This analysis improperly uses geologic data from Texas instead of from the Project area.

(Page 4-17 – Section 4.2.4, Discussion of Groundwater Flow Model Results)

116

The EIR must describe why carbonate rock units from the Death Valley region, which are correlative with those carbonate units in the Project area and which have been extensively studied, were not evaluated in lieu of more distant carbonate rocks from Edwards Aquifer in Texas.

2. Evapotranspiration is grossly overestimated in calculating the amount of recoverable water and the related estimate of "conservation" of water that would otherwise evaporate

(Page ES-3, Paragraph 2) The text states that "Total recoverable water, therefore, is equal to the amount of recharge to the groundwater system in the Fenner Watershed, which is approximately equal to the amount of groundwater flow through Fenner Gap through the alluvial and carbonate rock units." With respect to this statement, the total recoverable water would actually be the amount of recharge to the groundwater system minus any evapotranspiration losses from springs and spring vegetation. The EIR must explain why its calculation of the total recoverable water does not consider evapotranspiration losses.

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More importantly, the Johnson-Wright report provides extensive critique of the flawed use of evapotranspiration. Evapotranspiration rates "allowed to vary substantially between recharge scenarios even though evapotranspiration would be unlikely to change." (J-W p.10) According to that report, "Evapotranspiration rates of greater than 50 ft/yr for Cadiz Dry Lake and 20 ft/yr for Bristol Dry lake are "substantially" above the pan evaporation rate, and nearly five times the evapotranspiration rate for Cadiz Dry Lake. "These are geologically unreasonable evapotranspiration rates for use in the model….that the evapotranspiration rates had to be increased to the extent described above indicates that there is a problem elsewhere in the model." (Johnson-Wright p.10)

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Further points on evapotranspiration:

- (JW-10) The EIR's evapotranspiration rate is ten times the USGS evapotranspiration rate from playa soils in Death Valley.
- (JW-10) Cadiz dry lake is where most of the evapotranspiration is claimed to occur, yet **the evapotranspiration model did not include most of Cadiz dry lake.** Using such a rough (and, as it turns out, wildly inflated) estimate of evapotranspiration as a basic data

point to evaluate impacts in the EIR is unacceptable and a blatant failure to accurately assess project impacts. If the model boundary actually included Cadiz dry lake, such wild estimates could have been lessened or avoided entirely. On a related note, there was no sensitivity analysis performed for

- The analysis used geologically unreasonable evapotranspiration rates:

  (Page 36)

  The evapotranspiration rates used, greater than 50 ft/yr for Cadiz Dry Lake and 20 ft/yr for Bristol Dry Lake, are substantially above the pan evapotranspiration rate (nearly five times the pan evapotranspiration rate for Cadiz Dry Lake) and therefore geologically unreasonable. According to the text, "maximum evapotranspiration rates used were based on model calibration results in order to obtain a more reasonable evapotranspiration from the dry lakes and a better match between the model-calculated and observed water levels." GSSI Report (2011b), p. 36. That the evapotranspiration rates had to be increased to the extent described above indicates that there is a problem elsewhere in the model.

  The text also states that "Results show an average of 19 inches/year over those cells where evapotranspiration is occurring in this run which is a reasonable average." This is approximately ten times USGS's estimated evapotranspiration rate from playa soils in Death Valley.

  The text states that, "For Cadiz Dry Lake, the maximum evapotranspiration rate was adjusted by a factor of approximately 2.5 from the maximum evapotranspiration rate of the Bristol Dry Lake due to the fact that most of the Cadiz Dry Lake area is outside of model boundary." This statement suggests that the model grid was either not widespread enough (thereby improperly constructed) or that there was a flaw in the logic behind evapotranspiration calibration. Concentrating evapotranspiration discharge in one location as a means to calibrate groundwater elevations when a substantial portion of the discharge from evapotranspiration is not taking place at that location in which groundwater levels are being calibrated is not appropriate. This would be analogous to a hypothetical significant discharging production well at a distant location being moved to this location in the model to assist with model calibration and suggests a need to expand the grid to encompass Cadiz Dry Lake. The EIR must explain why Cadiz Dry Lake was assigned an evapotranspiration rate 2.5 times the rate of Bristol Dry Lake solely because Cadiz Dry Lake is outside of the model boundary. The 2.5x multiplier is arbitrary as currently unsubstantiated in the DEIR. The EIR must also explain why the model grid does not include Cadiz Dry Lake since the evapotranspiration rates from this dry lake bear directly on the hydrological resources and impacts of the Proposed Project.

  The high evapotranspiration rates appear to be symptomatic of the amount of water that is needed to be discharged from the playa based on the existing

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recharge estimate. This symptom was present in the previous modeling (GSSI, 1999) where in lieu of the evapotranspiration rates being increased to the extent they are in the current analysis, the discrepancy was resolved with an extinction depth of 100 feet below ground surface (described in the current analyses is geologically unreasonable[37]).

The EIR must substantiate the evapotranspiration rates used in the model, and explain why the rates are treated as variables for the purpose of calibrating the model instead of as constants, or near-constants.

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Finally, there is the issue of the relative evaporation rate of the recharge/storage water when sitting in recharge ponds, and whether that water evaporates at the same rate as the water supposedly evaporating from the dry lakes' surfaces. It appears that the evaporation rates used to justify the "conservation" principle are different from those used to justify the efficiency and effectiveness of the recharge/storage. This discrepancy must be reconciled in the EIR.

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3. <u>Flawed Analysis of Cone of Depression</u>

Cones of depression are only measured for immediate post-pumping and 50 years after pumping ceases; the cones of depression should show how groundwater elevations change over time given the proposed management regime, and should be illustrated for over 100 years as the cone will continued to expand (meaning that groundwater levels will continue to decrease.) Given the cone of depression will continue to expand even after 50 years of shutdown, "it will likely be too late to make substantive changes in groundwater management to mitigate the problem." (Johnson-Wright W-8; 12; 14)

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4. <u>Failure of Monitoring/Mitigation Plan to Prevent or Reduce Potential Future Impacts</u>

The Proposed Project proposes to substantially reduce the volume of groundwater in storage and reduce groundwater levels over much of the groundwater basin. Given the large scope of the Proposed Project, and the sheer size of the planned cone of depression, it may take many years before groundwater level and/or spring impacts are identified. As shown in the impact analysis by the cone of depression that continues to expand even after 50 years of shutdown (at year 100), by the time an impact occurs, it will likely be too late to make substantive changes in groundwater management to mitigate the problem. This will be particularly true for those impacts that begin to arise after the Proposed Project has already ceased pumping. The Proposed Project lacks needed proactive groundwater management that would prevent unintended impacts from occurring to surrounding land owners and sensitive receptors.

The absence of a more rigorous spring monitoring program with specified thresholds and triggers for reduced or ceasing pumping is not appropriate. Visual observations of changes in spring flow will only begin to be obvious when a significant impact to a

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[37] The current extinction depth used is 15 feet below ground surface.

spring is already occurring. Given the time lag between shutting off pumping and the growth of the outer edges of the cone of depression, an observed impact will likely be too late to be protect the springs and their associated habitat. The DEIR and its accompanying analysis fail to demonstrate that the proposed spring monitoring will detect an impact in time to protect the springs and their associated habitat.

The groundwater and spring monitoring/mitigation plans must be re-evaluated and a more in-depth investigation into the impacts on springs must be performed. In particular, the sources of the spring water must be identified. Among the questions that need to be answered are: (i) whether any of the springs are fed through fractures; and (ii) whether the springs are only fed from surface runoff. The DEIR explains that the cone of depression would reach the same elevation as Bonanza Springs. The EIR must explain any effects on Bonanza Springs caused by the cone of depression reaching the same elevation. The revised monitoring/mitigation plan must include specific measurable conditions that would trigger specific actions to reverse and/or remedy any effects on springs. The mitigation plan in the DEIR is insufficiently general and lacks effective trigger points.

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5. Failure of Monitoring/Mitigation Plan and Technical Review Panel to Include Independent Oversight

FVMWC will manage the Proposed Project and implement the Groundwater Management, Monitoring, and Mitigation Plan ("GMMMP"). The parties that comprise FVMWC are the participating water providers (including SMWD), Cadiz, and the Arizona and California Railroad (ARZC). (*See* DEIR p. 3-14.) Local stakeholders, such as the Mojave National Preserve, BLM, local landowners, and Native American Tribes and Land Trusts are excluded from the management/mitigation process. This lack of stakeholder involvement means that there will be a lack of adequate independent oversight over the Project operations and mitigation. Moreover, the Technical Review Panel fails to include any technical representatives to represent these other stakeholders (e.g., landowners, BLM, USGS, etc.). As presented, the Technical Review Panel will consist of one member of FVMWC, one member from San Bernardino County (under an MOU with FVWMC), and one member jointly selected by the County and the FVMWC.

This lack of stakeholder participation and exclusion from the Technical Review Panel is particularly troubling in light of two important facts. First, most of the natural groundwater in the Fenner Valley originates in the mountains located in the Mojave National Preserve. *See* NPS Scoping Comments, p. 3. Second, the USGS has extensive knowledge of the hydrogeological conditions of the Project area, the surrounding areas, and the region. The USGS prepared extensive data to support NPS scoping comments on this Project and performed extensive hydrological analyses concerning the prior Cadiz project in 2000. The involvement of USGS and other stakeholders is necessary to ensure that the Project's effects on local and regional hydrological systems and dependent ecosystems are properly monitored, understood, and mitigated where necessary.

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A EIR should include important stakeholders in Proposed Project management (monitoring and mitigation) and the Technical Review Panel, or explain why they were excluded.

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6. Failure to Properly Analyze Past and Existing Aquifer Conditions

Geoscience Support Services, Inc. (GSSI) prepared a report on existing aquifer conditions, the *Geohydrologic Assessment of the Fenner Gap Area* (presented as Appendix C of Volume 2 of the *Cadiz Groundwater Modeling and Impact Analysis* (GSSI, Sep. 1, 2011), DEIR, Appendix H1C.) That report is unreliable because there is a lack of sufficient key data to adequately evaluate the interpretation of the aquifer results. Without this data, any analyses that depend on the aquifer conditions as a baseline are inherently suspect and presumably unreliable, and therefore insufficient for CEQA purposes.

123

The following are more detailed comments on the aquifer testing. All page citations are to the *Geohydrologic Assessment of the Fenner Gap Area* unless indicated otherwise.

- The report largely ignores hydrologic data gathered over the last 20 years.

  (Page 5 – Purpose and Scope)

  Substantial hydrologic work has been conducted at the proposed project area over the past 20 years. This past work should be used as an existing data resource that the new work can build upon. Instead, the DEIR's geohydrologic assessment appears to start the process anew, and provides little discussion as to how the newly developed data fit into the overall framework of previous investigations and results. A EIR must answer the following questions: Why was the hydrologic data collected over the last 20 years largely ignored? Are the aquifer test results conducted since 2009 consistent with previous test results in the area? Has the conceptual model for the Fenner Gap area changed significantly or has the current investigation simply confirmed previous information?

124

- The report largely excludes data from Cadiz's previously installed wells.

  (Page 5 – Purpose and Scope)

  The exclusion of Cadiz's previously installed wells is unexplained. A revised DEIR should explain why the DEIR largely excluded the data corresponding to these wells, and how those data fit with the models and conclusions included in the DEIR.

125

- There is no evidence that the aquifer testing was performed according to independent standards.

  (Page 21 – Section 4.4, Analysis of Pumping Test Data)

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Providing testing results according to independent standards is standard practice and should be reported for aquifer testing reports, as documented by ASTM and other experts. (e.g., Kruseman and de Ridder, 2000.) Independent testing results should be included in order to properly evaluate the Proposed Project and its associated impacts, and in order for reasoned conclusions to be drawn. A EIR must provide pumping rate data (which can be presented in graphical form) that is sufficient to evaluate changes in drawdown characteristics as presented in the aquifer test figures. 126

- Insufficient detail is presented to evaluate the aquifer test data and results.

  (Page 21 – Section 4.4, Analysis of Pumping Test Data)

  The DEIR fails to provide any details regarding the actual operation of the aquifer tests. Some of the questions that need to be answered in order to allow public review of the aquifer test data and results are: At what distance away from the discharging well or monitored wells did discharge take place and where did the discharge go? Could percolation of discharged water have influenced groundwater-level data, for example at MW-6, where according to Figure 8, there appears to have been no seal emplaced other than the surface concrete pad? Results of pumping rate monitoring during testing are not presented. How was flow rate monitored, at what frequency, and within what parameters were pumping rates to be maintained during testing? Were those parameters achieved? For new wells, discharge permits are commonly required. Were any required or obtained for this project? Without answers to these questions, proper analysis of the aquifer test data is impossible, and conclusions are not properly supported. 127

- The true static groundwater levels were not substantiated.

  (Page 6 – Section 2.4, Field Reconnaissance)

  The purpose of the pumping that was ongoing as of November 11, 2009, is not clearly explained. The EIR must clarify if there was an aquifer test ongoing. If so, the results must be reported. The EIR must also clarify if periodic groundwater monitoring was conducted on TW-1 and TW-2, and associated monitoring wells, prior to the aquifer testing to assure that true static groundwater levels were established prior to aquifer testing. This is crucial because full recovery from the step discharge test run on TW-1 had not been achieved prior to initiating the constant discharge test at TW-1 during 2009 (Figures 10 and 13), and the use of an improper static groundwater level could affect parameter evaluation. 128

- The corrections in groundwater elevations for barometric pressure are not explained. 129

Figure 18 notes that groundwater elevations were corrected for barometric pressure. The EIR must describe and explain the magnitude of these corrections. 129

- There are insufficient data to discern if Well TW-2 has fully recovered.

  (Figures and Associated Text)

  Late time recovery data analyzed for TW-2 appear to match the fully recovered data, therefore resulting in a very high transmissivity estimate. Although the well appears to be fully recovered, without the aquifer test data (even the hand measured water level measurements typically collected for backup purposes), it is difficult to discern if the well had fully recovered. Also, there appears to be a typographical error concerning the date of the TW-2 recovery test in the table summarizing aquifer test results. 130

- The existing conditions in Fenner Gap are misrepresented.

  (Page 4 – Photograph)

  The photo shows a flowing stream on the floor of Fenner Gap. This flowing water must have been derived from either pumped groundwater or surface runoff immediately after a storm event as there is no flowing water typically on the floor of Fenner Gap. The inclusion of the photograph without context is misleading as to the typical conditions present. The EIR should include a caption that explains the source of the water on the floor of Fenner Gap. 131

- The hydraulic conductivity of fanglomerate is not sufficiently substantiated.

  (Page 12 – Photograph)

  The photo shows that the fanglomerate has been lithified (evident by both the competence of the core and the natural fracture characteristics presented). Given the ragged nature of the sharp fracture visible, the fracture displayed in the photograph does not appear to have been caused naturally. Rather, the fracture is more likely the result of a break that occurred during the coring, or boxing, of the core. If the material in the photograph is typical, it can be expected that the hydraulic conductivity of the fanglomerate should be substantially less than unconsolidated basin fill material. The EIR should describe and explain the hydraulic conductivity of the fanglomerate in comparison to that of the basin fill material. 132

- The permeability of the granitic rock is not sufficiently described/explained. 133

  (Page 16 – Section 4.2.5)

This section states "Granitic and metamorphic basement rock forms the subsurface margins of the aquifer system within the project area (Freiwald, 1984). This basement rock is generally impermeable but can have significantly increased permeability along well developed fracture zones which are associated with the numerous faults that cross Fenner Gap." This is an important statement as the figures depicting modeled hydraulic conductivities do not provide reference to model zonation for aquifer parameters and in what areas for instance hydraulic conductivity values represent specific hydrogeologic units. The EIR must specify where the fractured granitic rocks of higher permeability are modeled as opposed to other granitic rocks. This would allow for the appropriateness of model zonation to be more readily evaluated given the absence of available model files. 133

7. Failure to Properly Model Groundwater Flow and Solute Transport

The groundwater flow and solute transport modeling (*Volume 1: Report – Cadiz Groundwater Modeling and Impact Analysis*, GSSI, Sep. 1, 2011) is flawed and unreliable because there is insufficient data about changes in groundwater elevation that will result from the development of the cone of depression over the next 100 years. Additionally, evapotranspiration rates are improperly treated as a variable to calibrate the model, and the aquifer's current inability to stabilize after only 5,000 AFY of pumping is not explained. The model's sensitivity analysis is flawed because it was not performed in accordance with third-party standards. Moreover, the sensitivity analysis is misleading because it was actually a series of separate recalibrated models rather than one collective model. This improper and insufficient analysis provides unreliable data and conclusions that cannot support the stated impact and mitigation analysis, thereby precluding meaningful public participation and informed decision making.

Numerical groundwater flow and solute transport modeling was conducted for the impact analysis of the proposed project (GSSI, 2011b). Numerical models are ideal tools to evaluate transient, three-dimensional groundwater issues in that the complexities of the groundwater system can be evaluated in detail, and assumptions of how the groundwater system works can be tested for internal consistency. As is discussed in the detailed modeling comments below, there appears to be a problem associated with the conceptual model as highlighted by the numerical modeling effort. 134

Overall, the model software used, construction (with one caveat described below), including discretization, and packages used were appropriate given the conditions present. However, a problem arises with either the estimated recharge, or the aquifer parameters (either in values or spatial representation), that results in the need for unrealistically high evapotranspiration rates to be required to calibrate the model. It appears that these high evapotranspiration rates were needed to allow the amount of water discharged from the Bristol and Cadiz Playas to accommodate the estimated recharge rate. This issue was also apparent in previous modeling (GSSI, 1998), where in lieu of high evapotranspiration rates, an unrealistic extinction depth (100 feet below ground surface, which has been changed to 15 feet in the current analysis) was used to

accommodate the amount of discharge needed to calibrate the model given the estimated recharge. 134

The following are more detailed comments on the groundwater modeling. All citations are to *Volume 1: Report – Cadiz Groundwater Modeling and Impact Analysis* (GSSI, Sep. 1, 2011) unless otherwise indicated.

a. <u>The analysis fails to provide comparative data from similar groundwater projects.</u>

The EIR must discuss any other approved groundwater "conservation" or "exportation" projects that had planned storage losses of this magnitude. The existence of such projects would provide invaluable comparative data concerning environmental impacts, project management, and mitigation. 135

b. <u>Insufficient groundwater data is provided for the duration of water table drawdown.</u>

(Page 9 – Groundwater Elevations)

The presentation of the development of the cone of depression is overly limited because data is only provided for the end of pumping and 50 years after pumping ceases. Related groundwater elevations are therefore lacking. Well hydrographs must be included that show how groundwater elevations change over time under the proposed management scheme. The drawdown maps are sufficient. However, the groundwater elevation maps are insufficiently detailed due to the 100-foot contour interval. Given that drawdown continues to expand in areal extent after 100 years, the hydrograph timeframes should expand out to the timeframe at which that condition ceases to exist. This is particularly important in evaluating the effectiveness of the GMMMP and its meaning in relation to proposed project groundwater pumping and the ability of the Proposed Project to achieve its stated objectives or meaningful time-dependent groundwater elevation and/or spring flow protective procedures. The EIR must provide hydrographic information that shows how groundwater elevations will change for the duration of the Proposed Project, as long as the cone of depression continues to expand, and as long as water table drawdown will occur. Without this information, the effectiveness of the proposed GMMMP cannot be sufficiently assessed. 136

c. <u>The analysis does not sufficiently explain why the aquifer will be so slow to recover after pumping.</u>

(Page 9 – Groundwater Level Drawdown)

There appears to be a delay in the aquifer's response to the proposed project pumping. As shown on the associated figures of project pumping (Figures 64 and 65 for example – see northeast extent of drawdown), the reach of the cone of depression is more extensive in the 100-year scenario (after 50 years of recovery) than the 50-year scenario (at the end of project pumping). This is the case with all 137

scenarios, which indicates that should unforeseen impacts occur as a result of project pumping, and even if project pumping is halted immediately, the impacts will continue to manifest for an extended period of time (greater than the length of time pumping was conducted) before recovery begins to take place. Therefore, the aquifer system will be very difficult to manage under the monitoring and mitigation plan. The revised EIR must explain why the system is so slow to recover in all pumping scenarios. The effectiveness of management and mitigation depends largely on the aquifer's ability to recover. 137

d. Evapotranspiration rates are improperly treated as a variable to calibrate the model.

(Page 36)

The evapotranspiration rate was allowed to vary substantially between recharge scenarios even though evapotranspiration would be unlikely to change given that the playa soils would remain unchanged, climate factors would be unchanged, and assuming the groundwater levels would be above the extinction depth allowing evapotranspiration to take place. The EIR must explain why the evapotranspiration rate was not treated as a constant, or near-constant for variations in local conditions. 138

e. The analysis fails to explain why the aquifer has not stabilized in response to current pumping.

(Page 39 – Section 6.2, Steady State Model Calibration)

The text states that "Twelve water level targets located in the Fenner Gap area were carried over from the Fenner Gap model (see Appendix A); however, a water level of five feet was added to each water level measurement based on transient water level data suggesting an approximately 5 ft. decline in heads in the Fenner Gap from predevelopment conditions." Given the limited pumping that has occurred in the Fenner Gap area in the past, the implications of this five foot groundwater level decline over a significant area must be discussed. The GSSI Report (2011c) states that, "Therefore, the stresses caused by Cadiz agricultural pumping have not created sufficient recharge (from vertical leakage or induced recharge) to sufficiently stabilize water levels." Therefore, the aquifer has not been able to stabilize with only approximately 5,000 AFY of pumping. That the aquifer has been unable to reach an equilibrium condition with this amount of limited pumping is alarming, especially given that the proposed pumping is ten times greater on average (50,000 AFY) and 15 times greater in peak pumping years (75,000 AFY). The expanded pumping in the Proposed Project is very unlikely to "increase recharge" and ameliorate the problem. This is illustrated by the calibration graphs (Figures 32 through 34), which show groundwater level declines over time in the Fenner Gap area as opposed to groundwater-level declines that would temporarily occur as a response to pumping and would stabilize as a new equilibrium is reached. Also, the vertical scale of the 139

hydrographs is expanded substantially, making discerning groundwater level trends difficult.

The EIR must explain if, when, and how the aquifer is expected to reach equilibrium after 50,000 AFY average pumping when the aquifer is currently unable to reach equilibrium after only 5,000 AFY of pumping. The EIR must also explain whether groundwater level declines are expected to be permanent or temporary. Finally, the EIR must decrease the vertical scale in the hydrographs so that evaluating changes and fluctuations in groundwater levels is possible. 139

f. The analysis provides inconsistent data concerning predicted storage losses.

(Page 12 – Groundwater in Storage)

There appears to be some discrepancy in pumping or storage terms as presented. The change in storage of an aquifer is equal to the groundwater inflow (recharge) minus the outflow (pumping, evapotranspiration). In the case of the Proposed Project's two "sensitivity" scenarios, the outflow (assuming only pumping) would be 50,000 AFY for 50 years. Based on the two scenarios (16,000 AFY of recharge; and 5,000 AFY of recharge), the storage loss after 50 years then would be a minimum of 1.8 million AFY, and 2.25 million AFY, respectively. These figures are somewhat higher than the storage losses predicted by the model. The storage losses presented above are minimums as the initial years of the Proposed Project would include a period of evapotranspiration losses from the playas (and to a lesser extent, from the springs) that would yield larger storage losses than predicted by the model.

The EIR must discuss the change in storage described above in comparison to model-predicted storage loss estimates of 1.68 million AFY, and 2.16 million AFY, respectively. Without clarification, the discrepancy is indicative of a significant data input error in the model with respect to either insufficient pumping rate or an excessive amount of recharge. This issue could have been evaluated if SMWD had made the modeling files available in electronic format. 140

g. The analysis presents conflicting data regarding predicted changes in groundwater storage.

(Page 58 – Findings – Groundwater in Storage)

The predicted changes in storage produced by the Groundwater Equation (inflow minus outflow equals change in storage) differ from those predicted in the model. The EIR must explain why these data are different and which is correct.

h. The sensitivity analysis does not conform to standard practice and is misleading. 141

(Page 8)

The text states that "The purpose of the sensitivity scenarios was to evaluate the potential ranges of worst case impacts by (1) reducing the amount of available natural recharge, and (2) increasing the distances between the wells within the proposed project wellfield." This "sensitivity" analysis does not represent the form of a sensitivity analysis that is standard practice, as described in ASTM, Anderson and Woessner (1992), and other references. Performing a sensitivity analysis is a standard part of evaluating the calibration of a modeling effort. The purpose of the sensitivity analysis is to evaluate the uncertainty in the calibrated model caused by uncertainty in aquifer parameters, stresses and boundary conditions. In a sensitivity analysis, these model parameters and conditions are changed systematically to evaluate how changes in each result in changes in head. The more a change in the parameter or condition causes a greater change in head, the more sensitive the parameter is. Sensitive parameters for which there are little ground-truthed information (for instance a sensitive hydraulic conductivity zone for which there are no aquifer test data) will indicate greater uncertainty in the predictive capability of the model.

The DEIR's sensitivity analysis is lacking and must be revised to comply with standard practice, such as ASTM or Anderson and Woessner (1992), to evaluate uncertainty. Proper sensitivity analysis assesses the sensitivity of all variables in a model. To do this, one variable at a time is changed while holding all others constant. The revised sensitivity analysis should follow this procedure or justify why another procedure is appropriate.

Next, the sensitivity analysis as performed is problematic in that changes in model results resulting from natural recharge are not comparable because the head distribution is affected by changes in model construction (well locations), aquifer parameters and evapotranspiration rates for the lower recharge scenarios. The analysis therefore mixes results and assumptions. If two wellfield configurations were to be evaluated, each configuration should have been tested against each of the separate recharge scenarios. As these analyses currently stand, the "sensitivity" analyses actually represent separate simulations based on differing assumptions. Proper sensitivity analysis must be performed that tests the two wellfield configurations against each of the recharge scenarios.

141

i. The sensitivity analysis, to evaluate model uncertainty, is not performed in accordance with standard practice.

(Page 43 – Section 6.4 – Sensitivity Analysis)

The only parameters for which a typical sensitivity analysis was conducted were for specific yield/storativity and vertical leakance, which in our experts' experience modeling alluvial groundwater basins of the desert southwest are commonly the least sensitive parameters in the flow model. Aquifer parameters such as hydraulic conductivity (on a zonal basis), evapotranspiration rate, recharge and other solute transport characteristics must be tested for sensitivity in

accordance with the method used for specific yield/storativity and vertical leakance.

j. The sensitivity analysis is mischaracterized as such and is actually a series of separate simulations.

(Page 44 – Section 7.1 – Description of Model Scenarios)

The "sensitivity" scenarios involved changing model parameters which are not sensitivity scenarios, but rather separate, recalibrated models or simulations. The changes in model parameters will serve to minimize any effect of changing the recharge or wellfield distribution of wells. The "sensitivity" scenarios must be recharacterized as separate, recalibrated models, or simulations.

141

k. The hydraulic conductivity data of fanglomerate is inconsistent.

(Page 32 – Hydraulic Conductivity)

The hydraulic conductivity value ranges used appear to be reasonable based on aquifer testing, although based on the photograph of fanglomerate core, it is hard to conceive that the fanglomerate in the geohydrologic assessment would yield hydraulic conductivities of up to 60 ft/day. Additionally, the areal distribution of specific hydraulic conductivities associated with specific aquifer units is not readily apparent in the figures where zonation is instead represented by hydraulic conductivity only. The EIR must explain the discrepancy between the photograph and the value ranges used in the model and explain why zonation is represented only by hydraulic conductivity.

142

l. The sensitivity analysis fails to account for the inconsistent hydraulic conductivity value ranges.

(Page 32 – Hydraulic Conductivity)

Changes in the effect of natural recharge on the model results have been minimized by recalibrating the aquifer parameters, thereby minimizing the effect of the change in recharge. Essentially, instead of evaluating the model sensitivity to recharge based on the calibrated numerical representation of the groundwater system, three distinct numerical groundwater flow models with differing conceptual models in relation to wellfield design, aquifer parameterization and evapotranspiration have been developed. The EIR must explain why three distinct numerical groundflow models were developed instead of basing the model on the calibrated numerical representation of the groundwater system.

143

m. The computer modeling process suffers from a lack of transparency.

(Page 27 – Computer Code)

144

The computer modeling platform is not disclosed in the analysis. The EIR must explain which platform was used to develop the model, and whether it is commercially available (e.g., Groundwater Vistas, GMS, Visual MODFLOW). Proper analysis by the public is impossible without knowing the computer platform used. 144

n. The uncertainty of the model has not been tested in an adequate manner.

(Page 61 – Model Limitations and Uncertainty)

The use of programs such as MODFLOW2000 and PEST greatly simplifies the sensitivity analysis process and it is unclear why this aspect of calibration evaluation was neglected or not presented. Although the aquifer parameters, including specific yield/storativity and vertical leakance, have been tested, the more likely sensitive parameters such as hydraulic conductivity from individual parameter zones, and evapotranspiration rate which were used as calibrated parameters have not. Additionally, given the issues associated with the need to use unrealistically high evapotranspiration rates to calibrate the model and serve as a mechanism to discharge sufficient water to allow the volumes of recharge to enter the modeled domain and maintain calibration, there is a problem with the conceptual model, or the representation of the conceptual model. Therefore, there is substantial uncertainty associated with any of the predictive results provided in the impact analysis. (See comments below.) The EIR must explain why programs such as MODFLOW2000 and PEST were not used for sensitivity analysis, and why the more likely sensitive parameters were not assessed in favor of less sensitive parameters. 145

7a. Failure to Properly Analyze Groundwater Impacts

The numerous failings of the groundwater flow and solute transport modeling described above (*Volume 1: Report – Cadiz Groundwater Modeling and Impact Analysis*, GSSI, Sep. 1, 2011) make any subsequent impact analysis unreliable and therefore an insufficient basis to support informed and reasoned public participation and decision-making. The specific failings of the impact analysis are as follows:

o. The effects of subsurface flow from under the Mojave National Preserve are insufficiently understood and described.

(Page 49 – Impact Analysis)

The outer limits of the cone of depression would likely still be expanding after 100 years. The cone is anticipated to extend to elevations approaching Bonanza Spring, thereby potentially affecting this important spring. Decades after the Proposed Project ends, additional impacts may still be identified as a result of earlier pumping. If an impact is identified at a spring or for a surrounding groundwater user, changes to groundwater management (if pumping is still 146

occurring) may be too late to adequately be protective of surrounding receptors. Additionally, increased hydraulic gradients upgradient from the project as a result of expansion of the cone of depression will result in greater subsurface underflow to the south out of the upper Fenner Watershed (beneath Mojave National Preserve), the effects of which are not understood and/or adequately described. The EIR must explain the effects of the subsurface underflow that is expected to occur beneath the Mojave National Preserve. 146

p. The impact analysis fails to consider the reduced rainfall expected as a result of climate change.

(Page 49 – Impact Analysis)

It can be expected that as less precipitation occurs as snowfall (as is predicted over the course of the Proposed Project) less water will recharge the aquifer. The EIR must account for projected reductions in rainfall as a result of climate change as well as any corresponding reductions in recharge rates. Including climate change in the data is particularly important because impacts on springs are expected to last up to 500 years, as evidenced by studies of springs (e.g., CH2M Hill, 2011). The EIR must explain why the impact analysis period does not match the analysis period for the springs. 147

q. The impact analysis period does not sufficiently correspond to the time frame of expected groundwater recharge.

(Page 54 – Table Regarding Groundwater Storage)

The text describing the table states, "*The following table summarizes the cumulative annual changes in groundwater storage at the end of 50 years (end of project pumping) and 100 years (end of model simulation) for each model scenario . . . .*" Of note is that the table then presents time for groundwater storage to recover after project pumping is stopped ranging from years 117 to 440. It is clear then that the end of model simulation was not 100 years. The EIR must explain why model impacts were not evaluated beyond 100 years, particularly in light of the continuously expanding cone of depression after 100 years as shown in the "sensitivity" scenarios presented. 148

8. Failure to Properly Analyze the Project's Effects on Springs

CH2M Hill prepared the *Assessment of Effect of the Cadiz Groundwater Conservation Recovery and Storage Project Operations on Springs* ((Aug. 3, 2011), DEIR, Appendix H3). That report does not sufficiently analyze the impacts of the Proposed Project on springs because of missing data and confusing and incomplete analysis. As a result, the significance of any impacts on springs cannot be properly assessed and the appropriateness of monitoring plans and effectiveness of mitigation plans cannot be 149

assessed. Without improved data and analysis, the type of reasoned and informed public participation and decision making CEQA requires is not possible. 149

a. The analysis is missing key information.

Discharge at springs generally occurs as a combination of both free discharge of flowing water and evapotranspiration from groundwater dependent vegetation and evaporation from soil in the subsurface. Therefore, the discharge of a spring can be substantially greater than the free flowing water observable at the surface. Figures 1-15 are missing from the report. The text references Figures 1-15, yet the figures in the document start at Figure 16. The EIR must clarify if Plates 1 through 15 are the missing Figures and, if not, include Figures 1-15. 150

b. The analysis fails to specify the source of key underlying data.

The analysis utilizes groundwater flow model results, but it is unclear (given that this is a CH2M Hill report) whether the numerical model used by CH2M Hill for evaluating underflow beneath Fenner Gap, or the GSSI model used to conduct the impact analysis, was used in the evaluation. The description of the extent of drawdown does not appear to match with the description in the impact analysis (GSSI, 2011). The EIR must explain which numerical model was used by CH2M Hill to conduct the evaluation of the springs. 151

c. The analysis fails to include geochemical analysis to evaluate sourcing.

An assessment of the springs should have included a geochemical analysis of springs to evaluate sourcing. The current analysis appears to spend more time and resources identifying the dryness of the desert environment. Figures of a dry wash with a bullet point identifying that no water is present, or photographs of dry voids in carbonate rocks high in the Marble Mountains where no springs are known does not contribute to the overall understanding of those springs present and potential effects of the project on those springs. Of note is the absence of a photograph of Bonanza Spring, the closest spring to the proposed extraction wellfield. The results of the canvassing and accounting of existing springs in the basin, including a discussion of the results of the geochemical sampling noted as having taken place and a spring discharge estimate, would have provided more beneficial information with respect to the groundwater budget and overall groundwater flow system. The EIR must provide a geochemical analysis of each spring in the basin to evaluate sourcing. The EIR must also provide a spring discharge estimate for each spring in the basin. Lastly, the EIR should provide a photograph of Bonanza Spring. 152

In sum, the DEIR's flawed hydrogeological analysis undercuts the reliability of the remainder of the DEIR's analyses. The impact analysis is largely dependent on the difference between the pumping rate and the recharge rate, which in turn depends on accurate baseline information about the existing state of the aquifer. The design of the monitoring and mitigation plan likewise 153

depends on accurate identification of significant environmental impacts, as does the cumulative impacts analysis. Project alternatives must be weighed in light of the impacts caused by the proposed project in relation to the project baseline. For the reasons described above, we believe that the hydrogeological analysis is insufficient to support a thorough analysis of the Proposed Project's impacts, and design of its monitoring and mitigation measures. The changes and additions described above are necessary to support a reasoned analysis and to allow effective public participation and agency decision-making. 153

9. Failure to Measure Impacts on Groundwater Quality

The imported groundwater storage and recharge component will negatively impact water quality of the underground aquifer. This is because the groundwater is of a much higher water quality than the imported water, either that from the Colorado river or the State Water Project. The DEIR does not evaluate these impacts, nor does it explain how these impacts would not violate the state anti-degradation policy, Resolution 68-16. This omission is a basic and fundamental flaw in the DEIR's analysis of the proposed project, and is legally deficient without a thorough analysis of these impacts. 154

Chapter 4.10 – Land Use and Planning

The lands surrounding the Proposed Project site are owned and managed by BLM, the State of California, NPS, and numerous private landowners including conservation organizations. In addition, local Native American tribes regard certain lands in the Proposed Project vicinity as sacred.

There are five designated wilderness areas located within a five mile radius of the Proposed Project Area: the Trilobite, Cadiz Dunes, Old Woman Mountains, Sheephole Valley, and Turtle Mountain Wilderness Areas. The Cadiz Dunes Wilderness Area is located west of and adjacent to the proposed water conveyance pipeline along an approximately five-mile-long portion of the ARZC ROW. At its closest point, the Cadiz Dunes Wilderness is only 100 feet west of the ARZC right-of-way. Given the close proximity of the Proposed Project to the wilderness areas, the Proposed Project proponents must demonstrate that it does not impair the nearby wilderness areas. 155

Impacts on Federal Reserved Water Rights

When Congress designated lands in the California desert as wilderness areas, the U.S. expressly reserved a "quantity of water sufficient to fulfill the purpose of [the] Act." *See* California Desert Protection Act of 1994, 16 U.S.C.A. § 410aaa-76. The Act's purpose includes preserving the unrivaled scenic, geologic and wildlife values of the wilderness areas, perpetuating their significant and diverse ecosystems, and protecting and interpreting ecological and geological features. The DEIR has failed to adequately demonstrate that the Proposed Project will not adversely impact the sensitive dunes areas, including their unique dune plants and wildlife.

The DEIR also fails to adequately address and quantify the impact of the Proposed Project on the United States' reserved water rights. To the contrary, as pointed out in the other parts of this comment letter, the Project Proponents failed to engage the USGS, BLM, or NPS at any stage of the environmental analysis. Their failure to partner with important stakeholders and expert agencies leaves decision makers and the public without sufficient information to evaluate the Proposed Project. 155

Inadequate Permitting for use of Right-of-Way over Federal Land

Page 3.53: The DEIR lists the agreements, permits, and approvals the Proposed Project proponents believe are necessary to implement the Proposed Project. The Proposed Project includes construction of a 43-mile pipeline running from the Cadiz wells to the Colorado River Aqueduct. The DEIR indicates that Cadiz intends to build much of this pipeline on an ARZC-held right-of-way over federal land. The DEIR indicates that Cadiz has an agreement with the ARZC to use this right-of-way, but does not intend to seek the federal government's permission to do so.

The agreement between ARZC and Cadiz Real Estate, LLC is cited in the DEIR, (e.g., DEIR, p. 1-8,) but is not contained in the appendix and its specific terms are not provided. The document granting ARZC this right-of-way over federal land is also not included. Without access to these documents, members of the public and decision makers are without sufficient information concerning the DEIR's assertions regarding the scope of ARZC's right-of-way.

In addition, the DEIR incorrectly asserts that the Proposed Project escapes federal environmental review because the full extent of the pipeline's passage over federal land will be within ARZC's right-of-way, (DEIR, p. 2-5,) and the Cadiz project will further a railroad purpose. In November 2011, the Department of Interior ("DOI") issued Solicitor's Opinion M-37025, which explains that a "railroad's authority to undertake or authorize activity within" the type of right-of-way the ARZC is allowing Cadiz to use, is limited to "those activities that derive from or further a railroad purpose." The "railroad purposes" identified in the DEIR include access to power meters located along the tracks; fire hydrants; an access road; and speculative future benefits such as water for passenger terminals that ARZC is "contemplating operating in the future" and access to 10,000 gallons of water per day for vegetation control, washing rail cars, offices, and "other contemplated improvements." (DEIR, p. 2-4.) We do not agree with the DEIR's conclusion that such "purposes" are, in fact, sufficiently related to railroad use to qualify as "railroad purposes" merely in order to allow the Proposed Project to evade federal approval and NEPA review. The practical use of water fire extinguishers along the right of way, for example, would be extremely limited to those rare instances where water would in fact extinguish an oil or chemical-based fire—attempting to extinguish a chemical fire with water may in fact exacerbate the situation and quite literally fuel the flames. 156

The purpose of the Proposed Project is clearly to mine the desert aquifer to provide water to Southern California water districts. The "railroad purposes" identified in the DEIR do not provide a legally sufficient basis for the Proposed Project to evade federal approval and NEPA review. Before constructing a pipeline over federal land, Cadiz must receive the permission of the DOI and/or BLM. Permission to build must be contingent on full review under NEPA, including the preparation of an environmental impact statement ("EIS"), and would require the

involvement of the U.S. Fish and Wildlife Service for consultation pursuant to Section 7 of the Endangered Species Act. 156

Chapter 4.11 – Mineral Resources

Failure to Provide an Accurate Baseline for Active Metals Mining

Page 4.11-2: The DEIR provides an inaccurate baseline by failing to include current data regarding any active metals mining operations. According to the DEIR, "the USGS website for tracking active mining operations identified no active metals mining operations as of 2003." (DEIR, p. 4.11-2.) The DEIR fails to account for the possibility that various metals mining operations may have been initiated since 2003. 157

Failure to Provide Effective Mitigation Measures for Effects on Existing Salt Mining Operations

Page 4.11-10: The action items under Mitigation Measure MIN-1 are not sufficiently described to assess their effectiveness. It is not clear that reducing pumping, revising pumping locations, or even stopping pumping altogether would arrest the adverse effects of the Proposed Project on the salt mines. The cone of depression is expected to grow for many years after pumping stops, so stopping pumping seems unlikely to mitigate the impacts caused by pumping. Injection wells may be effective mitigation, but there is insufficient detail about how such wells would operate to assess their effectiveness. Compensation could be effective mitigation for the salt mine operators, but insufficient detail is provided and the compensation is not part of an enforceable agreement. The EIR must describe the implementation of the mitigation measures with greater specificity. In particular, the EIR must explain (1) the process for determining how much to reduce the pumping; (2) the process for determining where to relocate the pumps within the wellfield; and (3) the process to determine the location and capacity of injection wells. The EIR must also structure the compensation to salt mine operators as part of an enforceable agreement that explains how the compensation amount would be determined and the time frame for payments. 158

Chapter 4.12 – Noise

Failure to Substantiate Finding of No Significance

Page 4.2-10: This section improperly concludes that noise during Proposed Project operations would have a less than significant impact. This conclusion is not supported by any data about the noise generated by wells or the effectiveness of the acoustical well covers. 159

Chapter 4.14 – Recreational Analysis

The DEIR's analysis of recreational impacts is inadequate. First, the analysis fails to estimate the number of visitors to wilderness areas surrounding the Proposed Project. Second, 160

the DEIR fails to adequately analyze recreational impacts resulting from the Project construction. Rather, the analysis assumes that no substantial impacts will occur from the initial construction of the Project. In addition, the analysis assumes there will be no future construction, but that assumption is inconsistent with the DEIR's commitment to monitor and mitigate the impacts from the Project. The DEIR also improperly concludes that the expansive vistas offered by the natural area will mitigate the visual impacts of the project because the Project area will seem small in comparison. (DEIR, p. 4.14-3 ("The expanded wellfield and spreading basin would be visible from distant views but would not disrupt the expansive vistas from higher elevations . . . ").) Finally, the DEIR fails to analyze whether any degradation to wildlife areas will have long-term social and economic effects, which are important in determining whether a project has a significant impact on the environment.

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Chapter 6 – Growth Inducement Potential

The DEIR provides inadequate treatment of the indirect growth inducement potential of the Proposed Project. An EIR must "[d]iscuss the ways in which the proposed project could foster economic or population growth . . . , either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth . . . ." Guidelines § 15126.2(d).

The Proposed Project includes the export of 50,000 acre-feet per year, enough water to support 100,000 households or 400,000 additional people each year. While the DEIR acknowledges that the Proposed Project would contribute toward "significant and unavoidable" growth impacts in the Project Water Area of Use, (*see* DEIR, p. 6-62,) the cursory and limited explanations in Section 6.3 and Appendix J are insufficient to "[i]nform governmental decision makers and the public about the potential, significant environmental effects of proposed activities." Guidelines § 15002. Table 6-34 incorporates by reference various city and county General Plan EIRs, but these EIR's could not have foreseen the impacts provided by the proposed project because they were completed prior to the proposed project.[38] The estimated ability for the 50,000 AFY to support new communities and development in the water districts which will receive the water must be analyzed, both in this chapter under growth inducement, and in the previous chapter under cumulative impacts. The likely increase in development within the recipient water districts as a result of the additional water exports should be accounted for in both sections, but is not.

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DEIR Appendix J purports to summarize the findings of the General Plan EIRs covering the project's water delivery areas, but its vague phrasing does not provide meaningful information and is deficient as it only indicates which cities and counties have indicated that direct or indirect inducement of substantial population growth is a significant and unavoidable impact. (DEIR, p. J-3, 6, and 15.) The underlying analyses that support these significance determinations are missing. The EIR must justify the significance determinations in Appendix J and provide specific land use, air, and other environmental indicators that the Proposed Project

[38] The DEIR also violates CEQA by failing to "state where the incorporated documents will be available for inspection." CEQA Guidelines § 15150(b).

would contribute to the significant and unavoidable growth impacts identified in the general plan EIRs.

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Chapter 7 – Alternatives Analysis

The alternatives analysis is premised on the assertion that the Proposed Project's Groundwater Conservation and Recovery Component would have less than significant impacts after mitigation to biological resources, hydrology, and water quality. (DEIR, p. 7-1.) As discussed above, the DEIR does not contain sufficiently accurate hydrogeological data to allow an accurate comparison of the impacts of the various non-Project alternatives. Additionally, the rejected alternatives of conservation and phased implementation must be fully considered, and the additional alternative of a sustainable removal rate must be more thoroughly analyzed.

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One of eight central objectives listed in Section 3.2 of the DEIR is to "[l]ocate, design, and operate the Project in a manner that minimizes environmental effects and provides for long-term sustainable operations." (DEIR, p. 3-6.) This goal is unattainable under the current plan. As described, the Proposed Project has a working lifespan of 50 years, followed by anywhere from 60 to 400 years of inactivity to bring the aquifer back to its pre-Project levels. That is *not* a sustainable project—it is a water mining operation. Sustainability alternatives would include the no-project alternative, an agricultural alternative that draws less water than is replaced, and a water conveyance project that draws less water than is replaced. The EIR must fully consider each of these alternatives.

Failure to Consider What Further Conservation Benefits Could Be Obtained If Water Agency Project Participants Funded Conservation Rather Than the Proposed Project

Pages 7-6 to 7-7: The water conservation alternative was rejected on the ground that all of the water agency Project Participants are already implementing conservation measures. But this reasoning does not address the possibility that further gains could be realized if additional funds were directed to conservation efforts rather than the Proposed Project. Further conservation efforts could substantially decrease demand for water provided by the water agency Project Participants and have a net positive effect on the environment—thereby achieving increased water supply reliability for Southern California water providers without taking the substantial risks associated with depleting the aquifer. The DEIR asserts that additional water conservation measures would lead to water supplies that "would be less reliable and subject to shortages in dry years." (DEIR, p. 7-7.) But without additional information in the DEIR it is impossible to assess whether this conclusion is correct. This deficiency in discussion of relative conservation measures by the districts can be seen in stark relief by comparing the discussion of conservation in this EIR with that in the 2001 EIS/EIR, as reflected in the comments provided on the previous EIS/EIR by Western Environmental Law Center. See Appendix B, Comments by Western Environmental Law Center, at 4-5 (incorporating the previous EIS/EIR by reference.) Although the WELC comments were highly critical of MWDSC's attempts to justify its use of "conservation," at least the district *attempted* to

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quantify its efforts, while the water districts in the present DEIR have made no such effort.

Beyond the omission of sufficient data, there are also other reasons to doubt the DEIR's findings with regard to the alternatives analysis. For example, the DEIR asserts that long-term savings from the Three Valleys Municipal Water District alone will be at least 19,200 AFY in 2020. (DEIR, p. 7-8.) It would be arbitrary and capricious not to consider further conservation as a legitimate alternative in the EIR. 163

Unwarranted Dismissal of the Phased Implementation Alternative

Page 7-39: As discussed at length above, the accuracy of the DEIR's evapotranspiration and recharge estimates is highly questionable. As such, the DEIR errs in concluding that under the Phased Implementation Alternative, no "significant impacts of the proposed Project" would "be avoided or lessened." (DEIR, p. 7-40.) Drawdown of the aquifer at the rate of 50,000 AFY or more could result in numerous significant impacts throughout the watershed. A more complete Phased Implementation Alternative could well be superior to the Proposed Project because potential negative effects could be closely monitored and possibly mitigated before they become catastrophic. "An EIR is an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes *before they have reached ecological points of no return*." *Laurel Heights Improvement Assn. v. Regents of Univ. of California*, 47 Cal.3d 376, 392 (1988) (internal quotation omitted) (emphasis added). To determine whether the Phased Implementation Alternative would enable the Proposed Project's impacts to be discovered before reaching an ecological point of no return, the EIR must use accurate evapotranspiration and recharge estimates. 164

There Is No Project Alternative That Provides For "Sustainable Operations," Which Is One of the Eight Avowed Project Objectives.

Page 7-40: Only the Reduced Project Alternative calls for a 25 percent reduction in the total proposed groundwater withdrawal. This alternative allows for removal of 75,000 AFY for 25 years. Given that the DEIR's high-end estimate for recharge is 32,447 AFY, (DEIR, p. ES-3,) and that as explained above, the actual recharge rate is likely closer to 16,000 AFY, it is irrational to consider the Reduced Project Alternative to be sustainable. 165

Chapter 8 – Irreversible and Irretrievable Commitment of Resources

Section 15126.2(c) of the CEQA Guidelines requires Project proponents to discuss any significant irreversible environmental changes caused by a project, including the use of nonrenewable resources. A project results in an irreversible and irretrievable commitment of resources if it: 166

1. Involves a large commitment of nonrenewable resources;
2. Creates primary and secondary impacts that generally commit future generations to

similar uses;
3. Involves uses in which irreversible damage would result from any potential environmental accidents associated with the project; or
4. Proposes consumption of resources that are not justified (e.g., the project involves the wasteful use of energy).

See Guidelines § 15126.2(c).

The DEIR characterizes the groundwater pumped from the aquifer as a renewable resource that is naturally recharged on an ongoing basis, and asserts that without pumping it will be "lost" to evaporation. (DEIR, p. 8-2.) Claiming that the water will otherwise be "lost" enables the Project proponents to conclude that the Proposed Project involves no irreversible or irretrievable commitment of groundwater resources. But the Proposed Project results in an irreversible or irretrievable commitment of groundwater resources under every model calculation or alternative analysis discussed in the DEIR. The Project would mine an average of 50,000 AFY. Even using the Project proponents' most optimistic estimate of a 32,000 AFY recharge rate, there will be an 18,000 AFY recharge deficit that will take more than a century to replace. The discrepancy between the pumping rate and the recharge rate is further exacerbated in light of the DEIR's disclosure that the initial years of the Project is expected to pump as much as 75,000 AFY—more than double the DEIR's most generous recharge rates—and as much as fourteen times the lowest recharge estimate of 5,000 AFY. Groundwater should not be classified as renewable when the estimates contained in the DEIR itself indicate that it could take anywhere from 117 years to 440 years for the aquifer to return to its pre-project level. (DEIR, Appendix B-1, Table 4-5.) This is not renewability on a meaningful human time scale. 166

Climate Change Issues Related to the Project

NPCA's scoping comments, dated March 29, 2011, requested that the DEIR include assessments of whether: 1) it is realistic to assume that recharge rates for a desert aquifer will remain constant over a 50 year period in light of climate change and the natural variability of desert hydrologic systems; 2) how the increasing variability in precipitation in the Southwest, drought, and increased evaporation due to higher temperatures that are predicted with climate change might affect Project recharge estimates over a 50 year period; and 3) whether there will be sufficient water available in the Colorado River for the Imported Water Storage Component based on the natural variability of hydrologic systems, climate change, and the changing demographics of the American West. The DEIR does not adequately address these concerns. 167

The DEIR acknowledges that there is a "general consensus that climate change will cause general warming . . . a shift in precipitation and runoff patterns," and that aquifer recharge can be difficult to quantify due to variable factors including: precipitation, stream density, ambient temperature, wind speed, and the amount of solar radiation. (DEIR, p. 4.7-6.) Yet the Project Proponents maintain that the Proposed Project's annual recharge rate is "unlikely" to be materially affected by climate change since it is "reliant on seepage from the hard rock formations underlying the mountain ranges rather than surface runoff or alluvial recharge." (DEIR, p. 4.7-7.) The DEIR fails to address where the seepage from the hard rock formations originates, and whether that water flow would itself be affected by climate change. If some of

the water seeping through hard rock formations originates as precipitation, then climate change-induced shifts in precipitation levels could have substantial effects on the aquifer's recharge rate. The EIR must address the origin of the seepage and indicate whether or not climate change could affect this source of recharge.

The DEIR assumes that the aquifer will average a recharge of approximately 32,000 AFY (*see e.g.*, DEIR, p. 4.9-38.) However, as explained above, a more accurate estimate is that the current recharge rate is actually around 16,000 AFY. The DEIR claims that even if the next 100 years were extremely dry and natural recharge were reduced by up to 85 percent, the Proposed Project would still result in a less than significant impact to groundwater resources. (DEIR, p. 4.9-15.) But if the Project Proponents wish to claim that an 85 percent reduction in recharge would result in a less than significant impact to groundwater resources, the DEIR should base this estimate on the plausible 16,000 AFY baseline rather than the unlikely 32,000 AFY baseline. This would require an analysis of the effects of a recharge rate of 2,400 AFY (fifteen percent of 16,000 AFY).

The DEIR also notes that the California Department of Water Resources ("DWR") has made a series of recommendations regarding how the state and local water agencies should address climate change. Agencies are directed to:

> (a) provide sustainable funding for statewide and integrated regional water management; (b) fully develop the potential for integrated regional water management; (c) aggressively increase water use efficiency; (d) practice and promote integrated flood management; (e) enhance and sustain ecosystems; (f) expand water storage and conjunctive management of surface and groundwater resources; (g) fix Delta water supply, quality, and ecosystem conditions; (h) preserve, upgrade, and increase monitoring, data analysis and management; (i) plan for and adapt to potential sea level rise; and (j) identify and fund focused climate change impacts and adaptation research and analysis.

(DEIR, p. 4.7-7.) Rather than follow DWR's recommendation to find more efficient use and management of existing water supplies, the Proposed Project seeks to add a new (vulnerable) water supply that is subject to the same climate change impacts as the Colorado River Basin and the Bay-Delta. (DEIR, p. 4.7-7.) The EIR must address why the Project Proponents are not taking steps to follow the DWR's recommendations before attempting to extract valuable groundwater supplies.

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CONCLUSION

Cadiz and SMWD have proposed an aggressive water mining project that should have San Bernardino County acting as lead agency, and places a fragile desert ecosystem at great risk of irreversible harm. The DEIR's analysis falls well short of accurately describing the Proposed Project and its impacts, or providing assurances that the Proposed Project is designed in a sustainable way that minimizes environmental impacts. Instead, the analyses point toward a future of uncertain effects that seem largely incapable of mitigation once discovered. The

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Proposed Project places the Mojave National Preserve and surrounding federally-designated wilderness in harm's way without adequately assessing the nature and significance of the risk.

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Given the breadth of required additional analyses, the risks involved, and the number of potentially impacted stakeholders, we believe that prudence and caution demand a return to the beginning of the environmental review process. That process should include additional stakeholders, including Native American Tribes, the National Park Service, BLM, USGS, and others, and should include both a new EIR and an Environmental Impact Statement prepared by the federal government.

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Our precious water resources must not be traded for short-term gain without the assurances of sustainability that a coordinated and fully inclusive CEQA/NEPA review would provide. This Proposed Project has a troubled history; a nearly identical version was rejected 10 years ago after undergoing a combined CEQA/NEPA review. Many of the same problems regarding problematic ownership, leadership, economic justification and funding remain with this project, as laid out in the earlier news reports by Michael Hilzik of the Los Angeles Times and the extensive policy advocacy provided by the Pacific Institute (See Appendix B.) The present DEIR does not identify what has changed to justify the project now, beyond Cadiz' taking over the federal component, which hardly seems like a justification at all. The problems were so great in the previous version that Met nixed the project; given this troubled past, the present iteration must not escape complete, thorough analysis, and the review and approval of neutral, expert agencies that are financially independent from the Proposed Project proponents. The goals of CEQA, as well as NEPA, demand as much.

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The Proposed Project must only proceed if approved by the proper lead agency and utilizing a complete and thorough EIR. That is impossible under the present review process due to an improper lead agency, an inaccurate project description, and repeated gross understatement of impacts presented in the DEIR. There must be a new EIR prepared under the proper lead agency, with all permitting agencies acting as responsible agencies, and USGS participating in the analysis and providing a neutral assessment of groundwater recharge. Until these changes are made and a new EIR is issued by San Bernardino County, the project's approval will prejudicially violate CEQA.

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Thank you for the opportunity to provide these comments.

DATE: March 13, 2012

Signed,

/S/
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ATTACHMENTS TO COMMENTS ON CADIZ 2011 DEIR
(Included on Separate CD-ROM, Sent by FedEx with Comments)

Appendix 'A': Studies and General References (non-Biological)

A. Hydrologic Review of the Draft Environmental Impact Report, Cadiz Water Project, by Andrew Zdon, Principal Hydrogeologist, Johnson-Wright Consultants, Inc. prepared for National Parks Conservation Association (February 1, 2012)

B. Comment on the Hydrogeology of the Cadiz Water Project by John Bredehoeft, Ph.D, prepared for National Parks Conservation Association and the Center for Biological Diversity (March 4, 2012)

C. Memorandum to Santa Margarita Water District Board of Directors from Dan Feron, "Reimbursement Payment to County of San Bernardino per the Memorandum of Understanding Concerning the Cadiz Valley Water Conservation, Recovery and Storage Project" (Excerpted from page 11 of October 26, 2011 minutes from Santa Margarita Water District board meeting, dated October 26, 2011)

D. Press Release, "Cadiz Advances Plan to Convert 300 Miles of Natural Gas Pipelines for Water Conveyance" (February 29, 2012)

Appendix 'B': Documents from 2000-2002 EIR/EIS Review

A. Comments on 2001 Cadiz EIR/EIS by Western Environmental Law Center

B. Hydrogeology Study on Cadiz Project, Prepared by Dr. John Bredehoeft, Ph.D.

C. Air Study on Cadiz Project, Prepared by Dr. John Giles

D. Michael Hilzik, "Critics Raising Concerns About Cadiz Water Project," *Los Angeles Times* (May 19, 2002)

E. Pacific Institute, "Mojave Water Grab: Environmental and Economic Flaws Exposed" (2002)

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Comments of

The Native American Land Conservancy

on the

Draft Environmental Impact Report

for the

Cadiz Valley Water Conservation, Recovery, and Storage Project

Submitted: March 14, 2012

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I. INTRODUCTION

A. The Commenter

The Native American Land Conservancy (NALC or Commenter) is a 501(C)(3) intertribal organization established in 1998 to preserve and protect natural and cultural heritage sites, areas and landscapes. The NALC holds and manages 2,560 acres in a Preserve in the eastern slopes of the Old Woman Mountains. The Cadiz hydrologic study area encompasses the western slope of the Old Woman Mountains. The NALC offers the following comments to the Cadiz Draft Environmental Impact Report (DEIR).

The Commenter requests that these comments, and all attachments be included as part of the administrative record. The Commenter further requests that all documents, articles, and reports cited in these comments and the attached expert reports and articles be included as part of the administrative record of this action. See Cal. Pub. Resources Code § 21167.7(e); County of Suffolk v. Secretary of Interior, 562 F.2d 1368, 1384, n.9 (2d Cir. 1977) (addressing scope of NEPA administrative record), cert. denied, 437 U.S. 1064 (1978); Silva v. Lynn, 482 F.2d 1282 (1st Cir. 1973) (same); see also Thompson v. United States Dep't of Labor, 885 F.2d 551, 555 (9th Cir. 1989) (administrative record consists of all documents and materials directly or indirectly considered by agency and includes evidence contrary to agency's position). Finally, the Commenter incorporates by reference the comments submitted on the 2001 Cadiz DEIR/S and SEIR/S and all attachments thereto and further requests that those comments and their attachments be included as part of the administrative record. 1

B. Summary

The Cadiz Valley Water Conservation, Recovery, and Storage Project (Cadiz Project or Project) is proposed primarily to provide an additional water supply for Southern Californian Project Participants, to supplement or replace existing supplies and enhance dry-year supply reliability. The Project has two components. The principal component is a groundwater pumping program, under which an annual average of 50,000 acre-feet of groundwater would be pumped from the basin over a 50 year period for delivery to Project Participants, with an annual maximum of 75,000 acre-feet. Facilities for the first component include a well field, piping system, and a 43 mile conveyance pipeline, monitoring features, other appurtenances and fire suppression mechanisms. A secondary, less definite, component is a still tentative proposal to potentially store imported, under which Project Participants could send surplus surface water supplies to the project area to be recharged via spreading basins and held in storage until needed in future years. This component proposes to store up to one million acre-feet. The second component is only at the conceptual development design stage, and is analyzed primarily at a programmatic level in the DEIR.

Despite the fact that most of the Project infrastructure will be built and operated in, and most of the impacts will occur in, San Bernardino County, the Santa Margarita Water District (SMWD or Agency) has designated itself as the lead agency under the California Environmental Quality Act (CEQA), Cal. Pub. Resources Code § 21000 et seq. Project Participants include SMWD, Three Valleys Municipal Water District, Golden State Water Company, Suburban

Water Systems, Jurupa Community Services District, California Water Service Company, and the Arizona and California Railroad.

As explained in detail below, the proposed Cadiz Project poses a serious threat to the groundwater system underlying the whole of the Cadiz-Fenner basin and the surrounding environment. Among the harms likely to be caused by the Project is catastrophic depletion of the aquifer that could take centuries, if not millennia, to be remedied. By pumping at a rate that far exceeds the average annual recharge, the project would amount to an aggressive program of groundwater mining that would substantially draw down the aquifer and dry out the moist lake beds, or playas, of Bristol and Cadiz lakes. This would create a large area of dried out lake sediment with an enormous potential to generate harmful dust emissions on a scale comparable to Owens Lake, which ranks as one of the nation's most conspicuous environmental disasters. In addition, the draining of the aquifer could cause springs in the surrounding mountain ranges to dry up, spelling extinction for the local populations of bighorn sheep. Perhaps even more distressing, the vast area of fresh water spreading basins on the Cadiz Project site will be a major attraction for ravens and other birds that will prey on the fragile desert tortoise population in critical habitat areas within the basin. These are only some of the devastating potential environmental impacts from the Cadiz Project, impacts that in practical terms will be permanent and extremely expensive to even attempt to mitigate. 2

The DEIR does not adequately address these and other serious problems with the Cadiz Project. Indeed the DEIR is woefully inadequate under CEQA and other state and federal laws. Among its most glaring deficiencies, the DEIR is based on a patently deficient description of the Project and the physical conditions and environmental resources in its vicinity, a grossly inadequate assessment of the purpose and need for the Project, and a failure to examine the Project's feasibility and likely adverse environmental impacts. Rather than addressing these issues directly and thoroughly, as required by CEQA, the DEIR simply attempts to sidestep all substantive problems by proposing to defer the identification of problems and the decisions about how to deal with those problems to a future date and to unaccountable committees dominated by the Project Proponent, SMWD, under a vague and inadequate monitoring and management plan. In all these regards, the DEIR fails to comply with CEQA, and for all these reasons the SMWD should reject the proposed Cadiz Project. 3

II. THE AGENCY HAS FAILED TO COMPLY WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

A. The Legal Requirements of the California Environmental Quality Act

"The California Environmental Quality Act, Cal. Pub. Resources Code § 21000 et seq., is a comprehensive scheme designed to provide long-term protection to the environment. In enacting CEQA, the Legislature declared its intention that all public agencies responsible for regulating activities affecting the environment give prime consideration to preventing environmental damage when carrying out their duties. CEQA is to be interpreted to afford the fullest possible protection to the environment within the reasonable scope of the statutory language." Mountain Lion Foundation v. Fish and Game Comm'n, 65 Cal.Rptr.2d 580, 584 (1997).

"The environmental impact report, with all its specificity and complexity, is the mechanism prescribed by CEQA to force informed decision making and to expose the decision-making process to public scrutiny. The EIR is, as the courts have said repeatedly, the 'heart of CEQA,' 'an environmental alarm bell,' and a 'document of accountability.' An EIR provides the public and responsible government agencies with detailed information on the potential environmental consequences of an agency's proposed decision." Planning and Conservation League v. Department of Water Resources, 100 Cal.Rptr.2d 173, 187-88 (Cal. App. 2000) (citations omitted).

The EIR serves not only to protect the environment but also to demonstrate to the public that it is being protected. CEQA Guidelines § 15003(b). Thus, CEQA requires that the lead agency identify and disclose all of the significant environmental impacts of a proposed project. CEQA Guidelines § 15126.2. CEQA also requires the public agency to consider feasible alternatives to the project which would lessen any significant adverse environmental impact. Cal. Pub. Resources Code §§ 21002, 21081; Planning and Conservation League, 100 Cal.Rptr.2d at 188.

B. The DEIR Fails to Adequately Describe or Assess the Objectives of the Cadiz Project

CEQA Guidelines require that an EIR describe a range of reasonable alternatives to the proposed Project, and analyze those that could feasibly attain the objectives of the Project. See CEQA Guidelines § 15126.6.a, b. As described below, the description and assessment of the project objectives, including the purpose and need for the project, is woefully inadequate and riddled with omissions and inconsistencies.

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1. Water Demand

The DEIR contains little discussion of Southern California water demands. The DEIR relies on a vague suggestion that supplies may decline and demand may increase, and proceeds on the assumption that additional supplies are necessary. Without a full evaluation and analysis of future supply and demand, it is not possible to evaluate the need for the project.

2. Conservation Measures

To begin with, the DEIR does not provide sufficient specificity regarding what conservation measures have been, or reasonably can be expected to be, implemented, or how the SMWD makes this assessment. Without this information it is not possible to assess the reasonableness of SMWD's future demand premise.

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Throughout the discussion of the Project's purpose, the DEIR betrays a bias in favor of obtaining additional water supply rather than pursuing available opportunities for increased water conservation within the Project Participants' service areas, which would be more cost-effective and more reliable than the environmentally unsustainable groundwater mining program being pushed by SMWD and Cadiz, Inc. The DEIR invokes the potential of drought to show the

need for improving Project Participants' supply reliability, and makes clear that improving supply reliability means essentially increasing supply. In contrast, the DEIR does not acknowledge that potential droughts make it just as clear that there is an even greater need for aggressive implementation of conservation in the desert region that makes up its service area. Similarly, SMWD claims that its studies of dry-year demand show the need to enhance water storage and water transfers, but it fails to acknowledge the self-evident fact that the same studies show an even more acute need to enhance conservation.

Another example is the contradiction between the assertion that adequate storage is needed to prevent and offset overdraft of groundwater basins and surface storage during droughts, coupled with the failure to meaningfully address the high probability that the Cadiz Project will result in a catastrophic overdraft of the groundwater basin underlying the Cadiz and Fenner valleys. The bias betrayed in this unbalanced consideration is also evident in the DEIR's failure to acknowledge that increased conservation measures could more effectively protect against such overdraft of groundwater basins and surface storage, and would do so more sustainably than draining new basins.

The assessment of future demand also is deficient because it gives no consideration to the opportunity to reduce consumption through the use of disincentives for unnecessary, wasteful "discretionary" water usage by higher income households. Rather, the DEIR just passively accepts such wasteful water use by the wealthy.

The discussion of current and projected water conservation measures is remarkably incomplete and vague, again revealing inadequate consideration of this least environmentally harmful and most sustainable approach to avoiding future shortfalls. The reality is that much greater levels of conservation could be accomplished, eliminating the need for the proposed project. Instead of engaging in an evaluation of the conservation alternative, the DEIR, without any justification, simply accepts the notion that conservation cannot possibly eliminate the need for the project.

5

Although the DEIR claims that Project Participants have embarked on an "aggressive" program of conservation measures, the detail indicates far more modest past and planned efforts. This is astounding given the fact that the Project's service area lies in what naturally is a desert area, the economic and environmental costs of importing water, and the availability of significant additional feasible, and more cost-effective, conservation measures. While the DEIR fails to provide adequate information for an adequate assessment of Project Participants' past or planned efforts in conservation, what detail is provided undermines the assertions that conservation has been adequately explored or emphasized.

Because reasonably available additional conservation measures are not addressed at all, and because virtually no meaningfully detailed information is provided for the measures or plans that are mentioned, it is not possible to assess the basis for the DEIR's rejection of the conservation alternative or need for the project. The sense that conservation has not been thoroughly considered is also reinforced by the fact that figures for projected additional conservation savings are not clearly attributed and are confusingly, and perhaps contradictorily, thrown out.

3. Water Recycling and Groundwater Recovery Programs

The purpose and needs analysis also fails to adequately describe or address the opportunities to meet anticipated water demand through water recycling and groundwater recovery programs. Specifically, the DEIR does not discuss the opportunities identified in the Southern California Comprehensive Water Reclamation and Reuse (CWRR) Study, a 6-year comprehensive effort to identify regional water recycling systems. The study identified 34 regional projects and estimated that they have the potential to produce approximately 450,000 acre feet per year of new recycled water supply. Such a new supply might well obviate any proposed need or justification for the Cadiz Project. Because these projects and the potential additional supply they represent are not considered in the purpose and need analysis underlying the DEIR, neither the Agency nor the public can make an informed decision regarding the actual need for the Cadiz Project. 6

4. Storage Potential of Southern California's Groundwater Basins

In addition, the DEIR fails to adequately describe the available water storage potential of groundwater basins in southern California. Because the DEIR fails even to accurately identify the full scope of storage potential, neither the Agency nor the public can have any confidence that potentially more cost-effective and less environmentally harmful water storage alternatives have been considered. The Association of Groundwater Agencies' guide to conjunctive use of groundwater and surface water in Southern California has documented over 21.5 million acre-feet of additional groundwater storage available in southern California groundwater basins, only one million of which comes from the Cadiz Valley. In other words, there are many places other than Cadiz that offer additional groundwater storage capacity, which could eliminate the need for extraction of indigenous fossil groundwater from the Cadiz-Fenner Basin. Because these potential storage alternatives are not even recognized, let alone evaluated, in the DEIR, it is not possible for the Agency or the public to make an informed judgment as to whether the Cadiz Project represents a reasonable choice among available alternatives. 7

Most importantly, the analysis regarding projected storage supply is internally inconsistent and does not support the assessment of need on which the DEIR is premised.

C. The DEIR Fails to Adequately Describe the Cadiz Project and the Physical Conditions and Environmental Resources in Its Vicinity

A complete, adequate description of a proposed project and the physical conditions and environmental resources in the project vicinity is an essential component of an EIR. CEQA Guidelines §§ 15125, 15126.2, subd. (A); Cadiz Land Co. v. Rail Cycle, 99 Cal. Rptr.2d 378 (2000); County of Amador v. El Dorado County Water Agency, 76 Cal. App. 4th 931, 952 (1999).

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1. Deficient Description of the Groundwater Pumping Plan

The DEIR's descriptions of the project are inconsistent. In places, the DEIR describes the Cadiz Project as a water conservation project, which simply captures water that would otherwise evaporate and suggests that "surplus" water would be captured. But the DEIR also acknowledges that the proposed Project would pump stored groundwater far in excess of the annual rate of recharge. These two descriptions are inconsistent with one another. The unacknowledged reality is that the groundwater pumping proposed would amount to groundwater mining resulting in catastrophic hydrologic and biologic consequences as described below. Such a failure to acknowledge this unavoidable reality renders the DEIR's analysis woefully inadequate under CEQA. 8

2. Deficient Description of Recharge Rate

The DEIR fails to adequately describe the Cadiz Project because it greatly overestimates the natural recharge rate of the groundwater system. It is commonly agreed that groundwater development, or extraction, must not exceed recharge if the development is to be sustainable. Accordingly, the estimate of recharge becomes critical in any analysis of how a groundwater system will perform. The recharge rate estimate used in the DEIR is directly contradicted by the recharge rate estimates of the USGS, Tim Durbin for San Bernardino County, and Dr. John Bredehoeft, one of the leading authorities on groundwater hydrology or hydrogeology. It also is contradicted by the more recent estimate contained in the Johnson Wright report described below. Because the estimate of recharge in the DEIR is in error, the predictions of system performance are also in error.

The proposed project DEIR and supporting documentation by Kenny Geoscience does not adequately review hydrologeologic conditions nor adequately assess potential hydrologic impacts of the project. The technical analysis has insufficient detail on key scope areas in order to determine the nature and extent of project impacts. The conceptual model or the numerical representation of the conceptual model is flawed in that it requires hydrogeologically unreasonable parameters to calibrate the numerical flow model. See Johnson Wright Inc., Hydrologic Review of Draft Environmental Report, at 1, 15 (Feb. 1, 2012), attached hereto as Attachment A. Johnson Wright estimated recharge of approximately 14,000 acre feet by employing a discharge evaluation utilizing evapotranspiration rates. Johnson Wright, at 5. This is substantially less than the 32,447 acre feet referenced in the DEIR. There is insufficient documentation to support the figure in the DEIR and additional documentation, including the documentation of the numerical groundwater flow modeling effort is needed. Johnson Wright, at 7. The analysis must address the deficiencies above. 9

The DEIR asserts that the CH2M Hill's model provided an annual recharge estimate of approximately 32,000 AFY, consisting of 30,191 AFY from the Fenner Watershed and 2,256 AFY from Orange Blossom Wash and on that basis suggests that there will be little or no adverse impact on the groundwater system. However, the great weight of the pertinent technical literature shows that the estimate of annual recharge used in the DEIR is an order of magnitude too high. The DEIR uses estimates made by GeoScience, a consultancy employed by Cadiz, Inc., which stands to be paid hundreds of millions of dollars if the Project is approved. Those

estimates stand in stark contrast to and are an order of magnitude higher than the range of every other estimate of recharge. See John D. Bredehoeft, Comments on the Final EIR/EIS, Cadiz Groundwater Storage Project Cadiz and Fenner Valleys San Bernardino County, California, at 8 (October 2001) (reviewing previous recharge estimates), attached hereto as Attachment B. In 2000 and 2001, John Bredehoeft estimated the recharge in the Fenner/Cadiz Valleys to be on the order of 5,000 AFY. See id., at 3, 4, 8; John D. Bredehoeft, Revised Comments, Cadiz Groundwater Storage Project Cadiz and Fenner Valleys San Bernardino County, California, at 11 (August 2001), attached hereto as Attachment C.

Thus, one of the most basic premises of the Project is seriously flawed. Factoring a more realistic recharge rate into the analysis would make it clear that there will be dramatic drawdown of the groundwater and adverse impacts to the surrounding environment from the proposed Cadiz Project.

The over-estimate of the recharge rate is even more troubling considering the fact that there is evidence that the basin is already overdrafted. A 1996 study by Boyle Engineering concluded that water levels in the vicinity were declining due to existing pumping for irrigation of Cadiz's agricultural operations. Similarly, the court in Cadiz Land Company, Inc. v. Rail Cyle, L.P., 99 Cal. Rptr.2d 378, 389, 392 (Cal. App. 2000), indicated that the system underlying Cadiz is already in a state of overdraft.

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D. The DEIR Fails to Adequately Assess the Feasibility of the Cadiz Project

Consideration of feasibility is central to an adequate alternatives analysis under CEQA. See, e.g., Planning and Conservation League, 100 Cal.Rptr.2d at 192. However, the DEIR has not adequately considered the feasibility of the Cadiz Project in several regards.

1. California Groundwater Rights Law

California has a correlative system of groundwater rights. All land owners overlying a common aquifer have the right to use the groundwater beneath their property. These "overlying rights" allow a land owner to take groundwater and make reasonable beneficial use of it on their property. Barstow v. Mojave Water Agency, 5 P.3d 853, 863 (Cal. 2000). As between overlying land owners, the rights are correlative. Therefore, in times of shortage each land owner is limited to her "reasonable share." City of Pasadena v. City of Alhambra, 207 P.2d 17, 29 (Cal. 1949).

If a groundwater supply contains "surplus water," this water may be appropriated by a private party and transported for use outside of the watershed or basin. Barstow, 5 P.3d at 863. However, "[p]roper overlying use . . . is paramount, and the right of an appropriator, being limited to the amount of the surplus, must yield to that of the overlying owner in the event of a shortage, unless the appropriator has gained prescriptive rights through the taking of nonsurplus waters."[1] City of Pasedena, 207 P.2d at 28-29.

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[1]Prescriptive rights are not at issue at this point because Cadiz has not yet begun to transport water out of the basin.

Under California law, there is a surplus of water only when the basin is not overdrafted. The Supreme Court of California has defined overdraft in terms of the "safe-yield" of the basin. The safe-yield is the amount of water that can be withdrawn annually from a groundwater supply under a given set of conditions without causing a gradual lowering of the groundwater levels resulting eventually in depletion of the supply. City of Los Angeles v. City of San Fernando, 537 P.2d 1250 (Cal. 1975). However, the court has stated that withdrawals may exceed the safe-yield to the extent that the amount will create storage space for "temporary surplus" water normally wasted in wet years. Id. Thus, overdraft occurs and there is no surplus for appropriation when extractions exceed the net recharge rate of the aquifer plus any temporary surplus.

There have been prior findings that the groundwater system underlying Cadiz is already in a state of overdraft. The 1996 Boyle study concluded that water levels in the vicinity were declining due to existing pumping for irrigation of Cadiz's agricultural operations. In addition, the court in Cadiz Land Company, Inc. v. Rail Cycle, L.P., 99 Cal. Rptr.2d 378, (Cal. App. 2000), observed that, "Although *the CPC and Board conclude the rechargeability of the aquifer water is relatively low and the aquifer is in overdraft*, without knowing the volume of water in the aquifer, it cannot be determined how soon depletion will occur." Id. at 392 (emphasis added). Thus, there is some evidence that there is an overdraft in the basin and that the county has previously recognized this fact. If this is the case, then Cadiz is legally prohibited from exporting any indigenous groundwater from the basin to the Project Participants. This would render the "transfer" portion of the Project infeasible.

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2. Federal Reserved Water Rights

The California Desert Protection Act reserves federal water rights sufficient to fulfill the purposes of the Act for each wilderness area designated by the Act. Pub. L. No. 103-433, § 706(a), 108 Stat. 4471 (1994). This includes five wilderness areas in the vicinity of the Project — Cadiz Dunes Wilderness Area, Clipper Mountains Wilderness Area, Old Woman Mountains Wilderness Area, Sheephole Valley Wilderness Area, Trilobite Wilderness Area. These reserved rights have a priority date of October 31, 1994. In addition the Act requires the Secretary of the Interior and all other officers of the United States to "take all steps necessary" to protect these rights. Id. § 706(b). Similarly, units of the National Park System, including Mojave National Preserve are federal reservations that implicitly have federal reserved rights as of the date of the reservation.

These reservations include surface and groundwater. The NPS and BLM have jointly agreed to "participate in local government proceedings that authorize nonfederal parties to withdraw percolating groundwater where such withdrawals may impact water sources within their respective jurisdictions to which federally reserved water rights are attached." Principles Governing Federal Water Rights Under the California Desert Protection Act 2 (1995) (memorandum of understanding signed by representatives of NPS and BLM). In addition, NPS and BLM have agreed to "vigorously defend federally reserved water rights through the state of California process." Id. at 1.

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However, the draft EIR has not recognized the existence of federal reserved water rights in these areas nor has it addressed the impacts of a potential drawdown of the aquifer on these rights.

Further, the impact to reserved water rights in the National Park units would violate the National Park Service's Organic Act, which provides for unimpairment of park resources. The National Park Service's Organic Act, in part, charges the Service to "conserve the scenery and natural and historic objects and the wildlife therein . . . in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." All of the alternatives considered are likely to withdraw groundwater supplies to the detriment of the protection of park flora and fauna. As explained in detail below, the monitoring system proposed to prevent such impacts from occurring is inadequate and the public land managers are not permitted to provide the oversight necessary to ensure the protection of federal resources.

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3. The DEIR Fails to Adequately Assess the Project's Cost-Effectiveness

The DEIR does not contain an examination of the Project's cost-effectiveness. Rather it merely assumes that the Cadiz Project is a cost-effective program. The complete failure to consider this fundamental issue undermines the DEIR's assumption of the Project's feasibility.

Just as the 2001 iteration of the Cadiz project was demonstrated to be economically irrational, see Pacific Institute, Economic Evaluation of the Cadiz Groundwater Storage and Dry Year Supply Project, Metropolitan Water District of Southern California (July 16, 2001), attached hereto as Attachment I, the current proposal is no more economically feasible. Since the original proposal, projected project costs have risen substantially, casting even more doubt on the project's economic feasibility. The DEIR does not discuss the substantial risk that hundreds of millions of dollars will have to be sunk in construction costs for the Project and millions more will be paid up front for indigenous groundwater that might not be extracted at all if the monitoring and management plan confirms the lower recharge rate that is supported by the vast majority of the technical literature. The failure to acknowledge and consider this risk is irrational and renders the feasibility assessment of the Project fatally deficient under CEQA.

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Second, additional costs will have to be incurred to treat the extracted groundwater for chromium 6 and arsenic under the new standards that have been adopted by California's Environmental Protection Agency's Office of Environmental Health Hazard Assessment and the U.S. EPA, respectively. This has significant implications for the cost-effectiveness, and thus the feasibility, of the Cadiz Project. But the DEIR does not even identify, let alone evaluate, these foreseeable developments early in the life of the Project or their implications for the Project.

4. Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead

The Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines) will govern how "surplus" water will be declared and diverted for use by the lower basin states (California, Nevada, and Arizona). It is not at all certain that Project Participants will be able to store the water (or what

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quantities they would be able to store), undermining the justification for this project. Furthermore, the Interim Guidelines are only in effect for the next 13 years, and thus 50 years of future storage are even more uncertain.

The DEIR does not make any mention whatsoever of the potential for the Interim Guidelines to prevent storage of surplus Colorado River water. Without considering this reasonably foreseeable barrier to Cadiz Project operations, the Agency and the public are unable to make a reasoned, informed determination regarding the Cadiz Project's feasibility, and thus its ability to fulfill its purported purpose.

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5. Financial Viability of Cadiz, Inc.

The feasibility of the Cadiz Project is also thrown in doubt by the fact that the financial solvency of Cadiz, Inc. appears to be extremely tenuous. As shown in Cadiz's own SEC filings, including its 10K and 10Q filings, the company has been losing money for some time now. This indicates that Cadiz's agricultural operations are fundamentally unsuccessful, a sham, and that the company is hoping to save itself with windfall profits from the Cadiz Project. This impression is reinforced by the fact that Cadiz has taken only minimal steps to carry out its purported plan to expand its agricultural operations in the Cadiz Valley. Rather, since obtaining initial approval to extract water for that expansion in 1993, Cadiz has almost exclusively sought to export that water from the basin at great profit. Indeed, Cadiz, Inc. appears to be pushing for this Project as a grand boondoggle to reward its speculative investors.

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The Agency should be hesitant to rely on such a financially unsound company to operate a Project that requires such substantial public investment up-front and that contains considerable unascertained risks of potentially hugely expensive harmful environmental impacts. Certainly, Cadiz appears to be completely unable to bear any of the additional substantial costs that may necessarily be incurred to mitigate the Project's potential impacts. Because it does not contain any consideration of Cadiz's tenuous financial status, the Agency's assessment of the Cadiz Project's feasibility is uninformed and unreasoned.

E. <u>The DEIR Fails to Consider a Reasonable Range of Alternatives to the Cadiz Project</u>

The California Supreme Court has described the alternatives and mitigation sections as "the core" of an EIR. <u>Citizens of Goleta Valley v. Board of Supervisors</u>, 52 Cal.3d 553, 564 (1990). The DEIR must analyze alternatives to the proposed project. "[A]n EIR for any project subject to CEQA review must consider a reasonable range of alternatives to the project or to the location of the project." <u>Id.</u> at 566; CEQA Guidelines § 15126.6. "The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives." CEQA Guidelines § 15126.6(a). The key is "whether the selection and discussion of alternatives fosters informed decisionmaking and *informed public participation*." <u>Laurel Heights Improvement Assn. v. Regents of Univ. of Cal.</u>, 47 Cal.3d 376, 404 (1988) (emphasis in original).

CEQA also requires the public agency to consider feasible alternatives to the project which would lessen any significant adverse environmental impact. Cal. Pub. Resources Code §§ 21002, 21081; Planning and Conservation League, 100 Cal. Rptr.2d at 188. "It is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which would substantially lessen or avoid the significant environmental effects of such projects." Cal. Pub. Resources Code § 21002; CEQA Guidelines § 15021(a). The CEQA Guidelines specifically prohibit the lead agency from approving a project unless all feasible mitigation and project alternatives have been adopted. CEQA Guidelines § 15091.

The discussion of alternatives in the DEIR fails to consider a reasonable range of alternatives to the Cadiz project. Thus, the discussion is inadequate for the purpose of providing for informed decision making. In addition, the alternatives discussed fail to include any that would avoid significant environmental effects, and therefore violate CEQA. As discussed above in the purpose and need section, the DEIR has failed to include such reasonable alternatives as conservation, water recycling and groundwater recovery, and storage alternatives. Instead, all of the alternatives analyzed are just basic variations of the same project. This narrow focus does not constitute a reasonable range of alternatives. 15

1. Ward Valley

In addition, the DEIR fails to consider a Ward Valley alternative. Ward Valley has a storage capacity of 14 million acre feet and is 10 miles closer to the Colorado River Aqueduct than the Cadiz Project site. According to the technical feasibility report prepared for MWD in May 1998, a Ward Valley alternative would be comparable in pretty much all other respects. At that time, it was summarily disqualified because it was the proposed site for the low-level radioactive waste disposal site. But that proposal was terminated permanently by the California State Assembly in 2002. Because the proposed nuclear waste site for Ward Valley was dropped, it is unreasonable for SMWD to have excluded it from their consideration of Colorado River water storage alternatives. 16

2. Desalination

The DEIR fails to consider opportunities to meet anticipated water demand through the construction of more cost effective desalination facilities. In particular, forward osmosis technology is likely to reduce energy costs associated with desalination by as much as 90% within the next 10 years, possibly before the Cadiz Project will even begin to deliver water to Project Participants. Such alternatives call the supposed need for the project into question. See Forward Osmosis desalination articles attached hereto as Attachments D through F. 17

The DEIR also fails to consider the potential of traditional reverse osmosis desalination facilities, such as either the South Orange Coastal Ocean Desalination (SOCOD) Project or the proposed HB Desalination Project. See South Coast Water District, South Orange Coastal Ocean Desalination Project Page, http://www.scwd.org/water/potable/oceandesal.asp (last visited March 14, 2012), attached hereto as Attachment G; Poseidon Resources Press Release, Santa Ana Regional Water Quality Board Unanimously Approves HB Desalination Project (Feb. 10,

2012), http://hbfreshwater.com/news/santa-ana-regional-water-quality-control-board-unanimously-approves-hb-desalination-project (last visited March 14, 2012), attached hereto as Attachment H. Alternative facilities like the SOCOD and HB Desalination Projects could have the potential to make the Proposed Project unnecessary. 17

3. Conservation

Finally, as described above, the DEIR's analysis of the conservation alternative is woefully inadequate, because it fails to meaningfully evaluate the effectiveness of current conservation efforts or explore the potential for additional conservation measures that could eliminate the need for the project. With no basis whatsoever, the DEIR simply dismisses the conservation alternative as unworkable or ineffective. Without a meaningful evidence based explanation of why the conservation alternative would not be effective, neither the public nor the agency is able to seriously evaluate whether the conservation alternative has the ability to be effective. 18

F. The DEIR Fails to Evaluate Fully the Impacts of the Cadiz Project

The CEQA Guidelines provide that, in discussing the environmental effects of a project, the EIR must include "a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences." CEQA Guidelines § 15151. When the failure to include relevant information precludes informed decision-making and informed public participation, the certification of the EIR constitutes a prejudicial abuse of discretion. Id.; Kings County Farm Bureau v. City of Hanford, 221 Cal.App.3d 692, 712 (5th Dist. 1990). "Certification of an EIR which is legally deficient because it fails to adequately address an issue constitutes a prejudicial abuse of discretion regardless of whether compliance would have resulted in a different outcome." Citizens to Preserve the Ojai v. County of Ventura, 176 Cal. App. 3d 421, 428 (1985).

"The core of an EIR is the mitigation and alternatives sections." Citizens of Goleta Valley v. Board of Supervisors, 52 Cal. 3d 553, 564 (Cal. 1990). "The purpose of an environmental impact report is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided." Pub. Res. Code § 21002.1. "[T]he CEQA process demands that mitigation measures timely be set forth, that environmental information be complete and relevant, and that environmental decisions be made in an accountable arena." Oro Fino Gold Mining Corporation v. County of El Dorado, 225 Cal.App.3d 872, 884-885 (3d Dist. 1990). "Mitigation measures must be *fully* enforceable through permit conditions." CEQA Guidelines § 15126.4(a)(2) (emphasis added).

"Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified." CEQA Guidelines § 15126.4(a)(1)(B). "A legally adequate EIR must contain sufficient detail to help ensure the integrity of the process of decisionmaking by precluding stubborn problems or serious criticism from being swept under the rug." Kings County, 221 Cal.App.3d at 733.

An agency violates CEQA if it approves a project as proposed when there are feasible mitigation measures available that would substantially lessen any significant environmental effects of the project. Pub. Res. Code § 21002; CEQA Guidelines § 15021(a)(2). A finding of infeasibility cannot be supported simply because the alternative is more costly. "The fact that an alternative may be more expensive or less profitable is not sufficient to show that the alternative is financially infeasible. What is required is evidence that the additional costs or lost profitability are sufficiently severe as to render it impractical." Citizens of Goleta, 197 Cal.App.3d at 1181.

1. The DEIR Impermissibly Defers the Identification and Evaluation of Potential Environmental Impacts and the Measures to Mitigate Such Impacts

The Groundwater Management, Monitoring and Mitigation Plan (GMMMP) proposed in the DEIR is inadequate because it impermissibly defers the identification and evaluation of actual and potential environmental effects, as well as mitigation measures to correct such effects, to some future date and to some other agency, specifically the Fenner Valley Mutual Water Company (FVMWC). Such a deferral is inconsistent with the reviewing agency's duties under CEQA. In addition, the GMMMP is ineffective for several reasons. First, this approach does not take into account the long-term response of the groundwater system to the Project. Second, the three-member Technical Review Panel (TRP) created to make determinations and recommendations with respect to the GMMMP and its purpose to identify and evaluate environmental effects and mitigation measures is fundamentally biased and flawed. Finally, the proposed remedial actions are illusory. 19

a. Deferral of Environmental Analysis

By relying upon the GMMMP to identify, address, and modify the Project to eliminate or lessen adverse environmental impacts, SMWD has deferred its present duties under CEQA to address potential environmental impacts until they manifest themselves during the life of the Project. This deferral of meaningful consideration of environmental impacts and establishment of the critical issue of recharge violates CEQA.

Deferring assessment of environmental impacts to a future date runs counter to the policy of CEQA that requires environmental review at the earliest feasible stage in the planning process. Cal. Pub. Resources Code § 21003.1; Sundstrom v. County of Mendocino, 248 Cal.Rptr. 352, 358 (Cal. App. 1988). Environmental problems should be considered at a point in the planning process "where genuine flexibility remains." Mount Sutro Defense Committee v. University of California, 143 Cal.Rptr. 365 (1978). Studies conducted after approval of a project will inevitably have a diminished influence on decision making and, even if subject to administrative approval, such studies are "analogous to the sort of post hoc rationalization of agency actions that has been repeatedly condemned in decisions construing CEQA." Sundstrom, 248 Cal.Rptr. at 358; No Oil, Inc. v. City of Los Angeles, 118 Cal.Rptr. 34 (1974). "[R]eliance on tentative plans for future mitigation after completion of the CEQA process significantly undermines CEQA's goals of full disclosure and informed decisionmaking; and[,] consequently, these mitigation plans have been overturned on judicial review as constituting improper deferral 20

of environmental assessment." Communities for a Better Environment v. City of Richmond, 184 Cal. App. 4th 70 (Cal. App. 1st Dist. 2010).

The "Environmental Setting, Impacts, and Mitigation Measures" section of the DEIR refers to the GMMMP to provide for the monitoring of the Project and its potential effect on critical resources. The GMMMP "establishes a comprehensive network of monitoring and data collection facilities combined with procedures for comprehensive scientific review of all actions and decisions. The groundwater modeling analysis completed for impacts assessments provide the baseline for future observations and actions." GMMMP at 9. This reliance on future data to identify potential adverse impacts calls into question the adequacy or comprehensiveness of SMWD's environmental analysis and mitigation measures set forth in the DEIR.

As indicated in the GMMMP, "[i]f there are deviations from the groundwater modeling projections, those deviations will prompt further investigation and assessment under [the GMMMP], and if necessary, implementation of corrective measures so as to avoid potential adverse impacts to critical resources." Id. at 11. The GMMMP leaves undefined what threshold levels of deviation are permissible and what levels will trigger the "action criteria" and subsequent decision-making process. Therefore, the monitoring system proposed in the GMMMP will ultimately prove ineffective to avoid undesired impacts as the standards and action criteria are not clearly defined and are left to the discretion of the FVMWC. 20

Similarly, it is improper for a lead agency under CEQA to defer formulation of mitigation programs by simply requiring some other body to conduct future studies to determine if mitigation is necessary and feasible. Fairview Neighbors v. County of Ventura, 82 Cal.Rptr.2d 436 (1999). The FVMWC is responsible for (i) assessing whether the triggering of any action criteria set forth in the GMMMP is attributable to Project operations, (ii) assessing whether a measured change is a precursor or predictor of a potential adverse impact, and (iii) identifying and implementing appropriate corrective measures. Therefore, SMWD is effectively deferring its responsibility as the lead agency under CEQA to conduct appropriate evaluations of the project, to identify impacts, and to adopt and implement mitigation measures. GMMMP 80. Such deferral of analysis of environmental impacts to a future date and to another agency runs afoul of the requirements of CEQA.

In addition to deferring the analysis of environmental impacts to a later date, the "corrective measures" developed in the GMMMP are illusory as they fail to require the SMWD to (i) correct adverse environmental impacts and (ii) elaborate how such corrections should be made beyond stoppage of pumping. This issue is further discussed below in the "Remedial Action" section.

b. Long Term Effects

The persistent dynamic response of the groundwater system to drawdown has profound implications for the monitoring and management scheme proposed in the DEIR and GMMMP. Indeed, it strongly indicates that the monitoring and management system will not work. Curiously, the DEIR alleges the Project will avoid chronic overdraft and yet simultaneously indicates the Project is intended to pump groundwater in excess of the recharge rate. In addition, 21

the DEIR states that the GMMMP will be used to ensure that the Project is managed to avoid adverse impacts for the life of the Project. DEIR 3-16. Yet, the DEIR and GMMMP fail to adequately address the long-term impacts on a groundwater system that is already in a state of overdraft. The DEIR therefore falls short of adequately analyzing and presenting adverse long-term impacts that may result from Project operations.

There is insufficient information about the groundwater elevation change over time which information is needed to evaluate the effectiveness of groundwater monitoring and mitigation plan and its ability to achieve protective procedures for ground water elevation and or spring flow protective measures. It is uncertain which model was used in the spring assessment and discussion of geochemical sampling and a canvass and accounting of existing springs would provide more beneficial information. See Johnson Wright, at 1, 8, 13, 15.

The likely long-term response to the groundwater system to the proposed extraction of native groundwater has been analyzed by Dr. John Bredehoeft (August 2001 study attached). Although the study was drafted based on the Project's earlier 2000 iteration, its analysis is premised on native groundwater extraction rates in excess of natural recharge rates (which is what the project is intended to do) and highlights (i) the long-term impacts of such practice, and (ii) the difficulty of monitoring and managing such impacts. Dr. Bredehoeft concludes that once the groundwater system is perturbed, the effects of the perturbation from pumping will ripple outward though the system slowly with great persistence. The drawdown from pumping will migrate slowly outward from the area of the pumping wells and ground water levels will continue to decline at some distance from the wells for many years, even after pumping has stopped. Thus, the adverse impacts will persist for well over a century even if groundwater extraction is stopped after 50 years or earlier. Consequently, even subtle indications of adverse impacts will not be observed for several decades. As a result, once an adverse impact to the system is observed by the proposed monitoring system, it will be too late to reverse the impact by stopping the pumping. The impacts analysis in the DEIR and GMMMP is limited to 100 years and is therefore woefully inadequate. In addition, any subtle indicators of adverse impacts that may be observable within the 50-year life of the Project may not trigger the action criteria and necessary response.

An analysis of the groundwater system's long term response to the proposed pumping, by Dr. Bredehoeft, reveals that the impacts from the drawdown will persist well beyond 100 years. At 100 years the drawdown beneath Bristol Lake will be more severe than it was at year 50 when the Project is stopped. This drawdown will reduce or eliminate groundwater discharge from major parts of Bristol Lake, which will tend to dry out the lakebed and lead to increased generation of dust from the lake area. The drawdown from the Project operations will also cause the brine to move from under Bristol Lake toward the cone of depression and the project site. This will take time to occur because the cone of depression moves slowly outward from the Project, but once the brine starts moving it will be extremely difficult, if not impossible, to stop.

The report analyzes the effectiveness of monitoring wells. At a monitoring well located halfway between the lake and the project site, it is likely that only a slight increase in dissolved solids will be observed during Project operations. Such slight increases may go undetected as they do not necessarily trigger action criteria. Even if such increases do trigger action criteria,

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they may be partially explained by natural or unusual climatic events and therefore preclude a determination that such triggering action is attributable to the Project or decision to implement appropriate corrective action. By 100 years, long after project operations and monitoring has stopped the concentration of dissolved solids will have risen, *and will still be increasing.*

The slow migration of the drawdown from the Project may also impact springs in the surrounding mountains, with the Marble Mountains most likely to be impacted. These mountains are home to the largest population of bighorn sheep in this region of the Mojave, a population that plays a critical role in sustaining other small sheep populations in the surrounding mountain ranges.

As the project proposes to substantially reduce the volume of groundwater in storage and reduce groundwater levels over much of a large groundwater basin, given the size of the project and of the cone of depression and the fact that it continues to expand even after the life of the project (50 years), by the time impact occurs, as noted by Johnson Wright, it will be too late to make substantive changes in groundwater management to mitigate the problem. Also as noted by Johnson Wright, with absence of a rigorous spring monitoring program, an observed impact will likely be already too late to be protective of the spring and also important associated habitat Johnson Wright, at 14. Thus, even if the extraction is stopped, the drawdown beneath the northern part of Cadiz Lake in the vicinity of the Cadiz Dunes Wilderness Area will continue to increase for many years. The drawdown in this area will greatly reduce or eliminate groundwater discharge to the wilderness area.

The long term nature of the impacts suggests that the early warning signs will be subtle. In addition, the considerable up-front investment in the Project makes it unlikely that subtle early warning signs will be heeded. As discussed below, implementation of corrective action is highly unlikely given the structure of the TRP and the decision-making process, as well as the substantial investment to build the required Project facilities. Close monitoring of water levels and quality in the groundwater system may provide some early warning that the Project is creating adverse environmental impacts even though these impacts may be impossible to stop. These early warning signs of adverse impacts will be very subtle and small drawdowns due to the Project could easily be confused with impacts of nearby pumping or unusual climatic events. Because of the potential for long lasting effects, the Project would have to be halted very early on in order to prevent the significant adverse impacts discussed above. Given the enormous investment of funds necessary before project operations even begin, it is implausible to expect that the SMWD will shut down the Project early in its life where indications of impacts are subtle.

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c. Monitoring Committee

The DEIR and GMMMP essentially set up a system where mitigation decisions and corrective actions are made by the Fenner Valley Mutual Water Company (FVMWC), a company that will be formed to deliver water to its shareholders, which are the water companies that will benefit from the Project's native groundwater extraction and which have entered into contracted water subscriptions ranging from 5,000 AFY to 15,000 AFY. The structure of the GMMMP permits FVMWC action prior to review by SMWD. FVMWC has the primary responsibility of collecting, collating, and verifying data. It is also responsible for (i) assessing

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whether the triggering of any action criteria set forth in the GMMMP is attributable to Project operations, (ii) assessing whether a measured change is a precursor or predictor of a potential adverse impact, and (iii) identifying and implementing appropriate corrective measures. GMMMP 80. During each of these stages, FVMWC will submit results of its assessments, determinations, and corrective actions, as well as other notifications to the Technical Review Panel (TRP), a three-member panel. The TRP will evaluate these items and within 30 days of convening, will issue a written report to SMWD, which will make the final determination regarding the assessments and actions already taken.

The makeup of the TRP virtually guarantees that no meaningful remedial action would ever be taken. The three person panel is to have representatives appointed by the FVMWC and the County of San Bernardino (County), with decisions made by 2/3 vote. There is an inherent conflict of interest in this structure. The FVMWC has an interest in continued extraction as it is comprised of Project Participants that have a financial interest in the extraction. It therefore has an incentive to overlook or attribute deviations in groundwater levels or quality to non-Project related factors. In addition, by the time the TRP reports to the SMWD, the FVMWC may have already identified and taken action. If the SMWD disagrees with the FVMWC's assessments or actions, it may order alternative actions. Therefore, the SMWD only superficially makes the final decisions relating to management, monitoring, and mitigation. The process of acknowledging environmental impacts and deciding how to respond to such impacts has been structured so as to favor continued extraction of indigenous groundwater. This is the case even in the event FVMWC and the County cannot agree upon designation of the third member of the TRP and the San Bernardino Superior Court appoints such an individual. The interests represented by the TRP are inherently aligned with extraction and the continued progress of the Project.

The technical review panel overseeing the monitoring and mitigation plan should include local stakeholders as technical representatives from the U.S. Bureau of Land Management, the National Park Service, local landowners and local Indian tribes.

Finally, the GMMMP entrusts the FVMWC and the TRP with a challenging task to gather and assess all data obtained from the monitoring network, as well as implement appropriate corrective actions. The GMMMP provides that only $50,000 of TRP's costs will be borne by FVMWC per year (escalated by 2% each year). Given the limited funding available and the conflict of interest discussed above, it is questionable whether thorough and adequate monitoring, management, and mitigation can be achieved.

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d. Remedial Actions

The GMMMP does not contain adequate triggers, thresholds, or goals to ensure that mitigation measures will be implemented. What is more, even where the DEIR includes quantified triggers (termed "action criteria") for some response, the only response provided for is a process of review and evaluation by the TRP and other bodies subject to the control of SMWD, the Project Proponent. While the GMMMP establishes some quantitative action criteria, many are vaguely defined and therefore ultimately ineffective. The action criteria for the monitoring and management of air quality, land subsidence and brine resources underlying the dry lakes

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include changes in air quality that exceed baseline conditions over a five-year moving average and changes in land subsidence rates and groundwater levels that are greater than projected by simulation models. Inevitably, there will be changes and deviations, both slight and significant, and unfortunately, these broadly-defined triggers provide the FVMWC and the TRP with too much discretion to determine what changes and deviations from baselines and simulation models warrant further review. In addition, as discussed previously, some changes will be subtle and will not be observable during the life of the Project. Such changes will therefore fail to trigger the action criteria and the adverse environmental effects will continue. A comprehensive and thorough monitoring and management plan should include triggers and action criteria that identify changes and deviations that are predictive of harmful environmental effects. This allows the agencies to act in a timely manner to prevent the occurrence of such harmful effects.

For each potential impact that is recognized, but insufficiently analyzed, the GMMMP provides for vaguely defined potential remedial actions to be taken in response to vaguely defined action criteria. The GMMMP takes for granted (i) that the "action criteria" are accurate indicators of potentially adverse environmental impacts, (ii) that such impacts can be halted, reversed, or corrected with or without impact to other environmental or critical resources, and (iii) that the structure of the TRP will appropriately manage the project despite the potential conflicts of interest.

Courts have consistently held that approvals of applications or projects on the basis of a mitigation plan will be upheld only when the mitigation measures significantly compensate for the proposed action's adverse environmental impacts. See Siskiyou Regional Educ. Project v. Rose, 87 F. Supp. 2d 1073 (D. Or. 1999). The DEIR is flawed in its overriding assumption that the Project will not cause significant adverse environmental impacts. It relies on the monitoring network described in the GMMMP to collect and analyze future data which is to be used to predict environmental impacts. It is therefore questionable whether the impacts analysis and mitigation measures discussed in the DEIR sufficiently meets the requirements set forth under CEQA. In reality, the long-term nature of the environmental impacts of the Project suggests that the early warning signs will be subtle. This fact alone will preclude the TRP and the SMWD from accurately assessing the Project's environmental impacts, much less devising mitigation measures that significantly compensate for such impacts. It is unreasonable to believe that the GMMMP can establish appropriate mitigation measures based on subtle early warning signs that may not appear until after the life of the Project.

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"Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified." CEQA Guidelines § 15126.4(a)(1)(B). The potential remedial actions or so-called "corrective measures" set forth in the GMMMP are superficial and appear to be limited primarily to reduction or halting of Project operations, rather than correcting adverse impacts. For example, the GMMMP lacks specifics or concrete mitigation measures to address subsidence beyond the mere stoppage of pumping. Also, the GMMMP does not discuss the basis for selecting a particular mitigation measure identified. One of the primary corrective measures is modification of wellfield operations. This measure is proposed to address subsidence, induced flow of lower-quality water from nearby dry lakes, changes in groundwater or brine water levels greater than presented in model simulations, and changes in air quality. Modifications include reduction in pumping, revision of pumping

locations, stoppage of pumping for a period necessary to correct the subsidence, or installation of injection wells. This is the extent of the discussion pertaining to the wellfield modifications. There is little guidance for the FVMWC or TRP to decide which modifications would be most appropriate; rather, decisions are left to the discretion of those entities.

In addition, the GMMMP does not require the TRP or SMWD to select a measure that will at least reduce or halt the adverse impacts. The TRP and SMWD have the discretion to select one or more of the corrective measures presented. Not all of the offered measures lead to elimination of the adverse impacts or correction of such impacts. For example, the TRP and SMWD have the option to pay an impacted well owner for increased material pumping costs (related to induced flow of lower-quality water from the dry lakes)—an option that does not address the adverse impacts of such induced flow.

Courts have held that an agency must analyze mitigation measures in detail and explain how effective the measures would be. Oregon Natural Desert Ass'n v. Singleton, 47 F. Supp. 2d 1182 (D. Or. 1998) (citing Northwest Indian Cemetery Protective Ass'n v. Peterson, 795 F.2d 688, 697 (9th Cir. 1986), rev'd on other grounds, Lyng v. Northwest Indian Cemetery Protective Ass'n, 485 U.S. 439 (1988). The GMMMP cannot explain whether and how effective the mitigation measures would be because it does not yet have the data to support such discussion. Although these measures would at least slow or halt continued subsidence and other adverse impacts in a particular area in the wellfield, it is unlikely such modifications will correct any adverse impacts that have already begun. The drawdown from pumping will migrate slowly outward from the area of the pumping wells and will continue to decline at some distance from the wells for many years, even after pumping has stopped. The corrective measures presented to address induced flow of lower-quality water from Bristol or Cadiz Dry Lakes goes as far as to make the assumption that these above listed modifications to wellfield operations will actually reestablish the natural hydraulic gradient and background concentrations at the margins of the lakes.

Although modification of wellfield operations would at least slow or halt continued depletion of the aquifer and it is at least theoretically possible, it is not plausible that the TRP and the SMWD would vote to discontinue pumping unless they were legally compelled to do so, given their enormous up-front investment in the Project. In fact, there is actually no requirement that adverse impacts be corrected. Even in the event the TRP and SMWD elect to halt wellfield operations, as the vast majority of the scientific studies make clear, the rate at which the aquifer would replenish itself is extremely slow. Thus, realistically, the best remedial action offered by the GMMMP would do nothing better than allow nature to take centuries or millennia to reverse the harm caused by the Project's depletion of the aquifer. (As an added note, even over the course of millennia, the aquifer will not be able to undo the effects of ground subsidence that may be caused by extracting so much native groundwater.)

Finally, it is clear that the GMMMP and the composition of the TRP are structured so as to minimize the chance of harmful impacts being acknowledged, let alone responded to, and that the purported remedial measures that could be implemented are illusory.

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2. The DEIR Fails to Address Adequately Potential Impacts to the Groundwater Basin Underlying the Project

The DEIR presents a woefully inadequate analysis of potential impacts to the aquifer underlying the Project. For example, as discussed previously, the DEIR inadequately addresses the recharge rate for the groundwater system. Thus, there is tremendous potential for drawdown of the aquifer, the effects of which will be felt throughout the area. For example, as discussed above, there may be brine movement toward the Project site. In addition, the water resources of surrounding wilderness areas, national park units, and mountain areas may be affected. Finally, drawdown of the aquifer is likely to lead to subsidence, which will result in the permanent loss of an unknown but potentially significant amount of groundwater storage capacity from the aquifer (or groundwater system). The DEIR fails to adequately address these impacts.

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3. The DEIR Fails to Adequately Evaluate Potential Impacts on Air Quality

The DEIR does not contain sufficient data or analysis to allow critical decisions to be made regarding the potential impacts to air quality from the Cadiz Project. Critical areas of concern that have not been adequately addressed are: 1) the potential for drawdown of the brine layer beneath Bristol and Cadiz lakes that will lead to increased dust emissions; 2) the failure to consider the potential for dust emissions from the spreading basins; and 3) the failure to recognize that the impacts to sand and dune areas are likely to expand and result in sand blowing onto the playas of Cadiz and Danby lakes causing increased potential for dust emissions.

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Further, the proposed monitoring system and mitigation measures are inadequate to accurately detect dust emission processes or mitigate such impacts because: 1) the instrumentation and measurements proposed are inadequate, 2) the time period for proposed monitoring is too short to reveal potential impacts or compliance with National Ambient Air Quality Standards, 3) the proposed plan for dealing with dust emissions, namely the assumed ability to manipulate the level of the brine layer, is completely ineffective as a dust control measure; 4) the management and monitoring program fails to explore an adequate range of control strategies to mitigate the potential dust problem or to address the associated costs, and 5) the monitoring plan is insufficient to address the impacts on the Mojave National Preserve.

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a. Inadequacy of Analysis of Dust Emissions

The DEIR fails to adequately assess the potential for dust emissions from Bristol and Cadiz lakes caused by the Cadiz Project. For instance, an analysis of the surface sediment characteristics and the brine water chemistry of Bristol and Cadiz lakes is necessary for an understanding of the potential for the lake beds to become susceptible to dust emissions. However, there is little information regarding the chemical composition of the brine beneath Bristol and Cadiz lakes or the surface crust on the lake beds.

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The DEIR also completely fails to address potential dust emissions from the Project's spreading basins. The DEIR makes the conclusory assertion that the spreading basins will not contribute significantly to dust emissions in the surrounding environment. In fact, there is a high

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probability of emissions from the spreading basins at levels significantly greater than the DEIR suggests. First, the basins will regularly accumulate substantial amounts of sediment. The removal and handling and storage of these large amounts of fine-grained sediments would produce significant amounts of dust and raises concerns about how this material would be stored to prevent it from becoming an additional source of dust.

Thus, estimates for the sediment yield in the spreading basins are critical to determine the impacts on air quality based on the scale of the removal and handling operations and the actions required to safely store this material in a manner that does not leave it susceptible to entrainment by the wind. However, the DEIR does not provide any estimate of the amount of sediment that would have to be removed from the spreading basins. Consequently, the assertion regarding the impact of its removal on air quality is unsupported by factual information and arbitrary. 28

In addition, the statement in the DEIR that the basins will not contribute higher levels of dust when they are not filled with water than the surrounding desert land is extremely dubious. This is so because the fine-grained sediment that will have accumulated on the surface of the basins will likely be inherently more susceptible to wind erosion and dust emissions than the surrounding desert lands that are characterized by a degree of surface armoring. The spreading basins also will be devoid of vegetation, which will make them more likely to omit dust at lower wind speeds than surrounding desert surfaces. These factors have not been addressed in the DEIR and are directly at odds with the conclusory assertion in those documents that the basins will not emit significantly more dust than the surrounding desert.

Finally, it is clear from the DEIR that construction of the conveyance facilities for the Project will both temporarily and permanently disturb significant areas within the Cadiz Dunes. These sandy soil types are extremely sensitive to wind erosion and their disturbance can create significant degradation of the local and regional environments. There is a high probability that the disturbance will expand beyond the initial zone of disturbance as sand is blown by the winds. Further, sand from the disturbed areas of the dunes will be susceptible to being blown onto Cadiz and Danby lakebeds where it could cause significantly increased dust emissions. 29

The failure to address these serious dust emission impacts was first raised in relation to the similar, earlier iteration of the Cadiz Project over a decade ago. See Dr. John A. Gillies, Review of Draft Environmental Impact Report/Environmental Impact Statement and Supplement to the Draft EIR/EIS Cadiz Groundwater Storage and Dry-Year Supply Program (Jan. 7, 2001).

b. Inadequacy of Management, Monitoring, and Mitigation Plan

The monitoring plan proposed in the DEIR and GMMMP is deficient because the mitigation measures are inadequate to accurately detect dust emissions or mitigate such impacts. First, the proposed instrumentation for the monitoring network is plainly inadequate. The proposed exclusive use of nephelometers would assure high levels of uncertainty in assessing particulate matter loading. Because compliance with air quality standards depends on actual measurement of particulate matter, the plan should use instrumentation in accordance with Federal Reference Method, or accepted equivalent, to ensure that it adequately monitors relevant conditions on the playas. In addition, the monitoring plan does not provide for any measurement 30

of saltation activity on the lake beds. Yet saltation is the key component of the dust emission process, effectively driving most of the dust emissions. Further, the corrective measures proposed in the DEIR to ameliorate potential impacts that lead to dust emissions are limited to the wellfield modifications discussed above and are not adequate. None of the proposed mitigation measures can provide the means to control a weather driven process like dust emissions.

In order to use the brine layer to mitigate the dryness of the lakebeds and dust emissions, a management plan would have to be developed that would ensure the brine layer was effectively contributing sufficient moisture to the surface layer when the lakebeds were most susceptible to wild erosion. This has not been done. Further, the brine layer cannot be effectively manipulated via the groundwater system to mitigate potential dust emissions because the groundwater system cannot respond quickly enough. Even if pumping were stopped or fresh water were pumped into the groundwater system, there almost certainly would be a time lag of months or years before the desired response in the brine layer could be expected. Thus, these measures plainly would not be effective in responding to weather conditions likely to cause increased dust emissions, which would require responses within hours or a few days at the longest. Moreover, given the demands for water extraction from the Project and the economics of maintaining a cost-effective water delivery schedule, it is implausible that the corrective measures would be implemented. 30

Before the Cadiz Project can be approved, the Agency must evaluate concrete mitigation actions designed to minimize dust emissions from Cadiz and Bristol lakes. The actions presently being carried out at Owens Lake appear to be the best and most obvious model for appropriate measures to control dust emissions from the playas. The costs associated with an effective dust control system on a playa are quite substantial; to date, the cost of a system to control dust emissions at Owens Lake have come to approximately a billion dollars. The DEIR has failed to consider the large potential costs involved in developing and implementing an effective system for the management and control of potential dust emissions, or who will bear those costs.

Until these concerns are adequately addressed, the Agency cannot make a reasoned, informed determination of the Cadiz Project's potential to cause significant adverse impacts to air quality and the potential future costs associated with the mitigation of those problems.

4. The DEIR Fails to Adequately Assess Impacts to the Desert Tortoise Population in the Vicinity of the Project

The DEIR fails to adequately address the impacts of the Project on the desert tortoise, a Federal and State listed endangered species In addition, the DEIR fails to adequately address the implications of § 7 and § 9 of the Endangered Species Act. 31

The DEIR fails to mention the potential for increased predation of the desert tortoise due to the addition of water sources that will attract ravens. Ravens are a significant predator for juvenile tortoises. Desert Tortoise (Mojave Population) Recovery Plan 6 (1994). The Project will result in the addition of hundreds of acres of spreading basins in the project area. The Fish and Wildlife Service has recognized that "artificial sources of food and water help sustain more individuals during times of resource shortage." Id. App. D, at. 34. Thus, the addition of these

water sources will lead to increased raven populations in the Project area. In addition, the recovery plan recognized that raven populations are already increasing in the Fenner Valley. Id. App. F, at. 11. The increase in raven populations and the resulting increased predation on juvenile tortoises is a significant impact that has not been addressed through the CEQA process.

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5. The DEIR Fails to Adequately Address Potential Impacts on Bighorn Sheep Populations in the Vicinity of the Project

The DEIR contains inadequate consideration of potential impacts to bighorn sheep from the Project. Indeed, the DEIR considered only potential direct impacts to bighorn sheep from the construction of facilities for the Project and in the specific areas where these facilities would be located. The DEIR fails to acknowledge potential impacts from the Project drawdown of native groundwater on springs in the mountains in the vicinity of the Project. The DEIR even goes as far as to suggest that the project will have no impact whatsoever on the springs relied on by bighorn sheep. The DEIR also failed to consider the Project effects on bighorn habitat and on bighorn inter-mountain movement through wildlife corridors.

As recited in the DEIR, Nelson's Bighorn sheep inhabit portions of the project area. The Bighorn's preferred ranges and habitat are within the higher elevations but they traverse the valley through movement areas that connect these preferred range areas. The DEIR identifies bighorn sheep populations in the Old Woman Mountains, the Iron Mountains, the Ship Mountains, the Calumet Mountains and the Markham Mountains as well as intermountain movement corridors between these (DEIR fig 4.4-4).

Surface water is extremely scarce in the Mojave Desert and consequently the bighorn sheep are heavily dependent for survival on the few existing springs in the mountains surrounding the Cadiz Project. Consequently, the potential impact of the Project on the groundwater system that supports those springs has significant implications for the bighorn sheep metapopulation in the region surrounding the Project site and possibly the adjacent metapopulation to the north.

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If the extraction of indigenous groundwater from the basin causes the springs in the surrounding mountain ranges to dry up, or greatly reduces their flow, bighorn sheep populations in those ranges can be expected initially to shrink to small numbers. The probability of extinction increases with declining population size. Eventually, this is likely to head the collapse of at least this portion of the South Central Metapopulation of bighorn sheep in the Mojave Desert as the small local populations go extinct and are not recolonized because of the small number of total sheep in the region.

Bighorn sheep favor mountainous habitat that is often naturally discontinuous and their population consists of a network of many populations connected through intermountain movement. Epps identifies intermountain corridors for bighorn that are important stepping stones of mountain habitat. Epps indicates that intermountain movement is essential for the persistence of population by making use of vacant habitat and genetic diversity. Therefore, mountain and intermountain habitat are of equal importance to the long term conservation of the sheep and conservation will be dependent on prevention of further population fragmentation while

attempting to bridge existing barriers Epps, Desert Bighorn Sheep Habitat in California, (May 2011).

The BLM has designated several regional wildlife movement corridors connecting occupied bighorn sheep habitat. As recited in the DEIR, movement corridors may provide favorable locations for wildlife to travel between different habitat areas such as foraging sites, breeding sites, cover areas, and preferred summer and winter range locations. They may also function as dispersal corridors allowing animals to move between various locations within their range. As shown in Figure 4.4-4 of the DEIR, these designated movement areas overlay the Project area. According to the DEIR, a regional movement corridor connects occupied bighorn sheep habitat between the Old Woman Mountains and the Iron Mountains to the south. Epps cites historical evidence of movement by male and female bighorn sheep between the Old Woman Mountains and the Iron Mountains to the south. Epps, Using Genetic Tools to Track Desert Bighorn Sheep Colonizations, 523 (2010). This corridor crosses Danby Dry Lake and is bisected by the ARZC rail line and Cadiz Rice Road. A larger regional movement corridor connects the Iron Mountains and the Calumet Mountains to the west. The power transmission line running north-south across Danby Dry Lake crosses suitable habitat at the southern edge of the Iron Mountains. A movement corridor connecting occupied bighorn sheep habitat between the Marble Mountains and the Ship Mountains to the southeast traverses the Project spreading basin and well field areas. This corridor is bisected by the mainline of the BNSF, Historic Route 66 and other roads. Schulyer Wash, which occurs southeast of the Project spreading basins, is a likely stopping point for wildlife that may be traveling between the Marble and Ship Mountains.

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The regulatory framework recognizes the importance of wildlife movement corridors, which are considered an important ecological resource by various agencies (CDFG, USFWS, United States Forest Service [USFS]) and under CEQA. Based on the *CEQA Guidelines,* Appendix G, a project may be deemed to have a significant effect on the environment with respect to biological resources if it would:

1. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;

2. Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS;

3. Interfere substantially with the movement of any native resident or wildlife species or with established native resident or migratory native wildlife corridors, or impeded the use of wildlife nursery sites.

As recited in the DEIR, direct impacts to biological resources are considered to be those that involve the loss, modification, or disturbance of natural habitats (i.e., vegetation or plant communities), which in turn, directly affect plant and wildlife species dependent on that habitat. Direct impacts also include the destruction of individual plants or wildlife, which is typically the case in species of low mobility (i.e., plants, amphibians, reptiles, and small mammals). The

collective loss of individuals in these manners may also directly affect regional population numbers of a species or result in the physical isolation of populations thereby reducing genetic diversity and, hence, population stability. Indirect impacts are considered to be those that involve the effects of increase in ambient levels of sensory stimuli (e.g., noise, light), unnatural predators (e.g., ravens, domestic cats, and other non-native animals), and competitors (e.g., exotic plants, non-native animals).

As noted in the DEIR under existing conditions, wildlife traverses the open valleys unimpeded except for the linear transportation and utility corridors that traverse the valleys. Movement corridors can be affected by linear structures such as highways, walls, and fences.

The DEIR analysis finds that open-space is crucial for the survival and movement of wildlife species. The DEIR discussion indicates that the proposed Project would modify some of the movement corridor land by constructing roadways and fenced well pads, but it would not restrict wildlife movement within the area. The areas between well pads would be maintained to provide unimpeded movement through the valley. The proposed pipeline route would result in temporary impacts along the already existing ROW and adjacent to railroad tracks during construction, but would not further restrict wildlife movement once construction is complete. The DEIR posits that effects would be temporary and not impede movement as the pipeline would be constructed in segments. Temporary exclusion fencing installed as mitigation would be erected in segments and would not impede movement across the valley. According to the DEIR once installed, no linear fencing would be installed that could impede wildlife movement. Well field construction would be located near already existing agricultural practices and though the well pads would be fenced, as described above, it would not inhibit wildlife movement. Also according to the DEIR the proposed well field would be located within a BLM-designated bighorn sheep movement corridor. Construction at the well field would involve grading roads and wellpads, drilling wells, and installing underground electric and water pipelines. Electric lines may also be overhead. The new 25-foot wide roadways would not be paved or fenced.

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The DEIR finds that once constructed, the project would not impede wildlife movement, and that there would be no significant effect. The DEIR analysis considers barriers to movement but is deficient in that it does not consider how modification of the movement corridor would affect corridor habitat. As pointed out above there is insufficient information to determine the extent of hydrologic effects and resulting effects on springs and habitat. Specifically there is insufficient information to determine impacts on vegetation and critical habitat for the bighorn sheep and the effects on the bighorn's critical intermountain habitat. There is likely to be a significant adverse effect that must be addressed in the DEIR. Without such information, neither SMWD nor the concerned public can make an informed decision. A plan should be developed to monitor and mitigate if possible, the affect on Bighorn sheep habitat as the project progresses.

6. The DEIR Fails to Adequately Evaluate Potential Impacts on Wilderness Areas and Mojave National Preserve and Joshua Tree National Park

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If the drawdown of groundwater dries out the lake beds and causes large scale dust emissions, this is likely to cause dramatic adverse impacts to air quality in some or all of the five

wilderness areas that surround the project site, the Mojave National Preserve, and possibly Joshua Tree National Park. The DEIR defers meaningful discussion of such potential air quality impacts and their mitigation to the future and delegates decisions regarding the likelihood, severity, and appropriate response to such impacts to the TRP that will be responsible for implementing the Management, Monitoring and Mitigation Plan. This deferral and delegation by the Agency violates CEQA and runs counter to the statute's fundamental goal of ensuring informed decisionmaking by agencies before a projects is implemented.

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In addition, the Project is likely to cause impacts to water resources in these wilderness areas and park units as discussed above.

7. The DEIR Fails to Adequately Evaluate Potential Impacts to Cultural Resources

CEQA provides that a project that may cause a substantial adverse change in the significance of a historical resource may have a significant effect on the environment. Cal. Pub. Resources Code § 21084.1. CEQA guidelines further provide that the lead agency shall determine if an archaeological site is a unique archaeological resource, and if so, the lead agency shall identify potentially feasible measures to mitigate significant adverse changes to the resource. CEQA Guidelines § 15064.5 (b) (4).

To begin with, the scope of the cultural resources survey in the DEIR is woefully inadequate. A cultural resources survey within the entire project area, including the wellfield, in anticipation of the project must be conducted before a decision is made.

The present DEIR analysis of cultural resources is wholly inadequate and incomplete as to cultural resources and the mandate of CEQA. A full Class I archaeological survey of the project area should be conducted in order that the DEIR analysis consider determinations regarding significant and unique archaeological resources including landscape level resources, adverse effects and mitigation measures. The present DEIR indicates that it is expected that cultural resources will be encountered, but does not make any attempt to discover them, deal with associations and the general cultural landscape of the area, and provides no assessment of what may be out there and what impacts the project will cause and how these may be mitigated. There is no discussion of Area of Potential Effects (APE) for cultural resources. Certainly there will be vehicle access, maintenance workers, etc. using the project area and the surrounding region impacting cultural resources.

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In addition to impacts on unknown archaeological sites that are likely to be discovered, there will be significant impacts to cultural resources in terms of cultural setting, view shed, cultural landscape, environmental changes, and sequential effects on culturally important animals, plants and landscapes. In fact, the affected area contains a number of sacred sites that have had tremendous importance to the Chemehuevi and other Native American peoples whose aboriginal lands include some or all of the area that will be affected by the project.

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The DEIR fails to even consider several important cultural resources and cultural landscapes within the project and in the vicinity of the project. The Cadiz project will result in significant adverse effects to the bighorn or mountain sheep and the desert tortoise, animals that

are considered an important cultural resource by Native Americans. The Chemehuevi, Mojave and Cahuilla as well as other tribes regard the bighorn sheep as a cultural resource.

The Chemehuevi Indians lived along the Colorado River in the vicinity of Chemehuevi Valley and in the Mojave Desert west of the River. Small Chemehuevi bands traveled across the vast distances between the Colorado River and their villages, camps, springs and hunting ranges in the Old Woman, Granite, Ship, Turtle, Maria, Paiute and Providence mountains. Madrigal, at 39 (2008). The Cahuilla inhabited a vast area of the desert and mountains to the west and south of the Chemehuevi. Bean, at 24 (1972). The Chemehuevi had an intimate knowledge of the desert and mountains including the area in the vicinity of the proposed project. Their Salt Songs celebrate the people's spiritual connection to important cultural places in the area. The songs are sung all night and recount a journey of three sisters from the Bill Williams fork up the Colorado River, north to Las Vegas, then south passing just west of the Old Woman Mountains, then running west to Twenty-nine Palms and south to the Colorado near Blythe. Madrigal, at 40 (2008).

The Chemehuevi and Cahuilla also maintain an important connection to mountain sheep and their ranges. The bighorn sheep was important in their life way as a big game animal that was hunted. The bighorn sheep was also important in Native belief and ritual. The Chemehuevi mountain sheep songs demonstrated an intimate knowledge of the landscape, plants and animals as they described specific places and Chemehuevi hunting preserves and ownership boundaries, which Chemehuevi said often included the land stretching from the top of a mountain range, through the intervening valley to the top of the next. The song would traverse the rocky slopes of a mountain and run down to the desert floor describing palo verde, mesquite, cactus and creosote stands. Laird, at 12, 21 (1976).

The Chemehuevi shamans employed the mountain sheep (*nagatutuguuvi)* as one of their principle familiars, a spirit animal who was their spiritual helper and who they summoned from the mountains when practicing a healing ritual. As the shaman performed his healing ceremony, and as he sang and danced, his shaman song traced the route by which his familiar was traveling from its mysterious home in the mountains. Laird, at 32 (1976). The Cahuilla also sang mountain sheep songs and recognized a sacred role of the bighorn sheep in their life way. *Pemtexweva*, the Cahuilla animal master of hoofed animals, was the being given thanks when mountain sheep, or deer were obtained. Bean, at 57 (1972). For Native Americans the importance of the desert tortoise goes beyond protection of an endangered species. The Chemehuevi sang a series of traveling songs which told of the indispensible role of the Desert Tortoise in the desert and identified areas where the tortoise was to be found. Klasky, at 45 (1996). The Mojave Indians considered the desert tortoise a sacred teacher, who was once a Mojave and served to educate the people how to survive in the desert. Klasky at 45 (1996).

Also the following observations regarding cultural setting and background are made: The information on where and when the Chemehuevi were in certain places, is incomplete. The 1605 documents regarding where various groups were located at the time are important; however, the Colorado River groups constantly moved about and changed alliances.

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Additionally, there are a number of errors and omissions in the introductory sections of Part 4.5. of the DEIR.

A. The DEIR does not distinguish between a permanent/semi-permanent village site and a repeatedly used seasonal campsite (4.5-1); "temporary campsite" infers minimal occupation. 36

B. There is no listing of Bighorn Sheep in the faunal list; this is and was an important animal in the region (4.5-3). 37

C. In the discussion of the chronological periods and artifact complexes, there is no discussion of the fact that Lake Mojave assemblages are characterized by one type of stone used as weapons and another type of stone used as other tools – this is an important characteristic of this Early Complex (4.5-4). 38

D. Footnotes # 27 and #29 (4.5-8) are in error in reference to Oñate's meeting Mohave on the Colorado River in 1605 – the reference should read Kroeber 1925:802. 39

E. Faunal list names "pronghorn sheep" – pronghorn are a type of antelope (4.5-8) 40

F. There is a failure to mention that the Chemehuevi at the Oasis of Mara shared the Oasis with Serrano (4.5-8) and that the Chemehuevi 160-acre reservation was at Twenty nine Palms. 41

G. In general, only one or two information sources are used and there is an apparent lack of understanding, in some instances, of what Sutton et al. 2009 said when citations are used. 42

8. The DEIR Fails to Adequately Address Potential Impacts to Water Quality

a. Required Report Concerning Waste Discharges to Groundwater Under California's Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act, CA Water Code §§ 13020-13983, requires any person discharging or proposing to discharge waste that could affect either surface or ground water quality to file a report with the appropriate Regional Water Quality Control Board. Id. §§ 13260, 13050(e). The Act defines waste as "sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal." CA Water Code § 13050(d). 43

Because Colorado River Water contains substances that would be considered waste under the Porter-Cologne Act, SMWD/Cadiz should be required to file a report with the Regional

Board. The Cadiz Project will increase the TDS in the native groundwater in two ways. First, the infiltration of Colorado River water will dissolve salts in the upper parts of the unsaturated zone and transport them to the indigenous groundwater. Second, Colorado River water contains much higher TDS concentrations than native groundwater and is expected to contribute many tons of TDS over the life of the Project. Finally, the Project would introduce perchlorate, found in Colorado River water, to the indigenous groundwater. Because the project will result in discharge of these wastes to groundwater of the state, SMWD must file a report with the Regional Board. 43

There is no evidence in the DEIR that SMWD has filed or intends to file this report. The section of the DEIR that discusses permits and/or approvals does not mention this requirement and is therefore incomplete.

b. The Project Will Lead to Impermissible Degradation of the Quality of Native Groundwater Under the Porter-Cologne Act.

The Porter-Cologne Water Quality Control Act, CA Water Code §§ 13020-13983, establishes a coordinated statewide program of water quality control overseen by the State Water Resources Control Board and administered by nine regional boards. The Cadiz basin falls within Region 7—the Colorado River Basin. The Colorado River Basin Regional Water Quality Control Board has adopted a Water Quality Control Plan ("Basin Plan"). The proposed discharges of Colorado River water into the Cadiz basin violates this Plan and the policy of the State Water Resources Control Board.

The State Water Quality Control Board has adopted a policy, which has been incorporated in the Basin Plan, to protect waters that are of a better quality than required by existing policies. The resolution states:

> 1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.
> 2. Any activity which produces or may produce a waste or increased volume of concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

State Water Resources Control Board, Resolution No. 68-16 (1968). In addition, the Basin Plan states that "[i]deally, the Regional Board's goal is to maintain the existing water quality of all nondegraded ground water basins." Basin Plan, at 3-9. 44

Thus, the State and Regional Boards have an obligation to protect high quality waters. It is clear that the native groundwater is of a higher quality with respect to TDS and perchlorate than the Colorado River water. Therefore, the Regional Board cannot allow the Project to cause degradation of the native groundwater source with respect to these wastes. In addition, the Regional Board should impose waste discharge requirements that result in the best practical treatment or control. The DEIR does not adequately address this requirement of California law. 44

9. The DEIR Fails to Adequately Consider the Fact That the Indigenous Groundwater Contains Chromium 6 at Levels That May Cause Public Health Impacts and Require Treatment

The presence of chromium 6 in the indigenous groundwater at concentrations that could cause health impacts and require expensive treatment of groundwater before it can be used by Project Participants was not addressed in the DEIR. Nor has there been consideration of the additional costs for water treatment that is likely to become necessary within a few years, or who will bear those costs. The DEIR's failure to consider the presence of chromium 6 and associated water treatment costs renders the impacts analysis fatally deficient under CEQA. 45

G. <u>The DEIR Fails to Adequately Consider Cumulative Impacts</u>

CEQA requires that an EIR include an assessment of the cumulative impacts of a project with respect to past, present, and probable future projects within the region. Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts. CEQA Guidelines, § 15355. Such an analysis is necessary because "'[t]he full environmental impact of a proposed . . . action cannot be gauged in a vacuum.'" <u>Whitman v. Board of Supervisors</u>, 88 Cal. App. 3d 397, 408 (2d Dist. 1979).

In this instance, the Agency has failed completely to undertake a meaningful cumulative effects analysis because they have made no attempt to quantify the level of ground water used or needed to fulfill the purposes of the reservation on the wilderness areas in the Project vicinity.

In addition, the cumulative impacts discussion in the DEIR lacks meaningful detail regarding other reasonably foreseeable water uses on private land. The DEIR also fails to recognize or address the existence of significant paramount water rights in Chambless and the existing plans of the owner of Chambless Station to use those rights both to establish a local water company and residential complex. 46

1. The DEIR Fails to Consider Climate Change

The Native American Land Conservancy (NALC) has been involved for over a year with the Desert Landscape Conservation Cooperative (the DLCC). This multi-agency cooperative is working to identify and assess the impacts of climate change in large portions of the American West, including the proposed project area. The NALC is on the Steering Committee as well as the Science Working Group of the DLCC and has access to state-of-the-art research and projections relative to climate change. It is therefore with some concern that we find the current project fails to take into careful consideration the projected impacts of climate change that will 47

affect the operation, sustainability, and biological impacts of the proposed project. We believe project-area climate change modeling must be considered in view of the most current scientific findings relative to the project area. Climate change in the western U.S. will have its greatest effect on ecosystems via changing precipitation regimes, although increased heat waves could impact wildlife species. Current models predict more pronounced droughts with predicted decreases in winter precipitation, and greater variability of precipitation inputs in the future for this region. Because freshwater resources are of particular risk, it is important to take additional steps to protect surface and sub-surface water quality and quantity Results from large watersheds show recent changes in snowmelt and runoff to earlier in the season, thus exacerbating summer drought conditions that will also impact aquifer recharge. This can also effect plant productivity and also strongly influence the structure and function of riparian systems, adding to the threat of desertification. Community and ecosystem trajectories are highly dependent on the pattern of future rainfall regimes – warmer/drier conditions will result in more desertification and may cause structural shifts in ecosystems. 47

H. The Public Participation Process for Comment on the DEIR Is Inadequate

The Public Participation Process for comment on the DEIR was inadequate to provide for meaningful public participation. The Cadiz Water Project presents complex and highly controversial issues of great public import. To provide the public with a reasonable opportunity to address these issues, the SMWD should have provided the public with the opportunity to participate via public meetings in locations easily accessible to the affected and interested public. 48

III. CONCLUSION

As stated above, the DEIR is lacking the kind of detailed description and analysis required under CEQA. The Agency must recognize the clear weight of expert opinion in the technical literature demonstrating that the extraction of native groundwater under the proposed Cadiz Project will exceed the natural rate of recharge and have significant impacts on the groundwater system underlying the Project and its vicinity. 49

The Agency must acknowledge, discuss, and analyze these potential impacts, including cumulative impacts in its Final EIR. In addition, the Agency must comply with the requirements of the Endangered Species Act and the Porter Cologne Act before proceeding with any action.

Dated: March 14, 2012

Submitted by,

Michael J. Madrigal, President
Native American Land Conservancy
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Attachments

A. Johnson Wright, Inc., Cadiz Groundwater Project, Hydrogeologic Review of Draft Environmental Impact Report (February 1, 2012) (prepared for National Parks Conservation Association).

B. Dr. John D. Bredehoeft, Comments on the Final EIR/EIS, Cadiz Groundwater Storage Project Cadiz and Fenner Valleys San Bernardino County, California (October 2001) (Prepared for the Western Environmental Law Center).

C. Dr. John D. Bredehoeft, Revised Comments, Cadiz Groundwater Storage Project Cadiz and Fenner Valleys San Bernardino County, California (August 2001) (Prepared for the Western Environmental Law Center).

D. Kevin Bullis, MIT Tech Review, A Cheaper Way to Clean Water (December 16, 2010).

E. Dr. Low Seow Chay, White Paper: Low Cost Seawater Desalination – Forward Osmosis Membrane Desalination, available at http://www3.ntu.edu.sg/home/msclow/FO%20White%20Paper.pdf.

F. Reuters Press Release: Oasys Water Commercializing Forward Osmosis Membrane (May 10, 2010), http://www.reuters.com/article/2010/05/10/idUS132321+10-May-2010+BW20100510 (last visited March 14, 2012).

G. South Coast Water District, South Orange Coastal Ocean Desalination Project Page, http://www.scwd.org/water/potable/oceandesal.asp (last visited March 14, 2012).

H. Poseidon Resources Press Release, Santa Ana Regional Water Quality Board Unanimously Approves HB Desalination Project (Feb. 10, 2012), http://hbfreshwater.com/news/santa-ana-regional-water-quality-control-board-unanimously-approves-hb-desalination-project (last visited March 14, 2012).

I. Pacific Institute, Economic Evaluation of the Cadiz Groundwater Storage and Dry Year Supply Project, Metropolitan Water District of Southern California (July 16, 2001).

J. Dr. John A. Gillies, Review of Draft Environmental Impact Report/Environmental Impact Statement and Supplement to the Draft EIR/EIS Cadiz Groundwater Storage and Dry-Year Supply Program (Jan. 7, 2001).

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ATTACHMENT A

Comments of

The Native American Land Conservancy

on the

Draft Environmental Impact Report

for the

Cadiz Valley Water Conservation, Recovery, and Storage Project

ATTACHMENT A

JOHNSON WRIGHT, INC.
Environmental Engineering, Hydrogeology, and Regulatory Expertise

February 1, 2012

Mr. Seth Shteir
California Desert Field Representative
National Parks Conservation Association
61325 Twentynine Palms Highway, Suite B
Joshua Tree, California 92252

RE: Cadiz Groundwater Project, Hydrogeologic Review of Draft Environmental Impact Report

Dear Mr. Shteir:

Johnson Wright, Inc. (JWI) is providing the following comments concerning the Draft Environmental Impact Report (DEIR) described above. Overall, the supporting documentation concerning the structural geology and stratigraphy of the project area (Kenney Geoscience, 2011) is complete and provides the necessary foundation to base subsequent hydrogeologic analyses. Additionally, JWI did not provide comments regarding the analysis of the potential for groundwater-dependent vegetation (HydroBio, 2011). This letter provides a summary of findings, a brief description of the proposed project and JWI's scope, our detailed comments regarding the hydrogeologic documentation in the DEIR and our conclusions.

SUMMARY OF FINDINGS

The Proposed Project is unique in its planned scope and magnitude. This is due to the planned reduction in storage and associated planned development of a large cone of depression resulting from project pumping. Among the purposes of the DEIR are the need to evaluate the potential of the proposed project to impact desert springs, mining operations on dry lake beds, limited surrounding landowners, and several federally-designated wilderness areas present in the area. To conduct such a project in this case is a high risk activity given that per the analysis in the DEIR, should an impact occur to a spring or other sensitive receptor, there are no means to prevent the condition from initially worsening, and recovery from taking as long as a century or substantially more time. Therefore a project of this type demands a higher level of confidence in the results of the analysis than is provided by the hydrogeologic impact analyses. Based on JWI's review of the hydrogeologic analyses and monitoring and mitigation plan, insufficiencies with the environmental review stem from the following fixable areas:

- Either the conceptual model, or the numerical representation of the conceptual model, is flawed based on it requiring hydrogeologically unreasonable parameters to calibrate the numerical flow model;
- Issues with the development of the numerical model may include the need to expand the grid in the Cadiz dry lake area, and potential data input errors;
- The report contains insufficient detail on key scope areas for a comprehensive evaluation; and,

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- The proposed monitoring and mitigation measures include inadequate milestones and decision points needed to address analytical deficiencies and/or uncertainty, while being protective of the environment as described in the DEIR.

In order to conduct our review, JWI requested a copy of the numerical model and associated files to evaluate the numerical model, and run sensitivity or alternative scenarios as part of a quality assurance/ quality control aspect of our review. It is our understanding that access to those files was denied. Therefore, the comments provided rely entirely on the DEIR and supporting documentation.

PROPOSED PROJECT SUMMARY

The proposed project, unique and size and scope, would extract approximately 50,000 acre-feet per year (AFY) of groundwater over a 50-year period for export to various water districts/agencies in Southern California. The estimated annual recharge based on the analysis provided by consultants for Cadiz, Inc. (Cadiz, the project proponent) is approximately 32,500 AFY. Based on the documentation provided in the DEIR and supporting documentation, it is stated that no significant impacts will occur as a result of pumping as planned whether the natural recharge is the estimated 32,500 AFY, or as low as 5,000 AFY. Based on these estimates, groundwater storage declines would range from 875,000 AF to more than 2.2 million AF depending on the recharge estimate used. As analyzed by the DEIR, the water use by the proposed project has the potential to impact desert springs, mining operations on dry lake beds, limited surrounding landowners, and several federally-designated wilderness areas present in the area. The upper portions of the Fenner and Orange Blossom Wash watersheds lie within the Mojave National Preserve.

JWI APPROACH

The comments provided by JWI are with the goal of identifying insufficiencies or asking for clarification in the analysis wherever needed that materially affect the environmental analysis. Upon fixing identified insufficiencies, and reevaluating the proposed project under that new light, informed decision making regarding the proposed project can be made. JWI's review focused on the geologic and hydrologic analyses presented in both the DEIR and supporting documentation. JWI reviewed the following selected sections of the DEIR and supporting documentation:

- HydroBio report entitled, "Vegetation, Groundwater Levels and Potential Impacts from Groundwater Pumping Near Bristol and Cadiz Playas, San Bernardino County, California (HydroBio, 2011);
- Groundwater Management, Monitoring, and Mitigation Plan for The Cadiz Groundwater Conservation, Recovery and Storage Project (Cadiz, 2011);
- Assessment of Effects of the Cadiz Groundwater Conservation Recovery and Storage Project Operations on Springs (CH2M Hill, 2011);
- Cadiz Groundwater Modeling and Impact Analysis (Geoscience Support Services, Inc. (GSSI), 2011)
- GSSI Addendum to September 1, 2011 Cadiz Groundwater Modeling and Impact Analysis (GSSI, 2011c);
- Cadiz Groundwater Conservation and Storage Project (CH2M Hill, 2010);

- Geological Structural Evaluation of the Fenner Gap Region Located Between the Southern Marble Mountains and Ship Mountains, San Bernardino County, California (Kenney Geoscience, 2011);
- Geohydrologic Assessment of the Fenner Gap Area (GSSI, 2011); and,
- Supplemental Assessment of Pumping Required for the Cadiz Groundwater Conservation, Storage and Recovery Project (GSSI, 2011).

REVIEW OF TECHNICAL ANALYSES

Comments Regarding Geohydrologic Assessment of the Fenner Gap Area

The following comments refer to GSSI (2011a). This report is very complete in terms of geologic logging and well construction details. The report also appears reasonable with respect to calculation of aquifer parameters as presented with one exception as described below. However, there is a lack of sufficient key data (described below) to adequately evaluate the interpretation of the aquifer results. The following is a list of general questions and comments regarding this geohydrologic assessment report and associated aquifer testing that should be incorporated into the assessment.

1. Page 4 – Photograph

A caption concerning the photograph is needed here. The photograph shows a flowing stream on the floor of Fenner Gap. This flowing water must have been derived from either pumped groundwater or surface runoff immediately after a storm event as there is no flowing water typically on the floor of Fenner Gap and the inclusion of the photograph without context is misleading as to the typical conditions present.

2. Page 5 – Purpose and Scope

Substantial hydrologic work has been conducted at the proposed project area over the past 20 years, and it should be used as an existing data resource that the new work can enhance, as opposed to recreating it. However, this geohydrologic assessment appears to start the process anew, and provides little discussion as to how the newly developed data fits into the overall framework of previous investigations and results. Are the aquifer test results conducted since 2009 consistent with previous test results in the area? Why or why not? For the most part, wells previously installed at Cadiz were excluded from the analyses. Why? Has the conceptual model for the Fenner Gap area changed significantly or has the current investigation simply confirmed previous information?

3. Page 6 – Section 2.4 Field Reconnaissance

What was the purpose of the pumping ongoing on November 11, 2009? Was there an aquifer test ongoing (if so results should be reported)? Also, given that pumping was operating prior to the aquifer testing that was conducted later in November, 2009, had there been periodic groundwater level monitoring conducted on TW-1 and TW-2 and associated monitoring wells prior to the aquifer testing to assure that true static groundwater levels were established prior to aquifer testing? This is particularly of importance as full recovery from the step discharge test run on TW-1 had not been achieved prior to

initiating the constant discharge test at TW-1 during 2009 (Figures 10 and 13) and the use of an improper static groundwater level could affect parameter evaluation.

4. Page 12 – Photograph

The photograph shows that the fanglomerate has been lithified (evident by both the competence of the core and the natural fracture characteristics presented). Given the ragged nature of the sharp fracture visible, that particular fracture does not appear to be a natural fracture but is more probably a break that occurred during the coring, or boxing of the core. If the material in the photograph is typical, it can be expected that the hydraulic conductivity of the fanglomerate should be substantially less than unconsolidated basin fill material.

5. Page 16 – Section 4.2.5 – *"Granitic and metamorphic basement rock forms the subsurface margins of the aquifer system within the project area (Freiwald, 1984). This basement rock is generally impermeable but can have significantly increased permeability along well developed fracture zones which are associated with the numerous faults that cross Fenner Gap."*

This is an important statement as the figures depicting modeled hydraulic conductivities do not provide reference to model zonation for aquifer parameters and in what areas for instance hydraulic conductivity values represent specific hydrogeologic units. For example where are fractured granitic rocks of higher permeability modeled as opposed to other granitic rocks? This would allow for the appropriateness of model zonation to be more readily evaluated given the absence of available model files.

6. Page 21 - Section 4.4 Analysis of Pumping Test Data

There is insufficient detail presented to evaluate the aquifer test data and results. There are no details regarding the actual operation of the aquifer tests. For example, at what distance away from the discharging well or monitored wells did discharge take place and where did the discharge go? Could percolation of discharged water have influenced groundwater-level data for example at MW-6 where according to Figure 8, there appears to have been no seal emplaced other than the surface concrete pad?

Results of pumping rate monitoring during testing are not presented. How was flow rate monitored, at what frequency, and within what parameters were pumping rates to be maintained during testing? Were those parameters achieved?

For new wells, discharge permits are commonly required…were any required or obtained for this project?

These are standard data that should be reported for aquifer testing reports as documented by ASTM, and in other references (for example Kruseman and de Ridder, 2000). The pumping rate data (which can be presented in graphical form) would provide key information for example to evaluate changes in drawdown characteristics as presented in the aquifer test figures.

7. Figures and Associated Text

Late time recovery data analyzed for TW-2 appear to be matching the fully recovered data therefore resulting in a very high transmissivity estimate. Although the well appears to be fully recovered, without

the aquifer test data (even the hand measured water level measurements typically collected for backup purposes) it is difficult to discern if the well had fully recovered. Also, there appears to be a typographical error concerning the date of the TW-2 recovery test in the table summarizing aquifer test results.

It is noted on Figure 18 that groundwater elevations were corrected for barometric pressure changes. What was the magnitude of those corrections?

Comments Regarding Recharge Estimation / INFIL3.0 Analysis

A modeling analysis has been completed by CH2M Hill (2010) using the U.S. Geological Survey programs INFIL3.0 and MODFLOW to re-evaluate the estimated groundwater recharge that was previously estimated by Geoscience Support Services (1999). Based on these efforts, the average annual "recoverable" water quantities for the Fenner Watershed area are estimated at 30,191 acre-feet per year (AFY) and 2,256 AFY for Orange Blossom Wash (32,447 AFY combined).

Estimating groundwater recharge in arid or semiarid regions can be a difficult and complex task. Groundwater recharge in arid and semi-arid areas is dependent on a complex set of spatial and temporal hydrologic parameters and processes dependent on local climate, land surface properties and subsurface characteristics. Indeed, surface hydrology generating recharge in arid and semi-arid areas is complex and extremely difficult to quantify using conventional methods of analysis (Wheatear, 2010). Because of these difficulties, estimating recharge in desert environments can be more easily arrived at (for basins in hydrologic balance) by estimating discharge. Discharge components are generally much more precisely quantifiable.

As part of our review and analysis, JWI used a discharge evaluation in the comments that follow based on more recent evapotranspiration data than were used in the CH2M Hill analysis. Continuous micrometeorological data collected over a four year period in Death Valley were used to estimate evapotranspiration rates over the area evaluated (DeMeo, et.al. 2003). The JWI analysis resulted in more consistent and generally improved estimates of groundwater discharge than in previous studies (San Juan, et.al. 2004). The resulting midpoint evapotranspiration rate estimates were 0.13 feet per year (ft/yr) for salt-encrusted playa and 0.15 ft/yr for bare-soil playa. Assuming the 0.15 ft/yr evapotranspiration rate, it can be assumed that there is 8,947 AFY of evapotranspiration losses from the Bristol and Cadiz playas (based on the area in which evapotranspiration takes place in the model). Taking the JWI analysis one step further and adding the estimated annual pumpage from the basin of approximately 5,000 AFY (and assuming that the basin is in hydrologic balance or inflow equals outflow), an estimated recharge of approximately 14,000 AFY (plus the volume of spring discharge) can be inferred. Of note is that total spring charge has not been estimated in the DEIR. The JWI estimated recharge of approximately 14,000 AFY plus spring discharge is very similar to the best estimate of Davisson (2000, 2012). The Davisson estimate will be discussed in more detail later in this document.

The following are more detailed comments on the recharge estimation report (CH2M Hill, 2010):

1. Page ES-3, Paragraph 2. *"Total recoverable water, therefore, is equal to the amount of recharge to the groundwater system in the Fenner Watershed, which is approximately equal to the amount of groundwater flow through Fenner Gap through the alluvial and carbonate rock units."*

With respect to that statement, total recoverable water would actually be the amount of recharge to the groundwater system minus any evapotranspiration losses from springs and spring vegetation.

2. Page ES-5, Validation of Recoverable Water Estimate, Paragraph 1. *"A three-dimensional groundwater flow model of the Fenner Gap area was developed for the purposes of validating the 30,000 AFY estimate of steady-state groundwater flow through the Fenner Gap…"*

The three-dimensional model described was constructed using the U.S. Geological Survey program MODFLOW. The description of model construction needs additional detail. Given that calibrated hydraulic conductivity values described appear to vary considerably from those calibrated hydraulic conductivity values described in the Impact Analysis (Geoscience Support Services, 2011) it is unclear on what assumptions the CH2M Hill numerical model was based. For example, evapotranspiration losses from the playas play a key role in the hydrologic budget, how was playa evapotranspiration modeled?

3. Page 2-2, Section 2.1.3., Vegetation.

This section does not appear to include riparian habitat at springs for example at Bonanza Spring.

4. Figures 2-10 through 2-12. Figures presenting soil characteristics.

As is indicated by the figures, and for the purposes of the recharge evaluation, large areas (in the hundreds of square miles) are assumed to have similar characteristics. Given the local landscape, it is clear that substantial generalization is incorporated into these figures and the resulting analyses. More detailed mapping of surface conditions would not likely be feasible under typical project constraints. Therefore, in order to account for these generalizations or unknowns, the INFIL3.0 modeling should be subject to a sensitivity analysis of input parameters (i.e., evaluate the effect of altering input parameters on model results) to evaluate sensitive parameters that may have a high degree of uncertainty leading to overall model uncertainty.

5. Page 3-2. Comparison of Storage estimates.

In keeping with this presentation regarding storage volumes, the following recharge volumes are provided to put in perspective the amount of groundwater estimated to recharge the Fenner and Orange Blossom Watersheds:

- This is greater than the natural recharge to the Coastal Plain of Orange County basin (29K AFY) (California Department of Water Resources, 2004).
- This is greater than the combined recharge from stream flow in the Bishop Creek to Big Pine Creek region (and inclusive of intermediate streams) of the eastern Sierra Nevada (Danskin, 1991).

6. Page 4-8, Section 4.1.8.1 Comparison to Most Recent Recoverable Water Estimates. *"INFIL3.0 simulation results compare favorably to GSSI (1999) watershed water balance modeling results and the Davisson and Rose (2000) Maxey-Eakin recoverable water estimate of 29,815 AFY…"*

This section misrepresents the results of the work by Davisson and Rose. Davisson and Rose presented a range of groundwater recharge estimates (referred to as recoverable water in the CH2M Hill report) ranging between 7,864 AFY to 29,185 AFY. Personal communications (Davisson, 2012) indicate that a best estimate of groundwater recharge based on their work would be an estimate closer to their regional precipitation-elevation curve of 16,214 AFY. The 29,185 AFY estimate was a maximum estimate. Therefore, the estimated recharge developed by CH2M Hill (2010) and Geoscience Support Services (1999) generally represent a two-fold increase in estimated recharge in comparison to other estimates.

7. Page 4-10, Last Full Paragraph.

Evapotranspiration work by the U.S. Geological Survey is referenced for evaluating evapotranspiration rates and associated discharge from Bristol and Cadiz dry lakes. However, more recent, follow-up work by the U.S. Geological Survey is not referenced. See the discussion provided above for Page 4-13, Section 4.2.2 Numerical Model Development

This section references a numerical model developed by CH2M Hill that varies substantively from that presented by the GSSI model previously discussed. A discussion is needed concerning the differences between the two models, why this model (which was apparently completed prior to the GSSI model) is reliable given the substantial differences in hydrologic parameters used, results of sensitivity analyses and calibration, etc. Standard documentation of numerical groundwater flow modeling efforts as described in Anderson and Woessner (1992) or by ASTM and other references are lacking regarding this effort and therefore do not provide substantive support for the estimated groundwater recharge. Therefore additional information is needed to support the statements provided.

8. Page 4-17, Section 4.2.4 Discussion of Groundwater Flow Model Results

Please describe why carbonate rock units from the Death Valley region which are correlative with those carbonate units in the project area, and which have been extensively studied were not evaluated in lieu of more distant carbonate rocks (Edwards Aquifer in Texas) which may or may not have similar characteristics?

Comments Regarding Groundwater Modeling and Impact Analysis

Numerical groundwater flow and solute transport modeling was conducted for the impact analysis of the proposed project (GSSI, 2011b). Numerical models are ideal tools to evaluate transient, three-dimensional groundwater issues in that the complexities of the groundwater system can be evaluated in detail, and assumptions of how the groundwater system works can be tested for internal consistency. As will be discussed in the detailed modeling comments that follow in this document, there appears to be a problem associated with the conceptual model as highlighted by the numerical modeling effort.

Overall, the model software used, construction (with caveat described below in Point #6) including discretization, and packages used, were appropriate given the conditions present. However, the problem arises with either the estimated recharge, or the aquifer parameters (either in values or spatial representation) that results in the need for unrealistically high evapotranspiration rates to be required to calibrate the model. As stated in the impact analysis, these evapotranspiration rates were needed to allow the amount of water to discharge from the Bristol and Cadiz Playas to accommodate the estimated

recharge rate. This issue was also apparent in previous modeling (GSSI, 1998) where in lieu of high evapotranspiration rates, an unrealistic extinction depth (100 feet below ground surface which has been changed to 15 feet in the current analysis) was used to accommodate the amount of discharge needed to calibrate the model given the estimated recharge.

The following provide additional comments regarding the groundwater modeling and impact analysis.

Page 8, First Full Paragraph – *The purpose of the sensitivity scenarios was to evaluate the potential ranges of worst case impacts by (1) reducing the amount of available natural recharge, and (2) increasing the distances between the wells within the proposed project wellfield."*

This "sensitivity" analysis does not represent the form of a sensitivity analysis that is standard practice for modeling exercises such as this and as described in ASTM, Anderson and Woessner (1992) and other references. Performing a sensitivity analysis is a standard part of evaluating the calibration of a modeling effort. The purpose of the sensitivity analysis is to evaluate the uncertainty in the calibrated model caused by uncertainty in aquifer parameters, stresses and boundary conditions. In a sensitivity analysis, these model parameters and conditions are changed systematically to evaluate how changes in each result in changes in head. The more a change in the parameter or condition causes a greater change in head, the more sensitive the parameter is. Sensitive parameters for which there are little ground-truthed information (for instance a sensitive hydraulic conductivity zone for which there are no aquifer test data) will indicate greater uncertainty in the predictive capability of the model. This is key area where this analysis is lacking and should be completed to comply with standard practice.

Second, as conducted, the sensitivity analysis is problematic in that changes in model results resulting from natural recharge are not comparable as the head distribution is affected by changes in model construction (well locations), aquifer parameters and evapotranspiration rates for the lower recharge scenarios therefore mixing results and assumptions. If two wellfield configurations were to be evaluated, each configuration should have been tested against each of the separate recharge scenarios. As these analyses currently stand, the "sensitivity" analyses actually represent separate simulations based on differing assumptions.

1. Page 9 – Groundwater Elevations

Unfortunately the presentation of the development of the cones of depression are very limited (presenting only end of pumping, and 50 years after pumping ceases) groundwater elevations. Well hydrographs should be included that show how groundwater elevations change over time given the management scenario. This is evident in the drawdown maps but not in the groundwater elevation maps due to the 100-foot contour interval. Given that drawdown continues to expand areally after 100 years, the hydrograph timeframes should expand out to the timeframe at which that condition ceases to exist. This is particularly of importance in evaluating the effectiveness of the groundwater monitoring and mitigation plan and its meaning in relation to proposed project groundwater pumping and the ability for the project to achieve project objectives or meaningful time-dependent groundwater elevation and or spring flow protective procedures.

2. Page 9 – Groundwater Level Drawdown

A significant issue with the project appears to be the delayed response in the aquifer by the proposed project pumping. As shown on the associated figures of project pumping (Figures 64 and 65 for example – see northeast extent of drawdown), the extent of the cone of depression is more extensive in the 100-year scenario (after 50 years of recovery) versus the 50-year scenario (at the end of project pumping). This is the case with all scenarios. This indicates that should unforeseen impacts occur as a result of project pumping, and even if project pumping is halted immediately, the impacts will continue to manifest for an extended period of time (greater than the length of time pumping was conducted) before recovery begins to take place. Therefore, the aquifer system will be very difficult to manage under the monitoring and mitigation plan. Please discuss this issue and why the system is so slow to recover.

3. Page 12 – Groundwater in Storage

There appears to be some discrepancy in pumping or storage terms as presented. The change in storage of an aquifer is equal to the groundwater inflow (recharge) minus the outflow (pumping, evapotranspiration). In the case of this project's two "sensitivity" scenarios the outflow (assuming entirely pumping) would be 50,000 AFY for 50 years. Based on the two scenarios (16,000 AFY of recharge; and 5,000 AFY of recharge) the storage loss after 50 years then would be a minimum of 1.8 million AFY, and 2.25 million AFY, respectively for the two scenarios. These are somewhat higher than the model predicted storage losses. The storage losses presented above would be minimums as there would be a period during the initial years of the project where there would also be losses due to evapotranspiration from the playas (and springs which will be a lesser quantity) that would increase these storage losses. Please discuss the change in storage described above in comparison to model-predicted storage loss estimates of 1.68 million AFY, and 2.16 million AFY, respectively. Without clarification, the discrepancy is indicative of a significant data input error in the model with respect to either insufficient pumping rate or an excessive amount of recharge. This is an issue JWI could have evaluated prior to commenting had model files been available.

4. Please discuss any other groundwater "conservation" or "exportation" projects in which a project has been approved that had planned storage losses of this magnitude for comparison.

5. Page 27 – Computer Code

Please describe if a commercially available modeling platform (Groundwater Vistas, GMS, Visual MODFLOW) was used to construct the model.

6. Page 32 – Hydraulic Conductivity

Hydraulic conductivity value ranges used appear to be reasonable based on aquifer testing although based on the photograph of fanglomerate core; it is hard to conceive that the fanglomerate presented in the photograph of fanglomerate core presented in the geohydrologic assessment would yield hydraulic conductivities of up to 60 ft/day. Additionally, as described earlier, the areal distribution of specific hydraulic conductivities associated with specific aquifer units is not readily apparent in the figures where zonation is instead represented by hydraulic conductivity only.

The hydraulic conductivity discussion raises additional questions about the sensitivity runs in that again, changes in the effect of natural recharge on the model results have been minimized by recalibrating the

aquifer parameters thereby minimizing the effect of the change in recharge. Essentially, instead of evaluating the model sensitivity to recharge based on the calibrated numerical representation of the groundwater system, three distinct numerical groundwater flow models with differing conceptual models in relation to well field design, aquifer parameterization and evapotranspiration have been developed.

7. Page 36 – Evapotranspiration

A summary of the comments associated with this section are provided above. Evapotranspiration rate was a calibrated parameter and again, evapotranspiration rate was allowed to vary substantially between recharge scenarios even though evapotranspiration would be unlikely to change given that the playa soils would remain unchanged, climate factors would be unchanged, and assuming the groundwater levels would be above the extinction depth allowing evapotranspiration to take place.

Of note is that evapotranspiration rates of greater than 50 ft/year for Cadiz Dry Lake and 20 ft/year for Bristol Dry Lake are substantially above the pan evaporation rate (nearly five times the pan evapotranspiration rate for Cadiz Dry Lake). These are geologically unreasonable evapotranspiration rates for use in the model as described earlier. According to the text, "*maximum evapotranspiration rates used were based on model calibration results in order to obtain a more reasonable evapotranspiration from the dry lakes and a better match between the model-calculated and observed water levels.*" That the evapotranspiration rates had to be increased to the extent described above indicates that there is a problem elsewhere in the model.

The text also states that "*Results show an average of 19 inches/year over those cells where evapotranspiration is occurring in this run which is a reasonable average.*" This is approximately ten times the U.S. Geological Survey's evapotranspiration rate from playa soils in Death Valley described earlier and remains high.

The text states that, "*For Cadiz Dry Lake, the maximum evapotranspiration rate was adjusted by a factor of approximately 2.5 from the maximum evapotranspiration rate of the Bristol Dry Lake due to the fact that most of the Cadiz Dry Lake area is outside of model boundary.*" This statement suggests that the model grid was either not widespread enough (thereby improperly constructed) or that there was a flaw in the logic behind evapotranspiration calibration. Concentrating evapotranspiration discharge in one location as a means to calibrate groundwater elevations when a substantial portion of the discharge from evapotranspiration is not taking place at that location in which groundwater levels are being calibrated is not appropriate. This would be analogous to a hypothetical significant discharging production well at a distant location being moved to this location in the model to assist with model calibration. This issue suggests the need to expand the grid to encompass Cadiz Dry Lake.

The high evapotranspiration rates appear to be symptomatic of the amount of water that is needed to be discharged from the playa based on the existing recharge estimate. This symptom was present in the previous modeling (GSSI, 1999) where in lieu of the evapotranspiration rates being increased to the extent they are in the current analysis, the issue was resolved with an extinction depth of 100 feet below ground surface which as described in the current analyses is geologically unreasonable (current extinction depth used is 15 feet below ground surface).

8. Page 39 – Section 6.2 Steady State Model Calibration – Text states, "*Twelve water level targets located in the Fenner Gap area were carried over from the Fenner Gap model (see Appendix A); however, a water level of five feet was added to each water level measurement based on transient water level data suggesting an approximately 5 ft. decline in heads in the Fenner Gap from predevelopment conditions."*

Given the limited pumping that has occurred in the Fenner Gap area in the past, please discuss the implications that five feet of groundwater level decline has occurred, and continues to occur over a significant area. It is stated in GSSI (2011c) that, "Therefore, the stresses caused by Cadiz agricultural pumping have not created sufficient recharge (from vertical leakage or induced recharge) to sufficiently stabilize water levels." The aquifer nonetheless, has not been able to stabilize with only approximately 5,000 AFY of pumping. The aquifer has been unable to reach an equilibrium condition with this amount of limited pumping. This is not an encouraging trend when the proposed pumping is an order of magnitude greater. This expanded pumping is not likely to "increase recharge" thereby ameliorating the problem. This is illustrated by the calibration graphs (Figures 32 through 34) which show groundwater level declines over time in the Fenner Gap area as opposed to groundwater-level declines that would temporarily occur as a response to pumping and would stabilize as a new equilibrium is reached. Also, the vertical scale of the hydrographs is expanded substantially making discerning groundwater level trends difficult. The vertical scale should be decreased to be more useful in evaluating changes and fluctuations in groundwater levels.

Comments regarding model calibration described earlier apply to Section 6.2 and Section 6.3 (transient calibration).

9. Page 43 – Section 6.4 Sensitivity Analysis.

The sensitivity analysis (to evaluate model uncertainty) performed is not in accordance with standard practice. The only parameters in which a typical sensitivity analysis was conducted were for specific yield/storativity and vertical leakance which in our experience modeling alluvial groundwater basins of the desert southwest are commonly the least sensitive parameters in the flow model. Aquifer parameters such as hydraulic conductivity (on a zonal basis), evapotranspiration rate, recharge and other solute transport characteristics should be tested for sensitivity in accordance with the method used for specific yield/storativity and vertical leakance.

10. Page 44 – Section 7.1 Description of Model Scenarios

The "sensitivity" scenarios involved changing model parameters which are not sensitivity scenarios, but are separate, recalibrated models or simulations. The changes in model parameters will serve to minimize any effect of changing the recharge or well field distribution of wells.

11. Page 49 – Impact Analysis

The impact analysis suffers in reliability as a result of the modeling issues previously described. Of note is the issue of the continuously expanding outer limits of the cone of depression after 100 years. Additionally, the cone of depression is anticipated to extend to elevations approaching the head at Bonanza Spring, thereby potentially affecting this important spring. This indicates that decades after the

project ceases pumping, additional impacts may still be identified as a result of earlier pumping. This also indicates that if an impact is identified at a spring or for a surrounding groundwater user, changes to groundwater management (if pumping is still occurring) may be too late to adequately be protective of surrounding receptors. Additionally increased hydraulic gradients upgradient from the project as a result of expansion of the cone of depression, will result in greater subsurface underflow to the south out of the upper Fenner Watershed (beneath Mojave National Preserve) the effects of which are not understood and/or adequately described.

With respect to climate change, it can be expected that as less precipitation occurs as snowfall which is anticipated to be observed during the length of the proposed project pumping period, less of that water will likely recharge the aquifer. This issue does not appear to be addressed in the impact analysis. This rises in importance in that despite the reporting of the impact analysis being based on a maximum simulation period of 100 years, simulations extending 500 years and greater have been conducted as part of an assessment of springs (CH2M Hill, 2011).

12. Page 54 – Table regarding Groundwater in Storage

The text describing the table states, "*The following table summarizes the cumulative annual changes in groundwater storage at the end of 50 years (end of project pumping) and 100 years (end of model simulation) for each model scenario…."*). Of note is that the table then presents time for groundwater storage to recover after project pumping is stopped ranging from years 117 to 440. It is clear then that end of model simulation was not 100 years. Please describe why model impacts were not evaluated beyond 100 years, particularly in light of the continuously expanding cone of depression after 100 years as shown in the "sensitivity" scenarios presented.

13. Page 56-58 – Findings – Groundwater Elevations, Drawdown, and Depth to Groundwater

In addition to the conditions described, groundwater elevations in the outer edges of the cone of depression continue to decrease after 50 years of nonpumping (the 100-year scenario) due to continued expansion of the areal extent of the cone of depression. This continued expansion of the cone of depression will be uncontrollable by groundwater management activities in the basin.

As described earlier, the predicted changes in groundwater surface (and associated drawdown) suffer in their reliability due to the modeling issues described earlier.

14. Page 58 – Findings – Groundwater in Storage

Please describe the differences in predicted changed in storage produced by the Groundwater Equation (inflow minus outflow equals change in storage) and those predicted in the model as described in the earlier comments.

15. Page 61 – Model Limitations and Uncertainty

The uncertainty of the model has not been tested in an adequate manner. The use of programs such as MODFLOW2000 and PEST greatly simplifies the sensitivity analysis process and it is unclear why this aspect of calibration evaluation was neglected or not presented. Although the aquifer parameters

including specific yield/storativity and vertical leakance have been tested, the more likely sensitive parameters such as hydraulic conductivity from individual parameter zones, and evapotranspiration rate which were used as calibrated parameters have not. Additionally, given the issues associated with the need to use unrealistically high evapotranspiration rates to calibrate the model, and serve as a mechanism to discharge sufficient water to allow the volumes of recharge to enter the modeled domain and maintain calibration, there is a problem with the conceptual model, or the representation of the conceptual model. Therefore, there is substantial uncertainty associated with any of the predictive results provided in this impact analysis.

Comments Regarding Assessment of Effects of the Cadiz Groundwater Conservation Recovery and Storage Project on Operations at Springs (CH2M Hill, 2011)

A spring assessment and associated modeling analysis has been completed by CH2M Hill (2011) using the U.S. Geological Survey programs MODFLOW to evaluate the effect of project pumping on springs. Discharge at springs generally occurs as a combination of both free discharge of flowing water and evapotranspiration from groundwater dependent vegetation and evaporation from soil in the subsurface. Therefore the discharge of a spring can be substantially greater than the free flowing water observable at the surface. A number of figures are missing from the report (Figures 1 through 15 for example. Please clarify whether Plates 1 through 15 are the missing figures. Geochemical results of spring sampling appear to be missing as well.

The analysis provided utilizes groundwater flow model results but it is unclear (given that this is a CH2M Hill report) whether the numerical model used by CH2M Hill for evaluating underflow beneath Fenner Gap, or the GSSI model used to conduct the impact analysis was used in the evaluation. The description of the extent of drawdown does not appear to match with those in the impact analysis (GSSI, 2011).

Finally, an assessment of the springs should have included a geochemical analysis of springs to evaluate sourcing. Instead, the effort appears to spend more time and resources identifying the dryness of the desert environment. Figures of a dry wash with a bullet point identifying that no water is present, or photographs of dry voids in carbonate rocks high in the Marble Mountains where no springs are known does not contribute to the overall understanding of those springs present and potential effects of the project on those springs. Of note is the absence of a photograph of Bonanza Spring, the closest spring to the proposed extraction well field. The results of the canvassing and accounting of existing springs in the basin, including a discussion of the results of the geochemical sampling noted as having taken place and a spring discharge estimate would have provided more beneficial information with respect to the groundwater budget and overall groundwater flow system.

REVIEW OF BASIN PLAN FOR THE CADIZ GROUNDWATER CONSERVATION, RECOVERY & STORAGE PROJECT

1. As a general comment, in all cases attributability of impacts, significance and changes in groundwater management associated with the project will be under the sole auspices of the Fenner Valley Mutual Water Company consisting of the purchasers of the groundwater from the project. Local stakeholders including Mojave National Preserve, U.S. Bureau of Land Management, local landowners, etc., appear to be excluded from the management process and

therefore, the lack of that stakeholder involvement will result in a lack of oversight over the project operations and mitigation if necessary.
2. The project as planned proposes to substantially reduce the volume of groundwater in storage and reduce groundwater levels over much of the groundwater basin. Given the large scope of the project, and the sheer size of the planned cone of depression, it may take many years before groundwater level and/or spring impacts are identified. As shown in the impact analysis by the cone of depression that continues to expand even after 50 years of shutdown (at year 100) by the time an impact occurs, it will likely be too late to make substantive changes in groundwater management to mitigate the problem. This will be particularly true for those impacts that begin to arise after the project has already ceased pumping. Proactive groundwater management is lacking that would prevent unintended impacts from occurring to surrounding land owners and sensitive receptors.
3. Given the serious issues raised in this letter concerning the hydrologic assessment of the project, and the uncertainty of the impact analysis, the absence of a more rigorous spring monitoring program with specified thresholds and triggers for reduced or ceasing pumping is not appropriate. Visual observations of changes in spring flow will only begin to be obvious when a significant impact to the spring is already occurring. Given the lag in time between shutting off pumping and the growth of the outer edges of the cone of depression, an observed impact will likely be already too late to be protective of the spring and associated habitat. The spring monitoring / mitigation plan needs to be re-evaluated and more in depth investigation into the springs present is needed. Current efforts have been inadequate.
4. The technical review panel should include technical representatives representing the local stakeholders (i.e., landowners, U.S. Bureau of Land Management, etc.). As presented the technical review panel will consist of one member of Fenner Valley Mutual Water Company, San Bernardino County (under MOU with Fenner Valley Mutual Water Company), and a joint pick between the County and the FVMWC.

CONCLUSIONS

As described earlier, the proposed project is unique in its planned scope and the magnitude of the planned reduction in storage and associated planned development of such a large cone of depression due to project pumping. To conduct such a project in this case is a high risk enterprise given that per the analysis in the DEIR, should a significant impact occur to a spring, or other sensitive receptor, there are no means to address the impact and recovery may take a century or substantially more time. As shown in the supporting documentation to the DEIR, impacts will continue to propagate after pumping ceases. Therefore a project of this type demands a higher level of confidence than is provided by the hydrogeologic impact analyses. Based on JWI's review of the hydrogeologic analyses and monitoring and mitigation plan, insufficiencies with the environmental review of the proposed project stem from the following areas:

- The conceptual model appears flawed based on it requiring hydrogeologically unreasonable parameters to calibrate the numerical flow model;
- The report contains insufficient detail on key scope areas for a comprehensive evaluation; and,

- Inadequate stipulation of milestones and decision points associated with monitoring and mitigation measures needed to address analytical deficiencies and/or uncertainty and be protective of the environment as described in the DEIR.

Based on the bullets listed above and as described in our detailed comments, the DEIR in its current form does not provide an adequate review of the hydrogeologic conditions and potential impacts of the proposed project. Further, by not providing explicit milestones and decision points as a basis for project groundwater management and mitigation, there are insufficient proactive, protective means to overcome the uncertainty associated with technical analyses as presented. Should you have any questions or comments, please contact us at 925-403-4200. We appreciate the opportunity to assist with you with this matter.

Sincerely,

Johnson Wright, Inc.

Andrew Zdon, P.G., C.E.G., C.Hg.
Principal Hydrogeologist

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ATTACHMENT B

Comments of

The Native American Land Conservancy

on the

Draft Environmental Impact Report

for the

Cadiz Valley Water Conservation, Recovery, and Storage Project

ATTACHMENT B

Comments on the Final EIR/EIS

Cadiz Groundwater Storage Project
Cadiz and Fenner Valleys
San Bernardino County, California

Prepared for: Western Environmental Law Center
Taos, New Mexico

John Bredehoeft, Ph.D.
October 2001

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INTRODUCTION

I have made three written comments to the Draft EIR/EIS for the Cadiz Groundwater Storage Projects. The last of the comments was issued in August 2001, and was entitled: ***"Revised Comments: Cadiz Groundwater Storage Project—Cadiz and Fenner Valleys—San Bernadino County, California"***. In each of these comments we tried to point out the difficulties with the pumping of indigenous groundwater envisioned by the project.

In the earlier comments I made several points; I quote from our first report (December, 2000—this report is included in the Final EIR/EIS, v. III, G42):

1. ***the estimate of annual recharge used in the Draft EIR/EIS is an order of magnitude too high—it is probably only 5,000-6,000 ac-ft/yr;***
2. ***using a more realistic recharge rate there will be adverse impacts to the groundwater system and the environment; and***
3. ***that once development has proceeded for a period of several decades simply stopping the project, as implied in the Supplemental EIR/EIS, will not halt the adverse environmental impacts—in other words, the groundwater system once perturbed has sufficient persistence that adverse impacts will persist well beyond 100 years, even though the project is stopped after 50 year or earlier.***

These comments remain relevant; none has been adequately responded to in the Final EIR/EIS.

THE RECHARGE RATE

In the Final EIR/EIS a Management Plan that includes an extensive monitoring network was proposed; the Plan is intended to act as the "safety net" that will prevent harm to federal resources. Neither of these strategies addresses the basic issue of concern: ***the recharge rate of the aquifer***—the annual rate at which the groundwater supply is replenished from precipitation. The recharge rate is generally viewed as equivalent to the upper bound of sustainable groundwater development. The estimate of recharge is critical in any analysis of how a groundwater system will perform. If the estimated recharge is wrong, predictions of the aquifer's response, including injury to federally protected resources such as air quality, water supply and quality, springs and wildlife, will also be in error.

The design and implementation of the monitoring system appears to be an end run around this more fundamental issue. In commenting on our concerns the authors of the Final EIR/EIS stated:

> *"BLM and Metropolitan acknowledge that there are different opinions among experts regarding the amount of recharge. Due to these conflicting opinions, The Management Plan was developed as the basis for operating the project without adverse impacts to critical resources."*

This leaves open the issue of how much indigenous groundwater is to be extracted.

HOW MUCH INDIGENOUS GROUNDWATER WILL BE PUMPED

In the recently released Final EIR/EIS one of the stated objectives of the project is to

> *"Provide the maximum amount of indigenous groundwater consistent with the Management Plan*

However, nowhere in the document are projected or target levels of local groundwater extraction indicated. The Management Plan replaces the various scenarios of development envisioned in the Draft EIR/EIS, leaving totally open the question of how much of indigenous groundwater is to be pumped. This is problematic, to say the least, because it is impossible to assess the impact of the extraction of indigenous groundwater without some estimate of the amount and timing of the groundwater to be extracted.

PROBLEMS WITH THE PROPOSED MONITORING AND CONTROL

As mentioned above, the monitoring system is unlikely to be a reliable safeguard. It will be very difficult to accurately detect "early warning signals" of adverse impacts as they are likely to be masked by feedback from project operations and/or natural groundwater fluctuations. Clear, indisputable signs of an overdraft of native groundwater will not occur until the project has operated for some time, at which point it will be too late to prevent adverse impacts. Perturbing a groundwater system is like putting a freight train in motion; once it has started moving it will be difficult, if not impossible, to stop the system from responding to the overdraft.

We are all the more concerned about the efficacy of the monitoring system. The final EIR/EIS defines what qualifies as an early warning sign. For the groundwater system the early warning signs are: 1) a one foot change in water level in one of the designated S-Series observation wells; and/or 2) a change in water quality of 25%. Should either of these conditions be met an analysis is made of whether the change constitutes a precursor to an adverse impact. In the analysis models will be used to project impacts into the future. Models have an inherent degree of uncertainty. In this instance certain key data such as the rate of recharge are highly uncertain. It is at this step that projecting future adverse impacts will be a matter of judgment on the part of the analysts. The analysts also will be subject to pressure because of the large up front investment in the project.

Adverse impacts are to be ameliorated by modifying the project operations including stopping the project, and/or recharging the groundwater system with Colorado River water (if it is available). Stopping the project may be a realistic last resort. Recharging the groundwater system with Colorado River water at a future time of scarce water supplies for human demands is implausible.

The Draft EIR/EIS suggested that perhaps as much as 2,000,000 acre-feet of indigenous groundwater would be extracted over the 50-year life of the project. In order to make our comments specific I did an analysis based upon a total withdrawal of 1,700,000 acre-feet of native groundwater during the life of the project. That analysis is presented in our earlier reports. In that analysis we showed that even though the project was stopped after

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50 years significant changes in both water levels and water quality would continue to occur after the project was stopped. In other words, stopping the project does not stop adverse impacts; impacts occur as the perturbation caused by pumping migrates through the groundwater system.

In responding to the concerns we presented in two earlier reports the authors of the Final EIR/EIS stated *"the results of the simulation do not reflect the project as it will be implemented"*—a response that was repeated more than 10 times. Again we make the point—it is impossible to assess the impact of extracting local groundwater without some estimate of the timing and quantity of extraction. In an effort to estimate impacts we assumed a given development that was within the level of development indicated by the Draft EIR/EIS. By dismissing our analysis the authors of the Final EIR/EIS failed to acknowledge, let alone address, the important point that the perturbations of the groundwater system will migrate slowly, but inexorably through the system.

A SCENARIO OF DEVELOPMENT

The stated objectives of the project are (from the Final EIR/EIS):

1. *"provide delivery capability of up to 150,000 acre-feet of Colorado River water annually;*
2. *provide a storage capacity of up to 1.0 million acre-feet at any one time;*
3. *provide the maximum amount of indigenous groundwater for transfer consistent with The Management Plan; and*
4. *provide a recovery capability of stored or indigenous water at a rate of up to 150,000 acre-feet per year for delivery to the Metropolitan service area during dry years; and*
5. *enhance water quality in the delivery system."*

At the risk of being discounted once again, I am going to assume a scenario of storage and withdrawal that is consistent with both the Draft and Final EIR/EIS. I am assuming this scenario in order to illustrate how difficult, if not impossible, it will be to design and implement a monitoring and control scheme that will prevent adverse impacts. Lest there be some misunderstanding, let me stress the fact that even though the actual pattern of storage and withdrawal which plays out under the project may differ from the scenario I assume for illustrative purposes, it does not invalidate the point being made.

Groundwater Models

In our earlier comments I used groundwater models of both groundwater flow and salt transport to make our comments more concrete. I patterned the parameters for the groundwater flow model after the model used in the comment by Durbin (2000) on behalf of San Bernardino County. I will use the same flow and transport computer models used in my earlier analyses to make this analysis. The transport model is approximate in that it does not include the effects of varying groundwater density within the model.

To make the analysis specific I assume five equal periods of storage (5 years each); each storage period is followed by an equal period of pumping (5 years each). During the storage period I assume 100,000 acre-feet is stored annually. During the pumping period I assume 150,000 acre-feet of groundwater is pumped annually. The scenario of storage and pumping is illustrated in Figure 1.

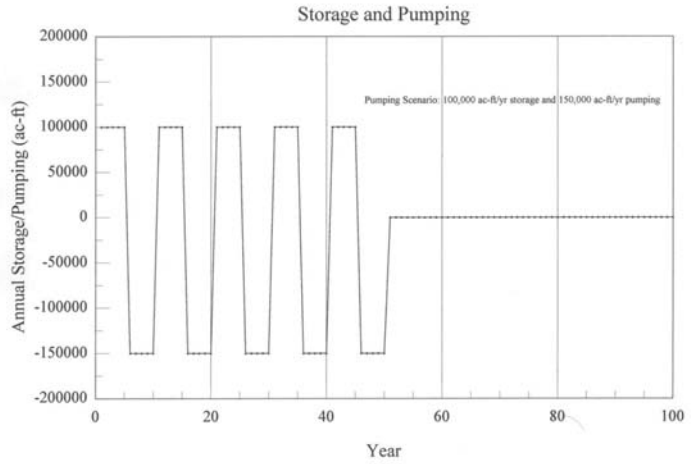

Figure 1. Scenario of annual pumping and storage.

During the 50-year life of the project, as envisioned in the Figure 1 scenario, the operations result in:

Stored Water	2,500,000 acre-feet
Pumped Water	2,500,000 acre-feet of stored Colorado River Water
	1,250,000 acre-feet of indigenous groundwater

These quantities are within both the stated objectives of the Final EIR/EIS for the project and the amount of local groundwater that the Draft EIR/EIS indicated would be pumped. (The Draft EIR/EIS suggested 2,000,000 acre-feet, or more, of local groundwater might be pumped.)

Change in Water Quality

One of the criteria that trigger an analysis of adverse impact is a change in water quality in one of the S-Series observation wells of more than 25%. I want to examine the simulated water quality in observation well SCE 5. Well SCE 5 is an existing well

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situated between the proposed project storage ponds and Bristol Lake Playa (see Figure 2).

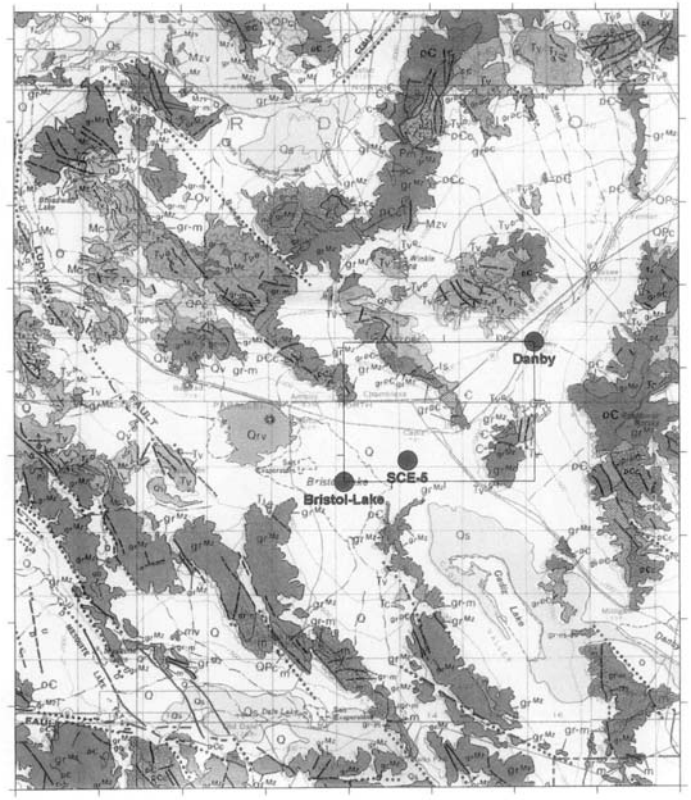

Figure 2. Location map of observations wells.

Figure 3 is a plot of the simulated water quality in the SCE 5 observation well. Under our assumed scenario of development the total dissolved solids (TDS) of the water increases by more than 25%, the criterion for triggering action, in year 45. In our simulation we stop pumping indigenous groundwater after year 45, and we simulate

totally stopping the project after year 50. Nevertheless, the quality of water continues to deteriorate for the next 50 years after stopping the project—out to year 100, as far as the simulation was carried. The TDS exceeds 1000 mg/l in year 62. The increase in total dissolved solids is an indication that the salt water associated with Bristol Lake Playa is moving toward the area of pumping; it continues to move even though the project stops.

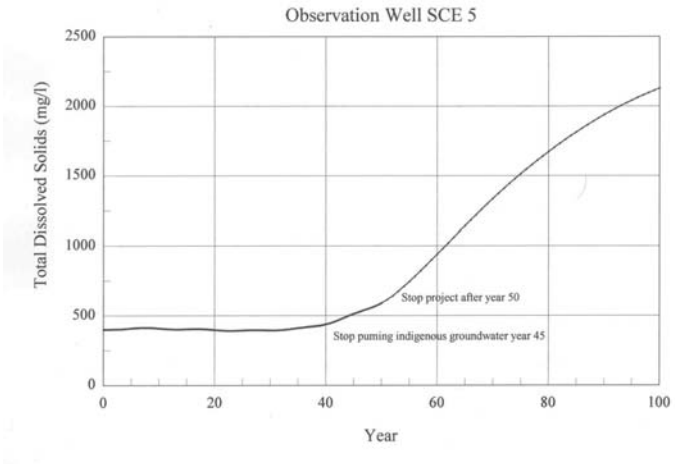

Figure 3. Simulated change in TDS in well SCE 5.

The simulated increase in total dissolved solids violates the water quality standards adopted by the State of California. The Basin Plan adopted by the California Regional Quality Control Board for the region has as its goal to maintain the existing water quality of all nondegraded groundwater basins. The State of California Department of Health Services has identified a secondary water quality standard of 1000 mg/l for TDS in drinking water.

The movement of salty water could be reversed by recharging water at the recharge facility. However, it would take a quantity of recharge approaching the magnitude of the total amount of local groundwater extracted in the 45 years of pumping (approximately 1 million acre-feet) to reverse the situation. This amount of recharge is outside the realm of feasibility.

The Management Plan proposes that a set of observation wells be drilled between well SCE 5 and Bristol Lake Playa. I have simulated the changes in water quality at a well 1 mile west of SCE 5, closer to the Bristol Lake Playa. Figure 4 is a simulated plot of TDS in this hypothetical well. The criterion for triggering action, a change in water quality of

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more than 25%, is met approximately in year 20. I simulated stopping the extraction of indigenous groundwater after year 20; from that time through year 50 only storage and extraction of Colorado River water is simulated.

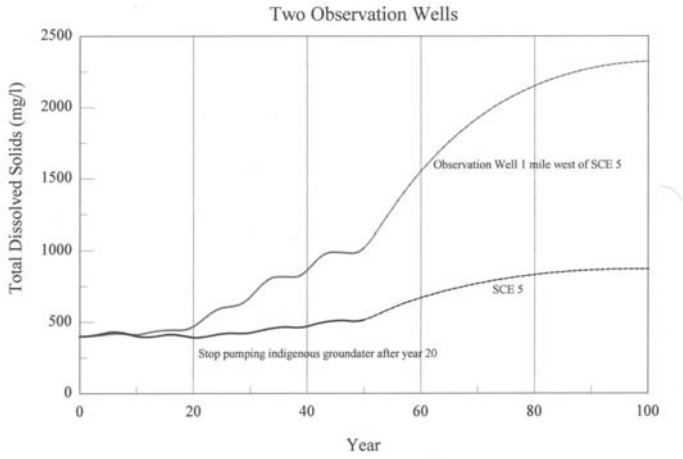

Figure 4. Simulated TDS in two observation wells near Bristol Lake Playa.

Again, stopping the pumping of indigenous groundwater does not stop the degradation in water quality. At this location the deterioration continues to year 100. The TDS at year 100 exceeds 2000 mg/l. This scenario also increases the TDS level at well SCE 5 to approximately 800 mg/l.

The two scenarios illustrate the impracticality of the proposed monitoring and control system.

Changes in Groundwater Levels

I would like to illustrate the kind of slow response in a groundwater system that in many ways resembles momentum in the system. The slow response leads to the fact that a perturbation in the system caused by pumping will take a long period to work its way through the system. I will use our same scenario of development (Figure 1) to illustrate the point.

In this case we will examine the simulated water level changes for an observation well near Danby (see Figure 2 for the location). Danby is situated up the Fenner Valley approximately 12 miles to the north of the area of project operations. Danby is north of

the Granite Mountains, east of the Clipper Mountains, and west of the Old Woman Mountains. Springs in these mountains are of concern to the wildlife in the area. Water level changes at Danby could be an indicator for changes in springflow in the adjoining mountain ranges. Danby is one of the areas designated in The Management Plan for a set of the S-Series observation wells.

Figure 5 is the simulated plot of the water level change in the well at Danby. In this instance the change in water level only exceeds the trigger criterion of a 1-foot change in approximately year 54; the project was stopped after year 50. However this is only the beginning of the change; the water level continues to steadily decline to year 100.

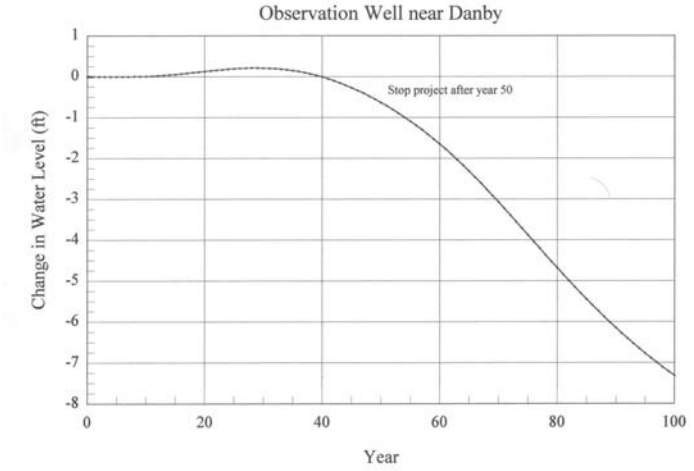

Figure 5. Simulated drawdown in an observation well near Danby.

The point of this illustration is that it takes more than 50 years for the change in water level to exceed 1 foot, but the decline continues to more than 7 feet in 100 years even though the project was totally stopped. If we wanted to avoid the decline in water level at Danby we would have to halt the project, or at least halt the extraction of indigenous groundwater, long before the water-level change there reached 1 foot. One could imagine adverse impacts to springs in the nearby mountains long after the project was stopped.

A SUSTAINABLE PROJECT

Many of the objections to the Cadiz Project are based upon the analysis that the project as proposed will mine a large quantity of indigenous groundwater. Given our current understanding of the groundwater system in the area**,** only a project that pumped a smaller quantity of local groundwater while storing Colorado River water could be sustainable indefinitely.

As suggested above**,** there is disagreement among the experts about the recharge to the Cadiz/Fenner valley aquifers. The current estimates range from a low value of 2,000 ac-ft/yr to a high value of 30,000 ac-ft/yr. However, most of the estimates clearly favor the lower range of values. Currentl y the Cadiz Company is pumping 5,000 to 6,000 ac-ft/yr for irrigation. The current agricultural pumping has, or will capture the natural discharge that probably occurred as evaporation from the dry lakes under virgin conditions. The agricultural pumping has been going on for more than a decade and appears to have little or no significant adverse impacts.

A Cadiz Project in which the quantity of groundwater pumped currently for irrigation is acquired by the project, and not exceeded, is probably sustainable. This would entail pumping for the project instead of for agriculture—the irrigation by the Cadiz Company would have to cease.

Accordingly, I recommend a sustainable Cadiz Project in which the total pumping of native groundwater from the Cadiz/Fenner Valleys be restricted to an average of 5,000 ac-ft/yr.

CONCLUSIONS AND RECOMMENDATION

From my analyses I have reached the following conclusions:

1. Recharge to the Valley aquifers is of the order of 5,000 ac-ft/yr, not 50,000 ac-ft/yr as suggested in the Draft EIR/EIS.

2. Water table groundwater systems respond slowly to perturbations. Once perturbed, impacts occur at long times into the future. This poses a challenge for monitoring and control. The delayed reaction of the groundwater system combined with the fact that the subtle indications of overdraft tend to be masked or easily confused with fluctuations due to other causes will profoundly undermine the early warning system that has been proposed.

3. The control measure to ameliorate adverse impacts is to modify the project operations. For practical reasons the most feasible modification of operations is to stop extracting indigenous groundwater. Recharging Colorado River water with the purpose of mitigating adverse impacts, as suggested in the Management Plan, is probably infeasible—the water will be needed to meet human demands at that time. Our simulations show that after the project has operated for several decades stopping the extraction of local groundwater will not mitigate adverse impacts. Again, water table groundwater systems respond slowly to perturbations; perturbations migrate slowly but inexorably through the system. Impacts occur at long periods into the future.

4. Models are useful tools in the monitoring. The Management Plan envisions using models to assess long-term impacts. However, future predictions made using models carry a degree of uncertainty inherent in the analysis. Given 1) the fact that a model analysis indicates an unwanted future adverse impact, and 2) the uncertainty inherent in the analysis, the question arises ***will such an analysis be sufficiently persuasive to modify or halt the mining of native groundwater—especially given the substantial amount of public funds invested up front in the project?***

5. The Cadiz Project could probably be sustainable if one limited the magnitude of pumping of native groundwater to approximately the current rate of pumping by the Cadiz Company—5,000 ac-ft/yr. In a sustainable mode the project would acquire the irrigation pumping of the Cadiz Company—irrigation in the area would cease. This rate of pumping of native groundwater is equal to 250,000 ac-ft over the 50-year life of the project. ***It is my recommendation that the project be made sustainable by restricting the pumping of native groundwater to an average rate of 5,000 ac-ft/yr.***

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ATTACHMENT C

Comments of

The Native American Land Conservancy

on the

Draft Environmental Impact Report

for the

Cadiz Valley Water Conservation, Recovery, and Storage Project

ATTACHMENT C

THE HYDRODYNAMICS GROUP
Studies in mass & energy transport in the earth

REVISED COMMENTS

CADIZ GROUNDWATER STORAGE PROJECT
CADIZ AND FENNER VALLEYS
SAN BERNARDINO COUNTY, CALIFORNIA

PREPARED FOR: WESTERN ENVIRONMENTAL LAW CENTER
TAOS, NEW MEXICO

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OVERVIEW

I have prepared this supplemental comment in an effort to both clarify and elaborate on points made in made in my earlier report on the proposed Cadiz Water Project. This comment specifically responds 1) to assertions made by the project proponents, 2) to measures that are reportedly being considered by the Agencies responsible for reviewing the project as means of addressing, or avoiding, the concerns raised in my earlier report, and 3) the critiques of other technical reviewers.

For example, it has been suggested the inefficacy of the monitoring system that I addressed in my earlier report can be remedied by 1) better placement of the observation wells, 2) by lowering the threshold at which a response would be triggered, and/or 3) or by adjusting the models that are to be used to predict the future response of the groundwater system. While this approach sounds superficially appealing, as I explain below, it does not address the fundamental problem that the recharge is undetermined. It does not address the fact that early warning signals will be subtle, and will be obscured by the operations of recharge and pumping, and by natural fluctuations in water levels. Monitoring for response and control has little chance of being effective.

In addition there is reportedly a proposal to treat the first five years of project life as a pilot project, or trial period, to observe how the groundwater system is responding to project operations. The idea is that magnitude of future extractions of native groundwater would be based upon the aquifer response during the five-year pilot period. As explained below this suggestion, while superficially appealing, is also fraught with problems and as a practical matter probably unworkable.

In this revised comment I conclude:

1. The magnitude of the recharge is an order of magnitude smaller than that suggested by the proponents of the project. The weight of evidence indicates it is approximately 5,000 acre-feet annually (ac-ft/yr) rather than 50,000 ac-ft/yr as the proponents suggest.
2. Monitoring for the purpose of avoiding undesired impacts and controlling the project is unlikely to work because the early warning signals of impending problems are both subtle and small, and will be obscured by the signals associated with the operations along with natural water level fluctuations. The threshold levels of what constitutes an early warning signal of adverse impacts are left unspecified by the project. The remedial measures to stop adverse consequences are also left unspecified.
3. The major uncertainty in assessing the long-term life of the project is the magnitude of the recharge. A pilot project, or trial period, must stress the aquifer sufficiently so as to give an indication of the impact of the long-term pumping of large quantities of native groundwater. The pumping in order to be definitive must be approximately an order of magnitude larger than the current Cadiz Company pumping for agriculture—currently the pumping is approximately 5,000 ac-ft/yr. Pumping 50,000 ac-ft/yr of native groundwater in the first five years of the project is in conflict with the practical consideration that surplus

water from the Colorado River may only be available during the first decade or so of project.

4. A ***sustainable*** Cadiz project is one in which the pumping of native groundwater is restricted to the current rate of pumping by the Cadiz Company for agriculture—approximately 5,000 ac-ft/yr. In a sustainable project the current agriculture pumping would be acquired by the project. ***I recommend a sustainable project in which the pumping of native groundwater is restricted to an average of 5,000 ac-ft/yr.***

INTRODUCTION

Before embarking on the analysis, a brief recap of the principal features of the Cadiz Water Project is in order.

The Cadiz Valley Groundwater Storage Project is proposed to serve three functions: 1) store water from the Colorado River Aqueduct during periods when water is available, 2) pump the water stored, and 3) pump a significant quantity of indigenous native groundwater from the Cadiz and Fenner Valleys when Colorado River water is deficient.

The project facilities consist of a pipeline (approximately 35 miles long) through Cadiz Valley from the Colorado River Aqueduct, at least one pumping station for the pipeline, recharge ponds, and a well field. The recharge ponds are used to infiltrate Colorado River water into the underlying alluvial aquifer where it is stored. The well field is used both to pump out stored water as well as the native groundwater in the area. The facilities are designed to recharge as much 145,000 acre-feet of water per year (ac-ft/yr). Similarly the well field is designed to pump 145,000 ac-ft/yr of groundwater.

The project is proposed both to store water and pump groundwater. The proposal is to extract more groundwater than that which is stored. One scenario of development indicates the project will extract 1,700,000 acre-feet of groundwater in excess of the amount stored during a 50-year period. Under this scenario 1,100,000 acre-feet of Colorado River water will be stored during the 50-year period; however, the total groundwater extracted will be 2,800,000 acre-feet during the period.

The argument put forward in the Draft EIR/EIS is that the 1,700,000 acre-feet of indigenous groundwater pumped is somewhat less than the cumulative recharge to the aquifers in the area during the 50-year period of project operation, and therefore will have no adverse impacts on the groundwater system. The Draft EIR/EIS indicates that the annual recharge is in the range of 40,000 to 50,000 acre-feet per year. It is on this basis that the report suggests little or no adverse impact on the groundwater system. It is the analysis of the impacts of pumping the native groundwater that creates great concern.

In my earlier report (Bredehoeft, 2000) I indicated that:

1. the estimate of annual recharge used in the Draft EIR/EIS is an order of magnitude too high—it is probably only 5,000-6,000 ac-ft/yr;

2. using a more realistic recharge rate there will be adverse impacts to the groundwater system and the environment; and
3. once development has proceeded for a period of several decades simply stopping the pumping of native groundwater, as implied in the Supplemental EIR/EIR, will not halt the adverse environmental impacts—in other words, the groundwater system once perturbed has sufficient persistence that adverse impacts will persist well beyond 100 years, even though the project is stopped after 50 year or earlier.

In this comment I wish to elaborate on some of the points made earlier. In order that the document stands by itself I am restating some of my earlier arguments.

THE GEOGRAPHIC/GEOLOGICAL SETTING

The Cadiz and Fenner Valleys are typical valleys within the Great Basin geographical province. The valleys are situated between mountain ranges. The mountain ranges are composed of older bedrock that ranges in age from PreCambrian through Mesozoic. The mountain ranges were uplifted by the basin and range tectonics of the region. The valleys are underlain by alluvial material that was eroded from the mountain ranges. Often the alluvial valley fill is quite thick, commonly in the more open parts of the valleys several thousand feet thick. The alluvial deposits beneath the valleys are good aquifers.

The valleys and surrounding mountain ranges are often closed topographic basins; the closed topographic basins form closed watersheds. Precipitation that falls in the watershed remains in the watershed. The discharge of water from these closed watersheds occurs either as evaporation or as plant transpiration. This is a desert; the precipitation ranges from a low of the 3 to 4 inches per year in Cadiz Valley to a high of 11 to 12 inches in the higher parts of the Granite Mountains west of Fenner Valley.

Commonly a playa forms in the lowest parts of the valleys in the area. These playas are ephemeral lakes. During periods of unusually high rainfall the runoff from the surrounding area is sufficient that the playas become lakes for a period; however, these events are infrequent. Most times runoff from the surrounding mountains is insufficient to reach the playa. Typically the runoff from winter snowfall and from summer thunderstorms 1) evaporates, 2) is held in the shallow soil where the plants transpire the moisture, or 3) infiltrates to the underlying groundwater table (the ***water table***).

Freshwater is supplied to the playas either as surface runoff in infrequent runoff events, or by underlying groundwater flow. The water evaporates from the playa; as it evaporates it leaves behind dissolved salts. The salts buildup naturally over time in the groundwater associated with the playas. There is highly saline groundwater underlying both Bristol Lake Playa and Cadiz Lake Playa; under Bristol Lake the groundwater is 7 times higher in dissolved salt than seawater. There are commercial salt works associated with both these playas.

The Hydrology of Valleys in the Basin and Range

Under natural conditions the alluvial aquifers that underlie the valleys are full of groundwater. These systems have existed for geologic time. There were periods of higher rainfall in the area during the Pliestocene ice ages. Under natural (virgin) conditions before any development the recharge to the aquifers is balanced by the discharge from the aquifers, or:

Recharge = Discharge (under virgin conditions)

As suggested above, the discharge from the aquifers occurs in many of the closed valleys in the Basin and Range as either evaporation from the playa, or by transpiration from plants in the lower parts of the valleys that draw their water from the water table. (Plants that draw water from the water table are referred to as ***phreatophytes.***) Common plants that draw groundwater from the water table are creosote bush, giant sage, and rabbit brush. Very few of these plants are present in Cadiz Valley; groundwater in this area is thought to discharge, before development, as evaporation from the local playas.

Pumping groundwater in one of these valleys constitutes an additional withdrawal from a system that was in a natural state of balance under virgin conditions. In order for such a groundwater system to reach a new equilibrium (a state of indefinite ***sustainability***) two things must occur: 1) the pumping must increase the recharge, and/or 2) the pumping must decrease the discharge. Usually groundwater pumping has no impact on the recharge; recharge is determined by climatic conditions—precipitation, etc. On the other hand the pumping can decrease the discharge. For example, in Cadiz Valley pumping groundwater can lower the water table beneath Bristol Lake playa and either reduce or eliminate groundwater discharge as evaporation there.

In the parlance of the hydrogeologist, pumping can capture groundwater discharge. *In order for a groundwater system to be indefinitely* ***sustainable*** *the pumping must be balanced by an equal capture of discharge.* If the pumping exceeds the total amount of the natural discharge from the system the system cannot be brought into a new balanced state; in other words one will be mining groundwater—such a system is not indefinitely sustainable.

One rarely hears the discussion of groundwater sustainability put in terms of the capture of virgin discharge. The usual statement is that *pumping must not exceed the recharge (in order for the system to be sustainable)*. In the discussion above I made the point that the virgin rate of discharge in these systems equals the virgin rate of recharge. The statement *pumping must not exceed recharge* is a round about way of saying that the pumping must not exceed the virgin discharge—the presumption is that all the virgin discharge can be captured by the pumping.

Nevada Groundwater Law

The Cadiz and Fenner Valleys are comparable to the closed Basin and Range Valleys in Nevada; they are dissimilar to much of the rest of California. For this reason it is worth looking at how Nevada treats groundwater in similar valleys.

Nevada recognized in the early1900s that the water supply for many of the valleys within the state would have to come totally from groundwater. The Nevada decision was to attempt to make that the groundwater supply within these valleys sustainable. The discharge in many of the valleys in Nevada is similar to Cadiz Valley where the groundwater discharge is by evaporation from the playas and from plants that tap the water table—the phreatophytic plants mentioned above. Nevada was willing to let the groundwater pumping capture both the evaporation and the groundwater that went to support the phreatophytic plants. This thinking led to the Nevada doctrine *that groundwater pumping must not exceed the recharge.*

As an aside, it has been difficult for the water managers in Nevada to administer this doctrine in places of heavy urbanization such as Las Vegas, even though Nevada law codified the doctrine.

Nevada has systematically surveyed the entire state in an effort to investigate the recharge in each of its many valleys. Many of the techniques of estimating recharge in the Basin and Range Province have stemmed from efforts in Nevada. One of the widely used methods of estimating recharge is the Maxey/Eakin Method. This is an empirical procedure devised by Burke Maxey and Tom Eakin (1949) working for the U.S. Geological Survey (USGS) in cooperation with the state of Nevada.

Even though the Maxey/Eakin Method is more than 50 years old it is still in widespread use. It applicability has been evaluated in recent years. Avon and Durbin (1994) published an evaluation of the method in which they showed that it gave good estimates of recharge for valleys in the Basin and Range. The Maxey/Eakin Method, along with other methods, indicates a much lower rate of recharge for Cadiz and Fenner Valleys than the method that was used in the Draft EIR/EIS. The method used in the Draft EIR/EIS continues to serve as the basis for overly optimistic projections of the quantity of native groundwater that can be extracted on a sustained basis from the Cadiz-Fenner groundwater system

As discussed above, whether a groundwater system can be brought into a state of indefinite sustainability depends upon whether the system can ultimately capture sufficient natural discharge to balance the pumping. I indicated that under virgin conditions, before development, in these systems the recharge is balanced by an equal amount of discharge. If a proposed development is much larger than the amount of potential discharge that can be captured the system will never be brought into a new equilibrium—one will be continuing to mine groundwater. In other words one will be draining the groundwater system.

Let's state these ideas in another way. Remember the virgin recharge equals the virgin

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discharge. If the proposed development is much larger than the recharge (or in other words the virgin discharge since it is equal) one can never capture sufficient natural discharge to bring the system to a new balance. Therefore, one hears the common statement the *development must not exceed the recharge if the development is to be sustainable.*

The estimate of recharge becomes critical in any analysis of how a groundwater system will perform. If the estimate of recharge is in error then predictions of system performance will also be in error. Thus, one cannot make accurate predictions of future performance without a good estimate of the natural recharge. One cannot make a defensible judgment about the impacts of withdrawing native groundwater without a good estimate of recharge. I wish to examine the various estimates of recharge for the Fenner and Cadiz Valleys that were referenced in my earlier report.

Summary of the Recharge Estimates

Table 1 summarizes the various estimates of recharge to the Fenner/Cadiz Valleys.

Table 1. A summary of the recharge estimates.

Methodology/Author	**Estimate (ac-ft/yr)**
1. Watershed Runoff Model—MWD & BLM (1999)	20,000-70,000
GeoScience Groundwater Model	50,000
2. Maxey/Eakin Method	
USGS (2000)	2,550-11,200
Durbin (2000)	5,000
3. Fenner Gap Groundwater Flow	
Friewald (1984—USGS)	270
LaMoreaux (1995)	3,700
USGS (2000)	2,600-4,300
4. Chloride Method (correctly applied)	
USGS (2000)	1,700-9,000
Durbin (2000)	2,000
5. Drawdown Associated with Cadiz Co. pumping	
Boyle Engineering (1996)	4,000

Looking at Table 1, the only investigator that estimated the recharge as high as 50,000 acre-feet per year was GeoScience in their work reported in the Draft EIR/EIS Report. This estimate was commissioned by the Cadiz Company and done in support of the project. The other eight estimates performed using a variety of proven methods indicated that the annual recharge is less than approximately 10,000 ac-ft/yr. While there is a range in the estimates the most probable value for the annual recharge is 5,000 acre-feet per year—an order of magnitude lower than that used in the Draft EIR/EIS.

The Boyle Engineering (1996) report indicated that Cadiz Company was pumping

approximately 4,000 ac-ft/yr for irrigation in 1996. Boyle noted small, continued declines in the groundwater levels of approximately 1 foot per year; they suggested that the recharge was less than the 4,000 ac-ft/yr pumped in 1996. The Cadiz agricultural pumping has, or will capture the natural discharge that is thought to have occurred as evaporation from the dry lakes under virgin conditions. The pumping for irrigation, now approximately 5,000 ac-ft/yr, appears to have had little, or no significant adverse impacts to date. The Cadiz Company has approval from San Bernardino County to continue their pumping for irrigation.

Apart from the GeoScience report there has been one other minority voice among the technical reviewers of the Cadiz Project. Lee Davisson, a scientist at Lawrence Livermore Laboratory, wrote a short letter that endorses the quantity of recharge indicated by GeoScience. The Davisson letter suggested that his support for the GeoScience estimate was based upon isotopic studies of the native groundwater. It is difficult to assess the Davisson suggestion since his letter is brief; it does not contain the usual scientific information—his method of analysis, his assumptions, his data, or his results.

The Supplemental EIR/EIS did not address the issue of how large is the recharge to the local groundwater system. It sidestepped the issue of the recharge by proposing a monitoring and control scheme. The idea is that the project operations would be carefully monitored and modified to control adverse impacts as they were observed. This proposal has two fatal flaws:

1. The future impacts of the project cannot be projected at all accurately without an up-front estimate of the recharge.
2. By the time an adverse impact is detected by the monitoring the groundwater system will be sufficiently perturbed that even completely stopping the pumping of native groundwater will not ameliorate the impacts.

The bottom line is that if a large quantity of native groundwater in mined from the Fenner-Cadiz system it will cause water levels to drop below the dry lakebeds. This in turn will result in an increase in dust from the two associated playas. An increase in dust from a similar dry lakebed in Owens Valley has been a difficult and expensive problem to attempt to ameliorate. In addition, saline water will move out from beneath the playas and invade parts of the aquifer that currently contain freshwater. Springs in the nearby mountains may be caused to dry up.

The connection between the springs in the nearby mountains and the pumping in the valley is undetermined. The proponents of the project argue there is no connection. However, there is insufficient understanding or empirical data to know what will happen to the springs. If the springs do dry up as a result of the local pumping it will have a severe impact on a local herd of Desert Bighorn Sheep.

The Cadiz Company does not seem to be concerned about these impacts. Once a large public investment is made in the project, the pressure will mount to continue the project including the mining of native groundwater.

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INFEASIBILITY OF MONITORING & CONTROL

The Cadiz project entails a substantial investment of public funds to build the facilities—pipeline, pumping station, recharge basin, and well field. Monitoring the groundwater system by observing water levels and water quality might reveal that the project operation is creating adverse environmental impacts. However**,** the early warning signs will be subtle, at best. The signals will be obscured by effects of the project operations, both storage and pumping, and other natural water-level fluctuations

The Supplemental EIR/EIS—Monitoring and Control

A number of individuals, in commenting on the Draft EIR/EIS suggested that the recharge indicated the Draft Report was much too large—approximately an order of magnitude too large. The Supplemental Draft EIR/EIS did not address this issue directly; a different tack was taken. The Supplemental Report proposed extensive monitoring with the idea that adjustments could be made to the project operation that would ameliorate adverse impacts.

The idea put forward in the Supplemental EIR/EIS is that early signs of adverse impacts will trigger modifications in the project operations. Exactly how the operations will be changed is not specified. Nor is it specified what constitutes an early warning sign of an adverse impact—what is the signal that triggers a modification of the project. The trigger signals that indicate adverse impacts are also left unspecified.

The problem with this idea is that once the project has operated for several decades the groundwater system will be sufficiently perturbed that stopping the pumping of native groundwater by the project will not stop the adverse impacts. Entirely stopping the pumping of native groundwater is probably the most drastic corrective action that can be taken. Clear signs of an overdraft of native groundwater will not occur until the project has operated for some time. In the early stages of operation it will be easy to discount early warning signs of adverse impacts as the result of project operations (storing water and pumping stored water) or natural groundwater fluctuations

Once the groundwater system is perturbed, that perturbation will work its way through the system at a rate dictated by the response time of the groundwater system. It is much like a freight train put into motion; once it has started moving it will be difficult, if not impossible, to stop the system from responding.

The traditional method of analyzing the impact of stopping pumping in a groundwater system is:

1. to analyze the aquifer as if the pumping is continued; and
2. to superimpose a recharge well of opposite but equal magnitude at the site of the pumping well.

This has the effect that the impacts of the pumping continue to migrate through the aquifer even though the pumping has ceased. It takes some time for the impact of the

superimposed recharge well to catch up with the impact of the pumping. The rule of thumb is that the impact of the pumping after it is stopped persists for a time approximately equal to the time of pumping. For example if one pumps for a year and then stops, the impact of the pumping will persist for approximately another year—it takes a year for the aquifer to recover. Therein lies the difficulty for monitoring; adverse impacts persist within the system even after pumping ceases.

The problem of recovery of the system is compounded if a large quantity of groundwater is mined. I made the point above that a number of investigators suggested that the recharge to the aquifer in the area is probably 5,000 acre-feet annually (ac-ft/yr). This estimate is an order of magnitude lower than the estimate presented in the Draft EIR/EIS for the Cadiz Project; the project estimate was 50,000 to 60,000 ac-ft/yr. Let's assume for the sake of argument that the project is operated based upon the higher estimate of 50,000 ac-ft/yr. Let's further assume that in 10 years of operation:

pumping indigenous groundwater	10 years @ 50,000 ac-ft/yr	500,000 ac-ft
recharge	10 years @ 5,000 ac-ft/yr	50,000 ac-ft
overdraft (groundwater mined)		450,000 ac-ft

Even if we stopped pumping indigenous groundwater after 10 years of operation we have created an overdraft that will take at least 90 years to refill at a recharge rate of 5,000 ac-ft/yr. This is without any other natural discharge from the system. Of course there will be continued natural discharge or other extractions that the project operators will not be able to control. By extension, if the project extracts groundwater at the proposed rate for two or three decades as seems likely, an overdraft will be created that takes more than a century or two to replenish.

If one is sufficiently alert there will be subtle early warning signs of trouble ahead. However, the early warning will be sufficiently obscure as to not halt the mining of native groundwater. As suggested above, once the project has operated for several decades it will be impossible to halt the adverse impacts even if the pumping of native groundwater is stopped. Let me try to illustrate my point further with results from the earlier modeling.

Water Levels in Selected Observation Wells

Using a groundwater flow model I projected the drawdown at several observation wells to illustrate the point about the difficulty associated with monitoring and control of the Cadiz Project. In order to do the modeling one has to assume some schedule of project operations. My assumed schedule of recharge and pumping is shown in Figure 1. Figure 2 is a map showing selected hypothetical observation well locations. Figure 3 shows the model-projected hydrographs for the three hypothetical well locations.

Consider for example the drawdown in Fenner Valley as observed in the observation well near Danby—see Figures 2 and 3. This well has almost no drawdown in 40 years of project operation. The drawdown is approximately 3 feet in 50 years, but this is only the beginning. The drawdown is 10 feet in 100 years, 50 years after the project was shut

down, and the drawdown at Danby is continuing to decline. At 100 years the drawdown is continuing to migrate up Fenner Valley to the north even though the pumping was totally stopped 50 years earlier.

The monitoring situation is a bit clearer beneath Bristol Lake—see Figure 3. There is no decline in the water table beneath the center of the lake out to 20 years. By 30 years the drawdown is approximately 7 feet and by 50 years it is approximately 12 feet. Again this is only the beginning, the drawdown goes to 20 feet in 80 years and remains at 20 feet to 100 years. Even though the project was stopped after year 50, there is no recovery in water levels beneath the lake in 100 years.

Water Quality in Observation Well SCE 5

I ran a groundwater transport model to simulate the movement of the brine beneath Bristol Lake. Observation well SCE 5 is situated approximately halfway from the proposed project and Bristol Lake playa—see Figure 2. The total dissolved solids, as observed in this observation well, are plotted in Figure 4. Notice that the dissolved solids start to increase slightly in year 30. By year 45 it increases to 1,000 milligrams per liter (mg/l); by year 50 the concentration is 1,300 mg/l. This water is still useable; but again this is only the beginning. The concentration increases to more than 7,500 mg/l by 100 years, and it is still increasing—again the project was halted 50 years earlier.

The point shown especially by the brine movement is that we would have to halt the pumping of native groundwater very early on in order for there not to be a significant degradation in water quality at this location. I selected only one location to make my point, but this is not an isolated location; the degradation in water quality between Bristol Lake and the project will be widespread and continuing out to at least 100 years. The groundwater flow into the cone of depression will still be significant at 100 years. The groundwater flow from the region of Bristol Lake will bring with it brine from beneath the lake. The outward flow of brine will render the groundwater unusable without costly treatment. The modeling suggests an area more than 10 square miles will be impacted.

To make my point that adverse impacts persist I stopped the project after 50 years of operation. To the reader this may suggest a worst-case scenario analysis. However, as suggested above the same point can be made after a much shorter period. As indicated above after a one-year period of pumping at any rate (for example 5,000 ac-ft/yr), pumping impacts will exist in the system for approximately another year; after a decade they will persist for approximately another decade; and so forth. The magnitude of the drawdown created is a direct function of the pumping rate; for example, the drawdown from pumping at 50,000 ac-ft/yr is ten times larger than drawdown from pumping at 5,000 ac-ft/yr. However, the rate at which the impacts migrate outward from the well through the groundwater system are the same for both pumping rates.

Modeling as an Integral Part of Monitoring

Modeling is one of the tools that hydrogeologists use to assess impacts of development—in this case recharge and withdrawal. Models have the ability to project the impacts into

the future. The procedure in using a model is to fit the model output to empirical data. This procedure is referred to as ***calibration***, or in the petroleum industry ***history matching***. Once the model fits the observed data it is referred to as calibrated. The calibrated model is then used to make predictions of the future response of the system.

Models are routinely calibrated based upon limited data sets. A steady-state model can be calibrated using either a high or a low estimate of recharge. Usually the aquifer permeability is adjusted to compensate for the high or low estimate of recharge. It will take a period of sustained high pumping from the aquifer before the impact of the recharge rate will be felt and a better estimate of the recharge provided by the modeling or other analyses. The bottom line is that the long-term behavior of the aquifer cannot be accurately estimated without a good upfront estimate of recharge.

During calibration what constitutes a good fit to the observed data is a matter of judgment on the part of the modeler. Compounding the calibration is the fact that the data is never sufficient to provide a unique model. The modeler adjusts the model parameters until an adequate fit to the observations is achieved. However, the non-uniqueness arises from the fact that another set of different model parameters could provide a similar fit to the observations. In colloquial terms, there are too many knobs to adjust in the model to be sure that the model is unique. Even so, once the model is calibrated it is used to make predictions of aquifer response.

This leads to the fact that analysis of the future response using models, or other analytical tools, has an inherent uncertainty associated with the prediction. The question is: in a situation where one is controlling one's actions based upon model predictions that are uncertain, ***how seriously will the model results be taken?*** This question becomes more important as the investment in the project increases.

Model uncertainty is likely to be used as an excuse for not taking warning signs predicted by the model seriously. This is especially likely in a project like Cadiz where a very substantial initial investment is made in the project before the model begins predicting problems. The likelihood of discounting the early warning signs of a model prediction are even greater where the decision to take remedial action is controlled by parties having a direct financial stake in the production of native groundwater.

A FIVE-YEAR PILOT PROJECT

It has been suggested that concerns associated with the long-term impact of pumping native groundwater can be resolved by using the first five years of the project as a pilot project or trial period. Such a pilot project might give an indication of the potential long-term impacts of pumping groundwater; however, five years is a short period to reveal how the long-term pumping of large quantities of native groundwater will impact the system. In order to be at all definitive the pumping rate must be much larger than the current Cadiz Company pumping for agriculture. There is an additional practical problem; water for storage from the Colorado River is probably only available during the

first decade of project operation. This consideration will probably preclude pumping large quantities of native groundwater during the first five years.

The major uncertainty in pumping native groundwater by the Cadiz Project is the recharge—is it 50,000 or some larger figure, or is it 5,000 ac-ft/yr? A five-year project in which a large amount of indigenous groundwater is pumped may provide an indication of whether the proposed pumping is sustainable. The Cadiz Company is reportedly currently pumping approximately 5,000 ac-ft/yr and has been doing so for more than a decade. The impacts of the current pumping appear to be acceptable

At issue is what happens if the pumping of indigenous groundwater is increased dramatically—up to the 50,000 ac-ft/yr of the projected recharge in the Draft EIR/EIS. Unless the pumping in the pilot project is much larger than the current level of pumping by the Cadiz Company**,** the pilot project will be inconclusive at best, and possibly misleading. The pilot project pumping needs to approach the larger estimate of annual recharge to be meaningful

A pilot project that calls for pumping so large a level of native groundwater is inconsistent with the proposal to store large amounts of Colorado River water in the first decade of the project when it is anticipated surplus water will be available from the Colorado River. Beyond 2015 surplus water from the Colorado River may be quite limited.

A SUSTAINABLE PROJECT

Many of the objections to the Cadiz Project are based upon the analysis that the project as proposed will mine a large quantity of indigenous groundwater. Given our current understanding of the groundwater system in the area**,** only a project that pumped a smaller quantity of local groundwater while storing Colorado River water could be sustainable indefinitely.

As suggested above**,** the recharge to the Cadiz/Fenner valley aquifers is probably of the order of 5,000 ac-ft/yr. This is approximately equal to the quantity of groundwater being pumped for irrigation by the Cadiz Company. The current agricultural pumping has, or will capture the natural discharge that probably occurred as evaporation from the dry lakes under virgin conditions. The agricultural pumping been going on for more than decade and appears to have little, or no significant adverse impacts.

A Cadiz Project in which the quantity of groundwater pumped currently for irrigation is acquired by the project, and not exceeded, is probably sustainable. This would be pumping by the project instead of for agriculture—the irrigation by the Cadiz Company would cease.

Accordingly, I recommend a sustainable Cadiz Project in which the total pumping of native groundwater from the Cadiz/Fenner Valleys be restricted to an average of 5,000 ac-ft/yr.

CONCLUSIONS AND RECOMMENDATION

From my analysis I reached the following conclusions:

1. Valley aquifers is of the order of 5,000 ac-ft/yr, not 50,000 ac-ft/yr as suggested in the Draft EIR/EIS.
2. Water table groundwater systems respond slowly to perturbations. Impacts occur at long times into the future. This poses a challenge for monitoring and control. The delayed reaction of the groundwater system combined with the fact that the subtle indications of overdraft tend to be masked or easily confused with fluctuations due to other causes will profoundly undermine the early warning system that has been proposed The weight of evidence indicates that the recharge to the Cadiz/Fenner for the project. Furthermore, trigger levels of what constitutes an early warning sign of adverse consequences have not been specified. One is left with only verbal assurances that careful monitoring will inform the project staff when bad consequences are anticipated. What triggers a response and what the response will be is left unspecified.
3. Models are useful tools in the monitoring. They can be used to assess long-term impacts. However, future predictions made using models carry a degree of uncertainty inherent in the analysis. Given 1) the fact that a model analysis indicates an unwanted future adverse impact, and 2) the uncertainty inherent in the analysis, the question arises ***will such an analysis be sufficiently persuasive to modify or halt the mining of native groundwater—especially given the project investment?***
4. A five-year pilot project is a short time in which to collect sufficient data to evaluate the long-term viability of the project. The major uncertainty is the magnitude of the recharge. The Cadiz Company currently pumps approximately 5,000 ac-ft/yr without apparent adverse impacts. In order to assess the recharge issue the pumping must be much larger than the current Cadiz Company pumping. To be definitive the five-year pilot period must involve pumping an order of magnitude greater than the current pumping; even at the higher pumping rate the results may not be definitive. To assess the recharge the pilot project must entail mostly pumping indigenous groundwater during its five-year life. This appears to be in conflict with the availability of surplus water for storage from the Colorado River.
5. The Cadiz Project could probably be sustainable if one limited the magnitude of pumping of native groundwater to approximately the current rate of pumping by the Cadiz Company—5,000 ac-ft/yr. In a sustainable mode the project would acquire the irrigation pumping of the Cadiz Company—irrigation in the area would cease. This rate of pumping of native groundwater is equal to 250,000 ac-ft over the 50-year life of the project. ***It is my recommendation that the project be made sustainable with the pumping of native groundwater restricted to an average rate of 5,000 ac-ft/yr.***

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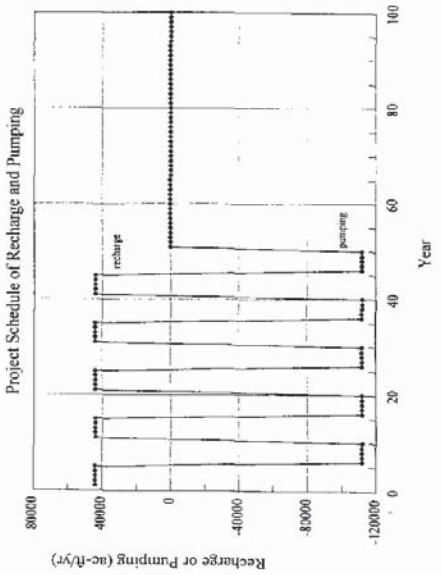

Figure 1. Hypothetical schedule of pumping and recharge.

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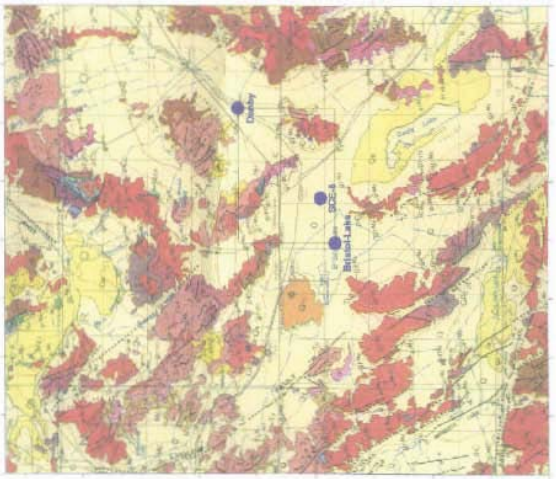
Figure 2
Location map of three hypothetical observation wells



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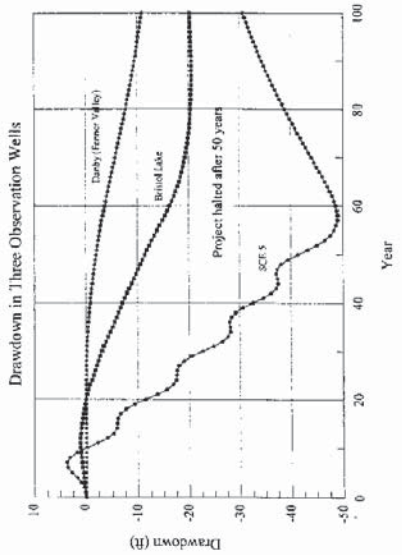

Figure 3 Computed drawdown in three hypothetical observation wells.

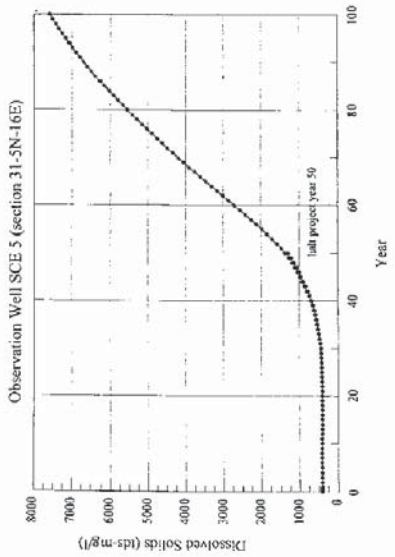

Figure 4. Computed plot of TDS in observation well SCE 5

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Thursday, December 16, 2010

A Cheaper Way to Clean Water

Oasys Water says it will test complete, large-scale systems using forward osmosis early next year.
By Kevin Bullis

Oasys Water, a company that has been developing a novel, inexpensive desalination technology, showed off a new development facility in Boston this week. The company, which has been demonstrating commercial-scale components of its system in recent months, plans to begin testing a complete system early next year and to start selling the systems by the end of 2011.

Currently, desalination is done mainly in one of two ways: water is either heated until it evaporates (called a thermal process) or forced through a membrane that allows water molecules but not salt ions to pass (known as reverse osmosis). Oasys's method uses a combination of ordinary (or forward) osmosis and heat to turn sea water into drinking water.

On one side of a membrane is sea water; on the other is a solution containing high concentrations of carbon dioxide and ammonia. Water naturally moves toward this more concentrated "draw" solution, and the membrane blocks salt and other impurities as it does so. The resulting mixture is then heated, causing the carbon dioxide and ammonia to evaporate. Fresh water is left behind, and the ammonia and carbon dioxide are captured and reused.

Oasys says the technology could make desalination economically attractive not only in arid regions where there are no alternatives to desalination, but also in places where fresh water must be transported long distances. In California, for example, a massive aqueduct system now transports water from north to south.

"The cost will be low enough to make aqueduct and dam projects look expensive in comparison," says Oasys cofounder and chief technology officer Robert McGinnis, who invented the company's core technology. The process could also require substantially less power than other desalination options. "The fuel consumption and carbon emissions will be lower than those of almost any other water source besides a local lake or aquifer," he says.

The key to making the process work was developing a draw solution with easy-to-remove solutes, something that was done at a lab at Yale University. "Others have tried to develop other solutes for desalination," McGinnis says, "but they haven't been successful so far."

The next-biggest technical challenge has been developing the membrane. The membranes used in reverse osmosis are unsuitable for this process because they work best at high pressures. Forward osmosis doesn't use high pressures, so water moves through these membranes too slowly for the system to be practical. McGinnis and colleagues reëngineered the membranes, reducing the thickness of the supporting material and increasing its porosity without changing a very thin layer that blocks salts. These changes enabled water to pass through 25 times faster, McGinnis says.

The system uses far less energy than thermal desalination because the draw solution has to be heated only to 40 to 50 °C, McGinnis says, whereas thermal systems heat water to 70 to 100 °C. These low temperatures can be achieved using waste heat from power plants. Thermal-desalination plants are often located at power plants now, but it takes extra fuel to generate enough heat for them. The new system, on the other hand, could run on heat that otherwise would have been released into the atmosphere.

A Cheaper Way to Clean Water - Technology Review http://www.technologyreview.com/printer_friendly_article.aspx?id=26916

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The Oasys system requires just one-tenth as much electricity as a reverse-osmosis system, McGinnis says, because water doesn't have to be forced through a membrane at high pressure. That's a crucial source of savings, since electricity can account for nearly half the cost of reverse-osmosis technology. Not working with pressurized water also decreases the cost of building the plant—there is no need for expensive pipes that can withstand high pressures. The combination of lower power consumption and cheaper equipment results in lower overall costs.

The Oasys system will not help everyone. For example, it is unlikely to do much for farmers; although they account for about 80 percent of fresh-water consumption, it wouldn't be cost-effective for them, in part because farms are often located closer to aquifers and other water supplies than are large coastal cities such as L.A. In addition, "there's a minimum amount of energy needed to strip salt ions out of water," says Peter Gleick, president of the Pacific Institute for Studies in Development, Environment, and Security in Oakland, California. "I don't think it will ever be cheap enough for irrigation." In agricultural areas where water is scarce, he says, it's cheaper to switch to better irrigation practices.

As coastal cities grow, however, so will their need for desalination services, says Kenneth Herd, director of the water supply program at the Southwest Florida Water Management District. "It's not a matter of if," he says, "but a matter of when."

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White Paper : Low Cost Seawater Desalination – Forward Osmosis Membrane Desalination

Research Area : Clean Energy, Water and Desalination

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Summary :

Fresh water shortage in future will be unavoidable. At present, the oil rich Middle East countries and some developed nations, includes Singapore, exchange of oil for water using desalination technologies which are still very costly. The issues of global warming, depletion of oil reserve and the escalation of oil price, the idea of exchanging oil for water will be unsustainable. In search of more efficient desalination processes and attempting to use waste heat would be a long terms trend in desalination research and development.

This proposal aims to explore the forward osmosis (FO) membrane desalination process using a draw fluid with a high solute concentration. The FO process is to create a high osmotic pressure in the draw fluid on one side of the membrane and draw the water from the saline water on the other side of the membrane into the draw fluid. The draw fluid, diluted by water, is subsequently treated to obtain the pure water and the solute is reused in the fresh draw fluid.

Research workers reported different chemicals as solute in draw fluid and different techniques to obtain pure water from the water diluted draw fluid. So far no one had successful applied the research findings in commercial scale desalination plant.

This project will explore different FO draw fluids, different method of removing solute from draw fluid, cast dedicated RO membrane for FO process without the internal polarization and use energy efficient heat pump for transporting heat of solute regeneration.

Objective :

The objective of this research is to explore the FO as low cost desalination processes. The approaches are : (a) find a suitable draw fluid of high osmotic pressure; (b) cast a suitable RO membrane for FO process with less internal polarization; (c) minimized electric energy input and (d) use waste heat or energy efficient device like heat pump.

Motivation :

More than one out of six (1.1 billion) people lack access to safe drinking water. There are 26 countries do not have enough water to sustain agriculture and economic development. A third of Africans live without enough water as does most of the Middle-East. Within the next fifty years, the world population will increase by another 40 to 50 %. This population growth - coupled with industrialization and urbanization - will result in an increasing demand for water.

The oil rich Middle East countries and some developed nations, includes Singapore, overcome their water shortage through the exchange of oil for water using desalination technologies. The issues of global warming and pollution, depletion of world oil reserve and the escalation of oil price, the idea of exchanging oil for water will be unsustainable. In search of more efficient desalination processes and using

the available waste energy for desalination would be a long terms trend in desalination research and development.

Proposed research :

Topic : Forward osmosis membrane desalination process (FO)

The Forward osmosis (FO) process exploits the natural tendency of water to move in the direction of higher osmotic pressure when two aqueous solutions having different salinity separated by a semi-permeable membrane. Water flows across the semi-permeable membrane from a saline feed stream into a highly concentrated "draw solution", thus effectively separating the water from the saline feed water stream.

Water is subsequently extracted from the diluted draw solution by removing the solute. In order to achieve an effective FO desalination, the draw solution must have a high osmotic pressure and contain solutes that are simple and can be easily removed and reused.

In an ammonia–carbon dioxide FO process, the draw solution is composed of ammonium salts formed by the mixture of ammonia and carbon dioxide gases in an aqueous solution. A high concentration of ammonium salts in water offers a solution of high osmotic pressure that is higher than that of the seawater. When a semi-permeable membrane is placed in between the seawater and the draw fluid of higher osmotic pressure, water flows across the membrane from the seawater feed into the draw solution causing the dilution of the draw solution.

Fresh water is subsequently extracted from the diluted draw solution by removing the solute through heating at low pressure. As a similar quantity of heat would be released when the solute is re-channeled back and dissolved into the draw solution, a heat pump system could be applied to harvest the released heat from the concentrated draw fluid as heat source for heating the diluted draw solution at higher temperature.

A system block diagram is shown in figure 1.

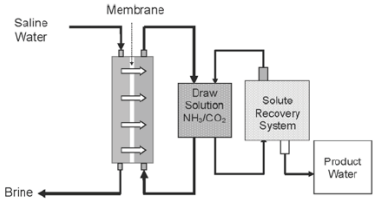

Figure 1 Block diagram showing a forward osmosis desalination system

In this proposal, work will based on ammonia-carbon dioxide water solution as draw fluid to study the FO desalination process. Heat pump would be the new contribution to the work for recovering the solute instead of using waste heat suggested by others. The project would also attempt to explore other solutes for the draw fluid aimed to reduce energy consumption and better quality of the water from the process.

All the commercial RO membranes are designed for SWRO processes. The thick membrane structure including the backing materials might not suit the FO application. It was reported that membrane internal polarization hindered the permeate flux. This work also attempts to cast a new RO membrane that is dedicated to the FO application.

The FO desalination does not require the high mechanical energy like the RO desalination process. Theoretically, the energy for heating up the diluted draw solution to extract the water can be harnessed

from the exothermic dissolution of gaseous solute into the concentrated draw solution. The only energy input is for the heat pump, and its COP could be as high as 15 due to the small temperature difference between the diluted and concentrated draw fluids.

Some statistics from others :
1. Electrical energy – 0.25 kW-hr / cu M
2. Heat for removing gaseous solute – either waste heat or heat pump for heat reuse
3. Permeate flux – 2.1 to 21 gallon/sq ft per day
4. Recovery ratio – up to 75%

The advantage of this method is that it completely avoids the high mechanical energy needed to go against the osmotic pressure in the RO process. The decomposition of the diluted draw solution could be done by low quality waste heat at low temperature whose electric energy equivalent would be negligible. The heat could also from the heat generated when the ammonia and carbon dioxide dissolved in the water though a heat pump. The method could be applied to seawater and brackish water desalination and also equally applicable to the extraction of water from treated sewer discharge.

Project plan :

The project will last for 36 months and the works to be carried out are listed as follows :

1st year : Select, develop and test suitable membranes for this application. Study the basic parameters that affect the process. Study of using heat pump for the transfer of heat.
2nd year : Formulate and test other draw solutions and compared those with the Ammonia-Carbon dioxide.
3rd year : Construct and test a sizeable system using the technology.

Costing :

13 man-years of either PhD student/engineer/scientist	$864,000
Cost of research hardware	$400000
Cost of a sizeable test system	$600000
Misc, travel, conference, patent and contingency	$200000
7% GST	$84,000
20% NTU cost	$429,600
Sub total	$2,577,600

Total research grant applying = $2,577,600 (Two million five hundred and seventy-seven thousand and six hundred dollars)

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ARTICLE

Oasys Water Commercializing Forward Osmosis Membrane

* Reuters is not responsible for the content in this press release.

Mon May 10, 2010 8:00am EDT

CAMBRIDGE, Mass.--(Business Wire)--
Oasys Water Inc., today announced the commercialization of a high performance forward osmosis (FO) membrane as a next step towards the introduction of disruptive, lower cost desalination and water reuse technology. Forward osmosis is well known to be an emerging alternative for lower cost desalination, but thus far two developments have limited its widespread adoption; a recoverable solute and a membrane with both high flow rates and high salt rejection. Last year, the company announced a solution for solute recovery; a patented ammonia carbonate formulation producing high osmotic pressure which is recoverable using low-grade heat. Today, the company is announcing that it is commercializing an FO membrane developed by Yale University and is disclosing performance specifications for the production of these membranes at full scale.

This advancement now paves the way for commercialization of next generation desalination products using the company`s patented Engineered OsmosisTM platform. "We are excited about the performance of this first generation FO membrane using thin film composite polyamide chemistry and we`ve tested modules produced on existing membrane manufacturing lines without modifications. By releasing performance specifications we are further encouraging the development of new FO membranes and accelerating the deployment of lower cost desalination", says Lisa Sorgini, Vice President of Markets and Strategy for Oasys Water.

A publication in this month`s Environmental Science and Technology (ES&T) journal entitled High Performance Thin-Film Composite Forward Osmosis Membrane authored by Professor Menachem Elimelech, Chair of Chemical Engineering at Yale University, details the specifications and performance of the FO membrane. Through an exclusive license and sponsored research agreement, Oasys has rights to patented technology from Yale and is now expanding the collaboration to further promote industry standards for forward osmosis.

"Yale continues to lead in the scientific understanding of forward osmosis and we look forward to incorporating future developments into our products. We believe that open collaboration with academia is critical to educating the public on FO," adds Oasys Chief Technology Officer, Rob McGinnis.

About Oasys Water

Oasys (Osmotic Application Systems) is a Cambridge, MA based company developing a suite of proprietary energy and resource recovery products to address the growing, global water crisis. Engineered OsmosisTM (EOTM) is a platform for reducing cost in the production of clean water, power and energy through more efficient and sustainable utilization of resources. For information, please visit: http://www.oasyswater.com.

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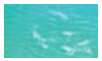
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SOUTH ORANGE COASTAL OCEAN DESALINATION PROJECT

Project Contact

Karl Seckel, P.E.
Assistant General Manager
Municipal Water District of Orange County

(714) 963-3058
kseckel@mwdoc.com

Project Location: Doheny State Beach

Extended Pumping and Pilot Plant Testing for the South Orange Coastal Ocean Desalination Project began June 2010 at a temporary mobile test facility at Doheny State Beach in Dana Point and will continue for two years.

Project Background

The **Municipal Water District of Orange County** began exploring the feasibility of developing an ocean desalination facility in 2002. The South Orange County Water Reliability Study recommended a number of initiatives to improve water reliability, including ocean desalination in South County.

In 2006, a **Project Participants' Committee** was formed with members from the cities of San Clemente and San Juan Capistrano, Laguna Beach County Water District, Moulton Niguel Water District and South Coast Water District. The Municipal Water District is a Project Supporter.

Project Meetings

The Project Participants' Committee generally meets once a quarter. Upcoming or most recent meeting information is posted here.

- **Date:** February 22, 2012
- **Time:** 2:00 pm
- **Location:** Dana Hills Tennis Center, 24911 Calle de Tenis, Dana Point, CA 92629

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- **Documents:** Click here for the Agenda Packet 02.22.12. They provide the agenda, reports and draft minutes from the last meeting.

While the committee meetings are not subject to the Brown Act, members have decided that their meetings involve a matter of public interest and shall be open to the public.
The group is voluntarily following Brown Act procedures as a courtesy and convenience to its members and the public.

Project Goals

Currently, South Orange County is about 90% reliant on imported drinking water to meet the needs of residents and businesses. The proposed ocean desalination facility could yield 15 million gallons a day of local potable water -- approximately 25% of the water needed in the area. If feasible, funded and built, this regional facility could be operational as early as 2020.

- To replace unreliable and decreasing supplies of imported water
- For emergency back up should an earthquake, system shutdown or other event disrupt the delivery of imported water to our area

Project Milestones

- From 2005 to 2007, Phase 1 and 2 Project Testing took place at Doheny State Beach and concluded successfully – involving hydrogeology studies, near-shore test drilling, and initial ocean water pumping.
- In 2006, a subsurface slant well was drilled into the sand at Doheny Beach and under the ocean floor. The 350-foot long subsurface well is innovative technology for ocean-water intake because it draws feed water through an alluvial formation under the ocean rather than the open water. This approach avoids many environmental concerns of open-water intake such as entrainment and impingement of marine organisms. At the same time, it offers the benefits of natural filtration of feed water -- significantly reducing or eliminating costly pre-treatment efforts and providing a buffer against red tide and other shock-loading events.
- Phase 3 Extended Pumping & Pilot Plant Testing has received the support of environmental organizations because feed water intake does not harm marine life.

Project Status

Over the next two years of Phase 3 testing, essential ocean water and groundwater data will be evaluated, including well performance and impact on groundwater, reverse osmosis membrane treatment, materials corrosion and microbial growth. A pre-treatment study will investigate methods to remove iron and manganese in the feed water due to groundwater entering the subsurface slant well.

Phase 3 testing costs are estimated at $5 million. Funding has come from a $1.5 million grant from the California Department of Water Resources, an $850,000 grant from the U.S. Bureau of Reclamation, and the contributions of the participating agencies and cities.

The Metropolitan Water District of Southern California has agreed to provide a subsidy of $250 per acre-foot of desalinated water produced at the proposed facility, which could lower the projected cost of desalinated water to $1,100 per acre-foot. Metropolitan estimates that in 2015 the purchase price for its imported water will be $927 per acre-foot.

Project Elements

- Successfully complete feasibility testing.
- Form joint powers "project participant" group.

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- Secure project funding (up to $150 million).
- Develop full-scale project description
- Develop and adopt Environmental Impact Report
- Determine construction approach: design/build/operate
- Secure ground lease agreement for desalination facility.
- Secure necessary permits for construction in the coastal zone.
- Design intake well system and reverse osmosis process
- Select construction contractor/s.
- Construct well system and desalination facility.
- Commence operations (2020)

Project Information

Agendas
South Orange County Coastal Ocean Desalination Agenda Packets

- Agenda Packet 02.22.12 (1.74 MB)
- Agenda Packet 01.25.12 (4.98 MB)
- Agenda Packet 11.16.11 (653.1 KB)
- Agenda Packet 10.26.11 (2.03 MB)
- Agenda Supplement 09.21.11 (1.02 MB)
- Agenda Packet 09.21.11 (3.24 MB)
- Agenda Packet 05.16.11 (2.98 MB)

Desal Plant
South Orange County Coastal Ocean Desalination Plant

- SOCOD Desalination Plant Newsletter 2008/2009 (1.18 MB)
- SOCOD Desalination Plant Newsletter 2010 (542.3 KB)
- The Need to Diversify Slideshow (132.9 KB)

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SEAWATER DESALINATION
HUNTINGTON BEACH FACILITY

Santa Ana Regional Water Quality Control Board Unanimously Approves HB Desalination Project

Huntington Beach, CA – Poseidon Resources today announced that the Santa Ana Regional Water Quality Control Board ("SARWQCB") unanimously approved an amended National Pollutant Discharge Elimination System ("NPDES") Permit for the Huntington Beach Seawater Desalination Project ("Project"). SARWQCB first approved

February 10th, 2012 in News, News Release, Press Release by admin No Comments »

Huntington Beach, CA – Poseidon Resources today announced that the Santa Ana Regional Water Quality Control Board ("SARWQCB") unanimously approved an amended National Pollutant Discharge Elimination System ("NPDES") Permit for the Huntington Beach Seawater Desalination Project ("Project").

SARWQCB first approved the Project's NPDES permit in 2006 enabling the desalination facility to operate in unison with the co-located Huntington Beach Generating Station ("HBGS"). The amended permit allows the Project to operate in a "stand-alone" mode when the HBGS is temporarily shut down; or when the HBGS is operating but its seawater discharge volumes are not sufficient to meet the Project's 126.7 MGD intake requirements.

"Poseidon Resources is grateful to the Regional Board and its staff for the thoughtful consideration given to the Project," said Poseidon Resources Vice President Scott Maloni. "The Regional Board's approval confirms that the Project's stand-alone operation complies with all applicable state and federal policies, laws and regulations, and the amended permit ensures long-term operational certainty necessary to provide Orange County with a reliable, new drought-proof water supply," he said.

The California State Water Resources Control Board is the state's prevailing regulatory authority on water quality and was created by the legislature in 1967 to protect California's waters. The Project's

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stand-alone operations are regulated under California Water Code (CWC) Section 13142.5(b), which requires new industrial facilities using seawater for processing to use the best available site, design, technology and mitigation feasible to minimize intake and mortality of marine life. In approving the Huntington Beach desalination facility's temporary stand-alone operation the Santa Ana Regional Board found the Project fully complies with CWC Section 13142.5(b).

The Regional Board's approval of the Project clears the way for the California Coastal Commission to consider approval of the final permit necessary before desalination facility construction can start. Poseidon Resources has applied for a Coastal Development Permit ("CDP") and a permit hearing is anticipated later this year.

"Poseidon is appreciative of the overwhelming support the community has expressed for the Project over the past decade," continued Maloni. "The Regional Water Board received dozens of letters of support from the business community, local Huntington Beach residents, and all 14 members of Orange County's state legislative delegation. The enthusiasm for this project, which will bring both water and jobs to Orange County, continues to grow," said Maloni.

Over 2,000 jobs will be created during Project construction. Once completed, the seawater desalination project will provide up to 50 million gallons of drinking water per day for Orange County, approximately eight percent of the county's water supply needs. For more information about the project, log on to www.hbfreshwater.com.

Poseidon Resources specializes in developing and financing water infrastructure projects, primarily seawater desalination and water treatment plants. These projects are implemented through innovative public-private partnerships in which private enterprise assumes the developmental and financial risks. For more information on Poseidon Resources and the company's projects, visit www.poseidonresources.com

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- Santa Ana Regional Water Quality Control Board Unanimously Approves HB Desalination Project
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This fresh water facility would bring millions in revenue to Orange County - money that could support schools, police and fire protection, health, welfare, and transportation.
- Orange County Taxpayers Association

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Economic Evaluation of the Cadiz Groundwater Storage and Dry Year Supply Project, Metropolitan Water District of Southern California

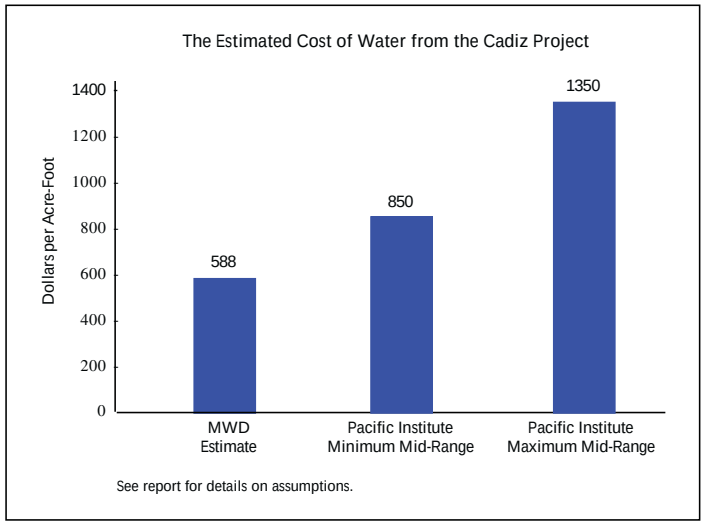
July 16, 2001

Prepared by:

The Pacific Institute for Studies in Development, Environment, and Security
654 13th Street, Preservation Park, Oakland, CA 94612
www.pacinst.org

Under the Supervision of:

Gary Wolff, P.E., Ph.D.
Principal Economist and Engineer



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About the Pacific Institute

The Pacific Institute for Studies in Development, Environment, and Security is an independent, non-profit center created in 1987 to conduct research and policy analysis in the areas of environment, sustainable development, and international security. Underlying all of the Institute's work is the recognition that the pressing problems of environmental degradation, regional and global poverty, and political tension and conflict are fundamentally interrelated, and that long-term solutions require an interdisciplinary perspective. The Institute strives to improve policy through sound research and consistent dialogue with action-oriented groups from the international to local level.

About This Report

Proposals for meeting California water needs are always controversial, as are the analyses of the costs and benefits of those proposals. One of the greatest uncertainties in studies of water is the cost of new water supply. Estimates of project cost depend on a wide range of uncertain factors, including water yields, the cost of money, expected capital costs for construction, the amortization period, and other factors. Often, the values chosen in analyses reflect the preferences and priorities of the analyst rather than the most reasonable values given uncertainty. Errors and omissions are often common as well, leading to unreliable or incorrect estimates.

Several historical and recent examples of inadequate cost projections should give those working in this field pause. Last year, an economist at the U.S. Army Corps of Engineers blew the whistle on biased cost-benefit studies for projects along the Missouri and Mississippi rivers, leading to calls for reform of the process. Closer to home, the actual cost of the Diamond Valley reservoir was considerably higher than originally estimated.

There is an old saying that there are few things more uncertain than the weather. Cost estimates might warrant that distinction. Nonetheless, like the man with the imaginary chicken in the old joke — "I know the chicken is imaginary, but I keep it because I need the eggs" — we continue to work hard at estimating the cost of water-supply projects, despite the uncertainty involved, because of the importance of avoiding making inappropriate or unnecessarily expensive choices.

This report addresses a recent estimate of the cost of water from the Cadiz storage and water supply project. Using the same data as project proponents, supplemented by generally available information, we offer an independent assessment of these costs. In preparing this assessment, we found that the estimate prepared by consultants to the Metropolitan Water District made a number of inappropriate or biased assumptions for at least four cost parameters. Changing these assumptions changes the range of cost estimates for the Cadiz project quite significantly. We believe that there is a high probability that the cost of water from the Cadiz project will be significantly higher than the consultant's estimate. This, in turn, should raise questions for policymakers and consumers about how to proceed with the project. What will be the ultimate cost of Cadiz water? The answer to this depends on decisions still to be made, and on information that is still incomplete. We hope that this report will help to ensure that public policy based on more accurate and complete information has a fighting chance.

Peter H. Gleick, Ph.D.
President

The research in this analysis was supported by a donation from the Western Environmental Law Center.-

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Economic Evaluation of the Cadiz Groundwater Storage and Dry Year Supply Project, Metropolitan Water District of Southern California

Synopsis

This report summarizes the Pacific Institute's economic evaluation of the Cadiz groundwater storage and transfer project. The evaluation is consistent with and elaborates on the analysis previously submitted by Professor Charles Howe of the University of Colorado at Boulder, a highly experienced water resources economist, in response to the draft Environmental Impact Report. It also updates the statements made by Gary Wolff, Principal Economist and Engineer at the Pacific Institute, in oral testimony before the Metropolitan Board of Directors on April 9 and 10, 2001.

Our minimum mid-range estimate of the cost of water from the project is more than 45% higher than that estimated by Metropolitan staff because favorable assumptions were used by staff for four cost estimating inputs,[1] rather than more neutral, middle of the road assumptions. Our minimum[2] mid-range cost estimate for the Cadiz project is about $850 per acre-foot as opposed to a staff estimate of less than $600 per acre-foot. This is obviously important from a rate-payer perspective.

Perhaps more importantly, however, these adjustments imply that the cost of water from the Cadiz project with 300,000 acre-feet or less of native groundwater take will probably be more than $1,050 per acre-foot, far in excess of other storage projects available to Metropolitan. That is, the project does not seem to make financial sense as a "storage only" project.

Because the quantity of native groundwater transferred is to be determined by a groundwater monitoring program during implementation of the project, Metropolitan is being asked to invest at least $120 million in a project that could be found, at a later time, to be economically undesirable.

Because the quantity of native groundwater transferred is to be determined by a groundwater monitoring program during implementation of the project, Metropolitan is being asked to invest at least $120 million in a project that could be found, at a later time, to be economically undesirable.

Method of Analysis

Our analysis is based on information available in the public record or provided by Metropolitan staff. A summary of the assumptions and calculations used in our analysis is attached. At least eight significant physical or economic cost factors are uncertain. (Contractual and business related uncertainties are also discussed in the report by Ernst & Young, described below). The significant physical and economic cost factors are:

[1] These are: quantity of native groundwater taken, quantity of Colorado River water that can be stored, the cost of obtaining water to be stored, and energy cost.

[2] We say "minimum" because two potentially significant cost factors — future environmental mitigation and groundwater treatment costs — are not included in our mid-range cost estimate. These costs are discussed, but are not appropriate to include prior to completion of the environmental impact statement.

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1. Hydrologic uncertainty associated with historical variation in yearly and longer-term weather patterns. This in turn affects the pattern of puts and takes that satisfies Metropolitan's operational opportunities and requirements.
2. Future adjustments in the fair market value of native groundwater.
3. Quantity of native groundwater that can be taken within environmental constraints.
4. Quantity of Colorado River water that can be stored.
5. The cost of obtaining water to be stored.
6. The cost of electricity (approximately 90% of the estimated operation and maintenance cost of the Cadiz project is for electricity).
7. The cost of treating extracted water to satisfy stricter, future State or Federal water quality standards.
8. The cost of mitigating any environmental impacts that do occur despite efforts to avoid such impacts. (Many water projects have had long-term environmental impacts that were unforeseen initially, or occurred despite best efforts to prevent them).

Metropolitan staff have estimated that water from the Cadiz project will cost, on average, about $200 per acre-foot more than the District is paying for wholesale water today (around $400 per acre-foot).

Metropolitan staff and consultants have used reasonable mid-range assumptions for items 1 and 2, but unreasonably favorable assumptions for items 3-8. Our evaluation assigns reasonable mid-range values to cost items 3-6. We do not assign a mid-range value to cost items 7 and 8 because doing so would be premature prior to completion of the environmental impact report. That is, we present conservative results that are applicable even if cost items 7 and 8 turn out to be insignificant. However, we discuss all eight cost factors, below.

Metropolitan staff previously estimated a uniform unit cost of $588 per acre-foot for water from the Cadiz project. Uniform unit cost estimates are the way economists compare the cost per acre-foot of water from a project that will deliver water in different years at different prices with the cost per acre-foot of water being paid today. The uniform unit cost estimate adjusts for the time value (earning potential) of money. This means that Metropolitan staff have estimated that water from the Cadiz project will cost, on average, about $200 per acre-foot more than the District is paying for wholesale water today (around $400 per acre-foot). The staff cost estimating procedure is documented in "Cadiz Groundwater Storage and Dry Year Supply Program, Agreed Upon Procedures" (Ernst & Young, January 2001). Ernst & Young used the draft Economic Terms and Responsibilities available in January, but subsequently stated that their results also apply to the Economic Terms and Responsibilities approved in April.

Before examining the impact of realistic mid-range cost assumptions for items 3-6, we created a base case economic analysis (spreadsheet attached) built around the assumptions documented in Ernst & Young (2001), but updated to reflect the Economic Terms and Responsibilities approved in April. Our base case cost estimate is $575 per acre-foot, very near the staff estimate of $588 per acre-foot. This confirms that our analysis is an "apples to apples" comparison with staff analysis. *We emphasize, however, that our base case is used only as a reference point. Calling it the "base case" does not imply that it is correct or likely to occur.*

Individual Cost Factors

The eight cost estimating assumptions identified above are evaluated one by one in this section of our report. When a change in cost assumption from that used by Metropolitan staff or in our base case is appropriate, we describe the additional cost that results from changing only that assumption. The impact of combinations of changes in cost assumptions is discussed in the next section.

1. Hydrologic Uncertainty

The usual and appropriate way to address uncertainty is to evaluate the range of favorable and unfavorable scenarios, and then to average them. This is precisely what Metropolitan staff did to address hydrologic uncertainty (e.g., the pattern and timing of wet and dry years). The staff estimate of $588 per acre-foot is the average of 77 hydrologic scenarios.

Annual water rate increases in the 1990s in Southern California exceeded inflation by about 3.5%. In comparison, our mid-range cost estimate for water from the Cadiz project -- in current dollars -- is more than double (200%) the current wholesale price of water.

2. Future Adjustments in the Fair Market Value of Groundwater

Staff and Ernst & Young investigated the impact of increases in fair market value (FMV) of native groundwater. They investigated 3%, 5%, and 8% annual increases in the nominal price to Metropolitan of native groundwater. These percentages include inflation assumed at a rate of 3% per year: that is, they represent increases equal to the rate of inflation, and 2% and 5% greater than the rate of inflation. The $588 per acre-foot estimate is based on 3% inflation and a 3% increase per year in the nominal price of native groundwater: That is, the estimate assumes Metropolitan's contractual price for native groundwater rises at the rate of inflation.

We compared these assumptions with historical water price and inflation data for Southern California. Figure 3 of the 1999 Black & Veatch California Water Charge Survey shows a Southern California rate trend that amounts to 5.5% per year, compounded, from 1991 to 1999. During that same period the change in the Los Angeles-Riverside-Orange County Consumer Price Index (All Urban Consumers) was about 2% per year, compounded. This implies that water rate increases in the 1990s in Southern California exceeded inflation by about 3.5% (5.5 - 2.0).

These historical data indicate that the assumed inflation rate of 3% was unfavorable to the project because the actual historic rate of inflation was lower (i.e., 2% is lower than 3%). On the other hand, they also suggest that the assumption that 50% of the change in FMV is equal to the rate of inflation was favorable to the project, because the actual adjustment in FMV that would have taken place based on historic data is 0.75% higher than the rate of inflation (i.e., 1/2 of 5.5% is 2.75%, which minus 2% is 0.75%) We analyzed a variety of combinations of inflation rate and possible future changes in FMV, and concluded that the staff assumptions for this cost factor were reasonable mid-range assumptions based on

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historical data. Of course, the historical rate of inflation and historical changes in water prices in Southern California may be a poor predictor of future inflation or future price changes. Historical data is merely the best data available at this time.

3. Quantity of Native Groundwater that Can be Transferred

The staff estimate and base case assume 1.5 million acre-feet of native groundwater can be transferred. This is not a reasonable mid-range estimate, but is at the favorable end of the range of quantities of native groundwater that various parties have said may be available. We used a mid-range estimate of 0.9 million acre-feet: the average of 1.5 and 0.3 million. This adjustment alone increases the estimated cost of water from the Cadiz project by about $45 per acre-foot. *As discussed in the section below, "Combinations of Cost Factors," it has a much larger financial impact than the impact in the Ernst & Young (January 2001) analysis of reduced transfer of native groundwater.*

Net take of native groundwater requires that it be taken prior to storage of Colorado River water or after stored water is removed. Operationally, net take of native groundwater is therefore not possible every year of the 50-year project life.

We used 6,000 acre-feet per year as the lower end of the range of transfers: the amount currently extracted by Cadiz for agricultural operations. This is also the sustainable yield estimated from a variety of credible sources, as documented in comments on the draft environmental impact statement. This amounts to no more than 0.3 million acre-feet over the 50 year time period. It probably overstates the amount of native groundwater that can actually be taken once storage operations begin, if 6,000 acre-feet per year is the sustainable yield, because recharge that occurs during "storage years" will probably be lost at least in part to evaporation before it can be captured for transfer.

We established the upper end of the range of native groundwater take as an average of 30,000 acre-feet per year; a total of 1.5 million acre-feet over 50 years. This figure is based on an operational constraint that applies even if the 60,000 acre-feet per year sustainable yield estimate provided by consultants to Cadiz, Inc. were accurate. Net take of native groundwater requires that it be taken prior to storage of Colorado River water or after stored water has been removed. Operationally, net take of native groundwater is therefore not possible every year of the 50-year project life. Our upper end assumption of 1.5 million acre-feet is equivalent to 60,000 acre-feet per year in 25 of the 50 years of the project life (perhaps after Colorado River water has been stored and then removed). Transfer of 1.5 million acre-feet of native groundwater is probably the maximum quantity of transfer that would be operationally possible, if recharge were 60,000 AF/ year, given that Metropolitan plans to store as much Colorado River water as can be stored prior to 2017.

4. The Cost of Water to be Stored

Metropolitan cannot store water and meet current demands in any year without obtaining additional water that year. The staff estimate of $588 per acre-foot and our base case estimate of $575 per acre-foot assume zero cost of the water to be stored. This is clearly inaccurate. Metropolitan staff informed us that the minimum variable cost for additional water from the State Water Project in wet years has been around $90 per acre-foot. Since the Colorado River Aqueduct (CRA) flows full at present, any storage along the CRA requires additional water to be procured from the State Water Project (or taken from other storage facilities).

A higher but equally valid estimate of the cost of the water to be stored is $154 per acre-foot. This is the payment Metropolitan offers to large customers or member agencies that can reduce water use by at least 10 acre-feet per year. It is reportedly based on an internal calculation of the avoided costs of conservation: that is, the variable cost per acre-foot that Metropolitan avoids when demand decreases by an acre-foot. This is the same as the cost of obtaining and delivering an extra acre-foot, which is essentially what is required when an acre-foot is stored somewhere in the Metropolitan system, then brought back from storage at a later time.

Consequently, we used the average of $90 and $154 ($122) for our mid-range cost estimate. This is much more realistic than the staff and Pacific Institute (PI) base case assumption of $0 per acre-foot for the water to be stored. This adjustment alone causes the cost of water from the Cadiz project to increase by about $33 per acre-foot. As discussed below, it has a much larger financial impact as less native groundwater is available, because stored water becomes a larger percentage of total water from the project as the quantity of native groundwater transferred declines.

As noted by several Board Members at the April 10th meeting, the currently ongoing Integrated Resource Planning (IRP) process -- if applied to the Cadiz project -- might find that the Cadiz project is not economically attractive relative to other conjunctive use opportunities.

In addition, this cost will probably not affect alternative conjunctive use projects equally. For example, the cost of obtaining water to be stored may be much higher for the Cadiz and Hayfield projects as compared with the Arizona or Coachella Valley projects, because the latter projects would not reduce water at the discharge end of the Colorado River Aqueduct in storage years, and therefore would not require replacement water from the State Water Project. Colorado River Water stored before it is placed in the CRA will probably have a much lower cost than State Water Project water, an issue that apparently has not been evaluated. As noted by several Board Members at the April 10th meeting, the currently ongoing Integrated Resource Planning (IRP) process — if applied to the Cadiz project — might find that the Cadiz project is not economically attractive relative to other conjunctive use opportunities.

5. Quantity of water that can be stored

The staff and base case estimates assume 1,000,000 acre-feet can be stored. This is the upper end of the range identified in the Environmental Planning Technical Report, Project Feasibility and Facilities Report (Black & Veatch, November 1999). Storage capacity as low as 500,000 acre-feet was also considered reasonable by Black & Veatch. A mid-range estimate of 750,000 acre-feet[3] is more appropriate than the assumption used, and in itself

[3] In fact, an as yet unpublished evaluation of storage capacity by John Bredehoft found that 750,000 acre-feet of storage was the maximum storage capacity, not the middle of the reasonable range. But we use the middle of the Black & Veatch range because it is a credible source as well.

increases the absolute cost of water from the Cadiz project by about $35 dollars per acre-foot. As discussed below, this factor also has a much larger financial impact as native groundwater quantity declines because the fixed costs of the project must be spread over fewer and fewer acre-feet, total.

In addition, this adjustment makes the Cadiz project less attractive relative to other conjunctive use projects. If storage capacity of the Cadiz project is smaller than 1,000,000 acre-feet, the cost estimates for other conjunctive use projects are unaffected. As noted by several Board Members at the April 10th meeting, the IRP process could conceivably find that the Cadiz project is not economically attractive relative to other conjunctive use opportunities.

Each additional cent per kwh, alone, adds about $25 to the cost of an acre-foot from the Cadiz project.

6. The Cost of Electricity

The staff estimate and base case assume electricity at rates that are no longer available in California: $0.045 per kilowatt-hour (kwh). Presumably this was realistic when Black & Veatch estimated project costs in 1999, but it is not realistic today given that power for the Cadiz project must be purchased on the spot market (Black & Veatch, 1999) or generated by Metropolitan in new energy production facilities. New electricity, at least in the next few decades, will not cost $0.045 per kwh. Consequently the staff and base case analysis are unreasonably favorable.

It is difficult to estimate the long-term mid-range cost of electricity for the project. Nine cents per kwh was a typical retail electric price prior to our current crisis. It is far lower than Metropolitan apparently paid recently for marginal kilowatt hours for pumps on the CRA (over $0.40 per kwh), and slightly higher than the ten to twenty year contracts for new natural gas power plants signed by the State of California since the current crisis began ($0.06 to $0.07 per kwh, plus transmission and distribution costs). Since transmission and distribution costs amount to well more than $0.02 or $0.03 per kwh, our assumption that power could be delivered to the appropriate pumping station(s) for $0.09 per kwh may be too low. But because project economics are very sensitive to the cost of energy, we have been careful to avoid a mid-range assumption that may be overly pessimistic.

Each additional cent per kwh, alone, adds about $25 to the cost of an acre-foot from the Cadiz project. Since we used $0.09 per kwh as a mid-range cost estimate, the change in the cost of energy assumption, alone, increases the cost of water from the Cadiz project by about $110 per acre-foot.

Again, this cost factor does not affect the Cadiz and other conjunctive use projects equally. For example, higher electricity costs affect the Cadiz project much more than the Hayfield project because Hayfield is much closer to the CRA; and therefore requires less energy for pumping. This is yet another reason that the IRP process might find that the Cadiz project is economically unattractive relative to other conjunctive use opportunities.

7. Future Water Treatment Costs

Native groundwater in the Cadiz and Fenner Basins contains levels of arsenic and chromium that are in excess of Federal and State drinking water standards that have already been proposed. It is likely that more stringent standards for arsenic and chromium will be adopted in the next few years. Over the 50-year time horizon of the project, it seems certain that extracted water (whether stored or native) will require some level of treatment. The staff and base case estimates, however, implicitly assume that any water treatment costs during this period will be small enough to be borne by Cadiz, Inc., as required under the approved Economic Terms and Responsibilities.

This cost factor is potentially very large, and also applies to a storage-only project since stored water will commingle with native groundwater or may leach naturally occurring minerals from soil and rock. Currently proposed standards might require reverse osmosis treatment: with current costs in the range of $500-$600 per acre-foot. Even if treatment by RO were not required until 2017, the real cost of water from the Cadiz project would increase by $500 to $600 per acre-foot at that time.

Over the 50-year time horizon of the project, it seems certain that extracted water (whether stored or native) will require some level of treatment.

Even though Cadiz is contractually required to pay for treatment of extracted water, a requirement for RO treatment — or any significant treatment requirement — would almost certainly bankrupt the Cadiz corporation, shifting water treatment costs to Metropolitan. Nonetheless, rather than arbitrarily selecting a mid-range or expected cost of treatment, we omit this cost factor in our mid-range cost estimate. Given the enormous uncertainty about future water treatment costs, we felt it was better to present a conservative mid-range economic analysis that does not quantify this cost factor. After all, less stringent chromium or arsenic standards than those currently proposed may be adopted, and less costly treatment techniques would then be feasible.

Whether this cost factor affects the Cadiz project more or less than other conjunctive use projects depends on the quality of native groundwater and the nature of geologic materials at other sites. It is certainly not true – as some Metropolitan staff have claimed — that all underground storage projects have the same financial exposure (risk profile) with respect to future water treatment costs.

8. Mitigation of Environmental Impacts

The staff and base case analyses assume that environmental impacts can be mitigated for $2 million, in total. This may be correct or incorrect. It is speculative at least until the Environmental Impact Report is completed. However, it is worth noting the potential environmental impacts that have been raised in comments and that could lead to significant mitigation costs. These include air quality impacts, impacts to the threatened desert tortoise, impacts on springs on which desert bighorn sheep depend, and water quality impacts from outward migration of brine from under Bristol and Cadiz Lakes. While estimates for the cost of most of these impacts cannot be made at present, it is useful to note that the cost of

mitigating airborne dust impacts from drying out of Owens Lake is currently estimated to be $60 million. Like the future cost of water treatment, the future cost of mitigation may be large.

Although reasonable estimates of mitigation costs cannot be made at this time, it is important to note that uncertainty in this cost factor affects the cost of the project asymmetrically: good news cannot reduce project costs significantly, but bad news can increase project costs significantly. Since environmental impacts and their mitigations are very project specific, there is again no reason to believe that this cost factor for the Cadiz project would apply equally to alternative conjunctive use projects.

Combinations of Cost Factors

Our analysis demonstrates that the project is probably economically undesirable unless it includes significant transfers of native groundwater.

The sum of the cost impact of each point identified above is not equal to their impact collectively. For example, less native groundwater increases the cost of the project, but reduces the cost increase caused by upward movement of the Fair Market Value for native groundwater. Our minimum mid-range cost estimate of about $850 per acre-foot accounts for these interactions.

In addition, estimates of the cost of the project over the range of native groundwater transfers – after combinations of cost factors are accounted for – differ significantly from the estimates prepared by Ernst & Young in January 2001. Ernst & Young (January 2001) analyzed the impact of more or less native groundwater using unrealistically low values for the cost of procuring water to be stored and the cost of electricity, and an unrealistically high value for the quantity of water to be stored. Once these three cost factors are adjusted to mid-range values, the cost of water from the Cadiz project becomes very high – over $1,000 per acre-foot – when native groundwater transfer is limited.

Table 1 and Figure 1 compare three estimates of the cost of water from the Cadiz project at six levels of native groundwater take varying from 0 acre-feet to 1,500,000 acre-feet. The Ernst & Young (January 2001) and Pacific Institute (PI) Base Case estimates are very similar, and give the impression the Cadiz project is competitive with the Arvin and Semitropic projects. The much more realistic Pacific Institute mid range estimate, however, shows in sharp contrast that the Cadiz project does not compare well with the Arvin or Semitropic projects unless a significant amount of native groundwater can be taken. For example, at 900,000 acre-feet of native groundwater transfer the Cadiz project ($840) is estimated to cost more than the Semitropic project ($797) and is much more expensive than the Arvin project ($491).

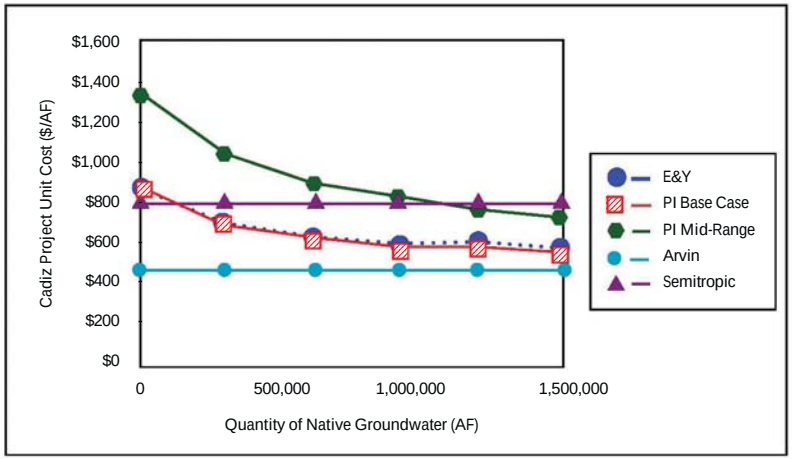
At 300,000 acre-feet of native groundwater, we estimate that water from the Cadiz project will cost more than $1,050 per acre-foot, *excluding* future water treatment costs and environmental mitigation costs. At 0 acre-feet of native groundwater — a direct storage-only comparison with the Arvin and Semitropic projects — we estimate that water from the Cadiz project will cost more than $1350 per acre-foot. Although Cadiz must turn over the

Table 1: Sensitivity of the Cadiz, Arvin-Edison, and Semitropic Project Cost Estimates to the Quantity of Native Groundwater Available at the Cadiz Site

	Cadiz Project Cost Estimates			Other Project Costs From E&Y (no native groundwater)	
GW Quantity (acre-feet)	E&Y ($/af)	PI Base Case ($/af)	PI Mid-Range ($/af)	Arvin ($/af)	Semitropic
0	$870	$820	$1,350	$491	$797
300,000	$715	$711	$1,055	$491	$797
600,000	$656	$653	$919	$491	$797
900,000	$625	$617	$840	$491	$797
1,200,000	$605	$593	$789	$491	$797
1,500,000	$588	$575	$754	$491	$797

Notes:
1. Ernst & Young (E&Y) estimates were interpolated from pages 6-8 and 6-9 of the Cadiz Groundwater Storage and Dry Year Supply Program, Agreed Upon Procedures (January 2001)
2. Pacific Institute (PI) Mid-Range Column is the mid-range estimate of $840/af adjusted to reflect the range of native groundwater that various parties claim will be available for export

Figure 1: Sensitivity to Quantity of Native Groundwater Transferred



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6,000 acre-feet of native groundwater it is currently using if necessary to provide 300,000 acre-feet of transfer water to Metropolitan, the proposed contract also limits actual quantities of transfer water to those which are consistent with environmental protection. The operational issue raised previously suggests that it is possible, and likely if 6,000 acre-feet per year is the sustainable yield of the Fenner and Cadiz Basins, that less than 300,000 acre-feet of native groundwater will be available to Metropolitan for transfer.

Conclusions

There is a good reason to question the economics of the currently proposed contract with Cadiz Inc. absent a detailed, credible field assessment of the sustainable yield of native groundwater.

The absolute cost of the Cadiz project is likely to be much higher than the $588 per acre-foot estimate presented by Metropolitan staff because four unreasonably favorable assumptions are embedded in that estimate. (Items 3-6 in the list of cost factors, above.) A reasonable, minimum, mid-range estimate of cost that uses appropriate values for cost factors 3-6 is about $850 per acre-foot, or about 45% higher than the staff estimate.

Furthermore, at least five cost factors will not have an equal effect on the Cadiz project and alternative projects: cost of water to be stored, quantity of water that can be stored, energy cost, water treatment cost, and environmental mitigation costs. The relative attractiveness of the Cadiz project and alternative projects may change significantly if they are thoroughly compared and contrasted through the IRP process.

Finally, if 300,000 or less acre-feet of native groundwater are available for transfer, water from the Cadiz project is estimated to cost from $1,050 to $1,350 per acre-foot. This is at least 2.5 times Metropolitan's current average cost of water; at least 2.0 times the staff estimate of the cost of water from the Arvin project; and at least 1.25 times the staff estimate of the cost of water from the Semitropic project. There is good reason to question the economics of the currently proposed contract with Cadiz Inc. absent a detailed, credible field assessment of the sustainable yield of native groundwater, and analysis of Cadiz, Inc.'s capacity to pay for future water treatment. *Because the quantity of native groundwater transferred is to be determined by a groundwater monitoring program during implementation of the project, Metropolitan is being asked to invest at least $120 million in a project that could be found, at a later time, to be economically undesirable.*

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Appendix A: Summary of Cost Estimating Assumptions

The base case assumptions were based on information in the Economic Terms and Responsibilities approved in April; the Environmental Planning Technical Report, Project Feasibility and Facilities Report (Black & Veatch, November 1999); the Cadiz Agreed Upon Procedures (Ernst & Young, January 2001); and staff reports or telephone conversations with Metropolitan staff. Key assumptions are listed below, with their relevant source:

Base Case Assumptions	Source
Put & Take pre-payments and payments	April Terms
Groundwater pre-payments and payments	April Terms
Capital and Equipment Replacement Costs	Black & Veatch
O&M Costs in Put, Take, and Idle Modes	Black & Veatch
Energy cost is 85-93% of O&M cost	Black & Veatch
Spot Market Energy cost of $0.045/ kwh (1999)	Black & Veatch
Discount Rate of 6%	Ernst & Young
Inflation Rate of 3%	Ernst & Young
Native groundwater transfer of 1,500,000 AF	Ernst & Young
Groundwater price of $230/ AF	April Terms
FMV adjustment of 3%	Ernst & Young
Storage capacity of 1,000,000 AF	Ernst & Young
Zero payment for water to be stored	staff
Mitigation costs of $2 million, included in capital cost	Black & Veatch
Extracted water treatment cost paid by Cadiz	April Terms

Mid-Range Estimate Changes From Base Case	Source
900,000 acre-feet of native groundwater	Average of reasonable range (0.3 to 1.5 million acre-feet)
$122 per acre-foot for water to be stored	Average of two Metropolitan sources; staff on the marginal operating cost of water from the State Water Project; and the avoided cost water conservation payment available to large customers.
Groundwater storage capacity of 750,000 acre-feet	Middle of Black &Veach Range (0.5 - 1.0 million AF).
Electricity at $0.09 per kwh	Retail rate before the current crisis, and consistent with 10 year or longer-term contracts signed by the Governor recently for electricity from new natural gas plants. Note that the March 2001 staff report shows spot market electricity for the CRA has increased 12-fold in the last year.

Appendix B: Economic Analysis Spreadsheet, Base Case

Cadiz Base Case Uniform Unit Cost Estimate ($/af): $575

Cost Estimating Inputs:

Met Cap + Loan Exp	$80,600,000	Water Treatment ($/af)	$0		
Electricity ($/kwh)	$0.045	Environ. Mitigation ($)	$0		
GW Price ($/af)	$230	Stored Water Procurement Cost	$0		
GW FMV Adjustment	3.00%	Native GW Take(af)	1,499,983	100 (% of 1.5 mill)	
O&M Put@150,000af	$3,800,000	Cost of Funds	6.0%		
O&M Take@150,000af	$8,000,000	CPI for Put & Take Fees	3.0%		
O&M Idle (fixed)	$450,000	Equipment Replacement	$400,000		
Put Fee ($/af)	$50	Loss of Stored Water	10%		
Take Fee ($/af)	$40	Max GW Storage (af)	1,000,000	100 (% of 1 mill.)	

Year	Discount Factor	Inflation Factor	Put (af)	Storage Take (af)	GW Take (af)	Total Take (Disc. af)	GW Payments ($)	Year	Capital & Eq. Replacement ($)	Put & Take Payments ($)	O&M Put Costs ($)	O&M Take Costs ($)	O&M Idle Costs ($)	Total Ann. (Nom. $)	Total Ann. (Disc. $)
2001	1.0000	1.0000	0	0	0	0	$0	2001	$80,600,000	$54,000,000	$0	$0	$0	$134,600,000	$134,600,000
2002	0.9434	1.0300	0	0	0	0	$0	2002		$0	$0	$0	$0	$0	$0
2003	0.8900	1.0609	131,132	0	0	0	$6,900,000	2003		$0	$3,524,321	$0	$0	$10,424,321	$9,277,609
2004	0.8396	1.0927	85,108	17,325	25948	34,878	$6,900,000	2004		$0	$2,355,995	$2,521,897	$0	$11,777,893	$9,888,946
2005	0.7921	1.1255	84,663	753	5735	5,079	$6,900,000	2005		$0	$2,413,987	$389,456	$0	$9,703,443	$7,686,036
2006	0.7473	1.1593	84,215	22,948	26416	35,173	$6,900,000	2006		$0	$2,473,249	$3,052,075	$0	$12,425,324	$9,284,925
2007	0.7050	1.1941	78,318	7,792	31247	26,972	$6,900,000	2007		$3,223,941	$2,369,067	$2,486,112	$0	$14,979,120	$10,559,689
2008	0.6651	1.2299	79,381	7,740	30156	24,688	$15,274,841	2008		$3,320,659	$2,473,258	$2,485,723	$0	$23,554,481	$15,665,075
2009	0.6274	1.2668	55,588	21,065	46351	40,976	$15,733,086	2009		$3,420,279	$1,783,903	$4,554,697	$0	$25,491,965	$15,993,974
2010	0.5919	1.3048	42,384	11,312	36844	27,834	$16,205,079	2010		$3,522,888	$1,400,972	$3,351,075	$0	$24,480,013	$14,489,682
2011	0.5584	1.3439	33,911	23,649	49883	39,739	$16,691,231	2011		$3,628,574	$1,154,530	$5,270,446	$0	$26,744,781	$14,934,146
2012	0.5268	1.3842	32,034	12,052	40156	26,868	$17,191,968	2012		$3,737,431	$1,123,345	$3,854,298	$0	$25,907,042	$13,647,506
2013	0.4970	1.4258	33,518	21,195	52078	35,361	$17,707,727	2013		$3,849,554	$1,210,646	$5,571,721	$0	$28,339,649	$14,083,937
2014	0.4688	1.4685	23,359	13,610	41325	25,118	$18,238,959	2014		$3,965,041	$869,021	$4,302,608	$0	$27,375,630	$12,834,763
2015	0.4423	1.5126	21,654	30,961	57883	37,926	$18,786,128	2015		$4,083,992	$829,758	$7,167,174	$0	$30,867,053	$13,652,527
2016	0.4173	1.5580	18,824	16,922	46835	25,897	$19,349,712	2016		$4,206,512	$742,955	$5,297,671	$0	$29,596,850	$12,349,731
2017	0.3936	1.6047	5,988	74,269	99558	65,503	$19,930,203	2017		$0	$243,428	$14,876,870	$0	$35,050,500	$13,797,499
2018	0.3714	1.6528	3,980	23,377	46610	25,123	$20,528,109	2018		$0	$166,651	$6,169,485	$0	$26,864,245	$9,976,425
2019	0.3503	1.7024	3,624	69,234	82026	50,567	$21,143,952	2019		$0	$156,297	$13,733,868	$0	$35,034,117	$12,273,985
2020	0.3305	1.7535	2,897	26,208	40364	21,137	$21,778,271	2020		$0	$128,691	$6,225,835	$0	$28,132,797	$9,298,255
2021	0.3118	1.8061	2,196	61,545	73364	40,146	$22,431,619	2021		$0	$100,478	$12,995,235	$0	$35,527,332	$11,077,590
2022	0.2942	1.8603	1,385	27,273	47657	21,239	$23,104,568	2022	$744,118	$0	$65,272	$7,434,233	$0	$31,348,190	$9,221,240
2023	0.2775	1.9161	730	50,988	68605	31,773	$23,797,705	2023		$0	$35,435	$12,221,470	$0	$36,054,609	$10,005,338
2024	0.2618	1.9736	197	29,057	53174	20,767	$24,511,636	2024		$0	$9,850	$8,655,466	$0	$33,176,952	$8,685,635
2025	0.2470	2.0328	0	44,540	72423	27,787	$25,246,985	2025		$0	$0	$12,680,624	$0	$37,927,609	$9,367,306
2026	0.2330	2.0938	0	23,677	46096	15,705	$26,004,394	2026		$0	$0	$7,791,422	$0	$33,795,817	$7,874,379
2027	0.2198	2.1566	0	37,233	62654	21,138	$26,784,526	2027	$0	$0	$0	$11,488,823	$0	$38,273,349	$8,412,866
2028	0.2074	2.2213	1,948	14,643	50488	13,202	$27,588,062	2028		$0	$109,619	$7,715,988	$0	$35,413,669	$7,343,660
2029	0.1956	2.2879	0	22,862	53253	14,443	$28,415,704	2029		$0	$0	$9,287,766	$0	$37,703,470	$7,375,935
2030	0.1846	2.3566	0	10,892	49256	10,900	$29,268,175	2030		$0	$0	$7,559,611	$0	$36,827,786	$6,796,816
2031	0.1741	2.4273	0	8,769	40105	8,357	$30,146,220	2031		$0	$0	$6,326,935	$0	$36,473,155	$6,350,346
2032	0.1643	2.5001	0	7,140	34372	6,701	$31,050,607	2032		$0	$0	$5,535,111	$0	$36,585,718	$6,009,381
2033	0.1550	2.5751	0	4,402	22840	4,153	$0	2033		$0	$0	$3,741,355	$0	$3,741,355	$579,751
2034	0.1462	2.6523	0	896	21429	3,251	$0	2034		$0	$0	$3,158,047	$0	$3,158,047	$461,663
2035	0.1379	2.7319	0	0	21429	2,955	$0	2035		$0	$0	$3,122,240	$0	$3,122,240	$430,593
2036	0.1301	2.8139	0	0	16225	2,111	$0	2036		$0	$0	$2,434,929	$0	$2,434,929	$316,797
2037	0.1227	2.8983	0	0	3951	485	$0	2037		$0	$0	$610,725	$0	$610,725	$74,961
2038	0.1158	2.9852	0	0	1948	226	$0	2038		$0	$0	$310,145	$0	$310,145	$35,913
2039	0.1092	3.0748	0	0	1299	142	$0	2039		$0	$0	$213,021	$0	$213,021	$23,270
2040	0.1031	3.1670	0	0	0	0	$0	2040		$0	$0	$0	$1,425,162	$1,425,162	$146,871
2041	0.0972	3.2620	0	0	0	0	$0	2041		$0	$0	$0	$1,467,917	$1,467,917	$142,714
2042	0.0917	3.3599	0	0	0	0	$0	2042	$1,343,960	$0	$0	$0	$1,511,955	$2,855,914	$261,942
2043	0.0865	3.4607	0	0	0	0	$0	2043		$0	$0	$0	$1,557,313	$1,557,313	$134,750
2044	0.0816	3.5645	0	0	0	0	$0	2044		$0	$0	$0	$1,604,033	$1,604,033	$130,937
2045	0.0770	3.6715	0	0	0	0	$0	2045		$0	$0	$0	$1,652,154	$1,652,154	$127,231
2046	0.0727	3.7816	0	0	0	0	$0	2046		$0	$0	$0	$1,701,718	$1,701,718	$123,630
2047	0.0685	3.8950	0	0	0	0	$0	2047		$0	$0	$0	$1,752,770	$1,752,770	$120,131
2048	0.0647	4.0119	0	0	0	0	$0	2048		$0	$0	$0	$1,805,353	$1,805,353	$116,731
2049	0.0610	4.1323	0	0	0	0	$0	2049		$0	$0	$0	$1,859,513	$1,859,513	$113,427
2050	0.0575	4.2562	0	0	0	0	$0	2050		$0	$0	$0	$1,915,299	$1,915,299	$110,217
2051	0.0543	4.3839	0	0	0	0	$0	2051		$0	$0	$0	$1,972,758	$1,972,758	$107,098
2052	0.0512	4.5154	0	0	0	0	$0	2052	-$451,542	$0	$0	$0	$2,031,940	$1,580,398	$80,941
	Sum of Takes, w/Losses, Discounted					794,320						Sum of Discounted Expenditures			$456,454,771
	Sum of Puts, 0 Loss		827,034												
	Sum of Takes, w/Losses, Nominal			744,329	1,499,983	2,244,312									

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ATTACHMENT J

ATTACHMENT J

Comments of

The Native American Land Conservancy

on the

Draft Environmental Impact Report

for the

Cadiz Valley Water Conservation, Recovery, and Storage Project

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ATTACHMENT TO COMMENT LETTER G42

Review of the Draft Environmental Impact Report/Environmental Impact Statement and Supplement to the Draft EIR/EIS (SCH. No 99021039)

Cadiz Groundwater Storage and Dry-Year Supply Program

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January 7, 2001

Review

The Cadiz Groundwater Storage and Dry-Year Supply Program (the Cadiz Project) has been proposed as a means to store Colorado River water imported from the Colorado River Aqueduct in the groundwater basins underlying a portion of the Cadiz and Fenner valleys in California's Mojave desert. The mixed source water would then be extracted to provide water to the customers of the Metropolitan Water District of Southern California.

A review of the Draft Environmental Impact Report/Environmental Impact Statement and Supplement to the Draft EIR/EIS (SCH. No 99021039) Cadiz Groundwater Storage and Dry-Year Supply Program was undertaken to specifically evaluate the potential for this project to impact upon the air quality environment in this region of the Mojave desert. Air quality will be affected by the construction, maintenance, and by long-term impacts on the environment brought about by this project.

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This review foremost raises questions concerning potential adverse impacts to the air quality, and in particular mineral dust contributions to particulate matter loading. This report identifies components in the EIR/EIS and its supplement where there appears to be insufficient data to allow critical decisions to be made regarding the potential levels of impact to the air quality environment that could be brought about by the Cadiz Project and its proposed management plan.

Specifically, there is a lack of information concerning the following aspects of the project and management plan, which may have greater environmental degradation effects beyond the claims of the EIR/EIS and its supplement:

The potential impacts of drawdown of the brine layer below Bristol and Cadiz Dry Lakes on dust emissions.

The discussion in the draft EIR/EIS and its supplement recognize that the brine water under Bristol and Cadiz Lakes is hydraulically connected with the freshwater aquifer adjacent to the lakes. The freshwater aquifer would be directly impacted by the Cadiz project. Information presented in the EIR/EIS estimates that drawdowns of between 10" and 25" are possible under the dry lakes during the lifetime of the project (EIR/EIS pgs. 5-100 to 5-103). These estimates of drawdown levels are also disputed; see Bredehoeft (2000) for a more detailed account of this potential impact created by the Cadiz Project. The lakebeds can respond to the lowering of the brine layer in several ways. However, sufficient knowledge is lacking to be certain which response may occur. If near-surface brine water sustains the salt-crusted surface, a drawdown of this magnitude might cause its destabilization making it increasingly susceptible to entrainment by the wind. This would result in an increase in dust emissions. The actual response of the surface to a lowering of the brine layer is not known at this time.

The response of the surface crust will depend in part on its composition as well as the dissolved load in the brine water. For example, at Owens Lake, CA, the surface crust becomes extremely susceptible to entrainment by the wind when hydration of the sodium carbonates and similar salts occurs, creating highly erodible conditions on the lakebed surface. If the playa crusts in question are sodium chloride or some other salt that does not effloresce in a hydrated state, then altering the groundwater may not change its

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inherent susceptibility to wind erosion. An analysis and comparison of the surface sediment characteristics and the brine water chemistry of Bristol and Cadiz lakes to Owens Lake conditions would allow for a better understanding of the potential for Bristol and Cadiz lakes to become more susceptible to dust emissions. G42-163

Even if the salt crust does not change its chemistry or its physical structure as a result of drawdown it must still be noted that any drying of the surface will result in the potential for increased wind erosion and dust emissions. Reducing water content in the pore spaces of the sediments increases the susceptibility to entrainment by wind. The loss of moisture from the surface sediments may also result in an increase in the amount of loose sand-sized particles that were once held in place by moisture. If large amounts of loose sand become available it will upon mobilization by the wind provide the most effective mechanism for liberating dust from the surface. G42-164

Potential impacts to air quality due to dust mobilization at Bristol and Cadiz dry lakes.

The monitoring plan to measure groundwater levels beneath the lake, soil moisture, evapotranspiration, wind speed, and wind direction at the lake surfaces described in the supplement to the EIR/EIS (pg. 6-10) is necessary and would have to be in place during the lifetime of the project to provide the information required to maintain an effective management strategy for the control of dust emissions. The drawdown of the brine layer is not projected to occur until 15 years into the project (EIR/EIS Fig. 5-15, pg. 5-104). In addition to the environmental parameters that have been identified in the supplement to the EIR/EIS (pg. 6-11) a recommendation is made here to include measurements of the saltation activity on the lakebed. G42-165

Saltation, the bouncing of sand-sized particles as they are moved by the wind is the key component of the dust emission process. The saltating particles effectively drive most of the dust emission process as they impact upon the surface, ejecting fine grained particles as they do so and also abrading dust-sized particles from larger particles. If more sand-sized particles become available for transport by wind due to a drying out of the surface, dust emissions from the lake surfaces can increase. The amount of dust injected into the air-stream during saltation scales approximately to the third power of the horizontal saltation flux (Shao *et al.*, 1993). An increase in the supply of sand that is susceptible to entrainment by wind will result in increased dust emissions. G42-166

Saltation activity can be monitored with commercially available instrumentation. The SENSIT, an instrument designed to measure saltation activity should be an integral part of an instrumentation network designed to monitor dust emissions from the dry lakebeds. The Great Basin Unified Air Pollution Control District, Bishop, CA, uses these instruments extensively to monitor saltation activity on Owens Lake, CA. They use the saltation activity data to infer the magnitude of the PM10 flux from Owens Lake. It offers a direct indication that the dust is being generated locally and is not being transported from more distant sources. A network of SENSITs on the lakebeds would provide an effective method to monitor on-lake saltation and dust emission activity through time and over the space occupied by the lakebeds. G42-167

The corrective measures proposed to ameliorate Cadiz-project impacts that lead to G42-168

dust emissions from Bristol and Cadiz lakes are not adequate to deal with the short time scales associated with dust emission processes. The proposed mitigation activities include one or more of the following options: 1) reduction in pumping from project wells, b) revision of pumping locations within the project wellfield, c) stoppage of groundwater extraction for a duration necessary to correct the predicted impact, or d) delivery of Colorado River water, if available, to the project spreading basins. None of these actions can provide the means to control a synoptically (weather) driven process like dust emissions. If it is dry and winds exceed the threshold value required for entrainment, dust emissions are likely to occur if there is a supply of available materials. Forecasting the occurrence of such an event beyond the scale of 24 to 48 seems unlikely. The brine groundwater system cannot respond to increased additions of Colorado river water in the project spreading basins, or by reduced pumping in the wellfields by rising to the surface (or near enough to the surface) to increase moisture content to levels sufficient to bind particles together in a time frame that could halt the dust emission process effectively. G42-168

A probabilistic approach could offer a better opportunity to use the brine layer as an effective control measure. This would be based on an understanding of the dust climatology of the area and the responsiveness of the brine layer to manipulation via increased water delivery to the spreading basins and/or decreased groundwater extraction. A management plan would have to be developed that would ensure the brine layer was effectively contributing sufficient moisture to the surface layer during periods when the lakebeds were most susceptible to wind erosion. This would most likely occur during periods of the year with the highest wind speeds and the greatest likelihood for dry surface conditions. The response of the brine layer to manipulation via the fresh groundwater system likely involves time lags on the order of weeks, months or years, but definitely not hours or a few days. The manipulation of the level of the brine layer to meet the requirement that the surface be resistant to wind erosion during the periods of highest erosive conditions (e.g., high winds, low humidity) may be at odds with the demands for the extraction of water and the logistics of managing a profitable water delivery schedule. G42-169

Before initiation of the Cadiz Project, further consideration must be given to mitigative actions that are designed to ensure dust emissions from Cadiz and Bristol lakes do not exceed levels of compliance for Federal and State air quality standards. At this time the actions being carried out at Owens Lake, CA, serve as a model for the development of control measures and a management plan for controlling dust emissions from a playa in order to meet Federal and State air quality standards. Key control methods being tested at Owens Lake, CA include the addition of water to the surface sediments using shallow flooding techniques, and the establishment of vegetation to control dust emissions. Both methods require the use of a readily available supply of water. The costs associated with a dust control system on a playa are not inconsequential. Who would bear the costs of such a system should be considered in the context of the Cadiz Project. G42-170

Air quality analyses related to mobilization of lakebed dust.

The views expressed by the NPS concerning the monitoring of air quality to determine degradation of the visibility and air quality in Critical Resource Areas are also G42-171

supported in this review. This review also levels several criticisms at the proposed monitoring plan in general. Two deficiencies are noted in particular. The first deficiency is in the proposed instrumentation for the monitoring network. The second deficiency is the plan to operate an air quality monitoring network for only a limited time span compared with the life of the project and with respect to the time frame in which air quality impacts may occur. G42-171

The EIR/EIS proposes the establishment of an air quality monitoring network consisting of four sites (Refer to Fig. 3-4 EIR/EIS Supplement) with meteorological instruments to measure wind speed and direction, light scattering with nephelometers, and digital cameras. The use of open-air nephelometers can be useful to provide an indication that dust emissions are occurring. However, the exclusive use of open-air nephelometers to estimate particulate matter loading from dust emissions that may originate from Bristol and Cadiz lakes is questionable. The nephelometer is an instrument that provides a measure of light-scattering. This measurement is dependent on the amount, size distribution, and scattering coefficient of aerosols in suspension. The units of light scattering (inverse megameters) can be converted to a mass concentration making assumptions for particle shape, size, and composition. This method of assessing particulate matter loading has high levels of uncertainty associated with it due to the assumptions made with respect to the properties of the suspended aerosol. It is recommended in this review that a Federal Reference Method (FRM) or accepted equivalent method be used to measure PM10 at the monitoring sites in addition to the measurement for light scattering. The actual measurement of particulate matter concentration is the basis for determining compliance with air quality standards, not a measure inferred from an indirect method. Collocation of the instruments does present the opportunity to calibrate the more cost-effective nephelometer instrument to a mass based standard. If a calibration relationship is established it may be feasible to remove the FRM instrument at some later time from the monitoring network. In addition, there is a need for measuring saltation activity on the lake, this is a key process affecting dust emissions and will provide data that clearly indicates wind erosion and dust emissions are occurring on the lakebeds. Please refer to the above discussion on potential impacts to air quality due to dust mobilization at Bristol and Cadiz dry lakes regarding monitoring of saltation activity on the lakebeds. G42-172

The EIR/EIS and its supplement propose an initial air-quality monitoring program of approximately 5 years. There seems little foresight in having a five-year air quality monitoring program for a project expected to last 50 years. In the first five years of the monitoring program the data would not reveal trends in air quality that result from impacts caused by the Cadiz project. This time period is too short to reveal potential project impacts for several reasons: 1) short-lived effects from the construction phase could be misconstrued as being representative of future conditions, 2) cyclical weather patterns such as the El Niño-Southern Oscillation (ENSO), which can bring increased precipitation levels to the Mojave, may ameliorate or mask Cadiz Project effects through several years, and 3) long-term impacts from the drawdown of the brine layer beneath Bristol and Cadiz Lakes that may result in increased dust emissions may not manifest themselves until after G42-173

the first five years of the project. G42-173

Potential for emissions from the spreading basins.

The EIR/EIS states during operations of the Cadiz Project, there would be occasions during annual periods of maintenance of the spreading basins when localized PM10 emissions would exceed standards (pg. ES 33). In addition, the report states that when the spreading basins are not undergoing maintenance, and are not being used for water recharge they would not contribute at levels significantly different from those of the surrounding desert environment. Two arguments can be raised to question the veracity of these claims. There is a high probability of emissions at levels significantly greater than the EIR/EIS and its supplement suggest.

The size of an individual spreading basin cell is reported to be 10-15 acres in size with the dimensions described as approximately 400'1,700 to 2,100'. This is an area of between 680,000 to. 840,000 square feet. No information is provided in the EIR/EIS or its supplement as to the amount of sediment that can be expected to be deposited annually in a cell. Conservatively estimating a deposition of only a fraction of an inch (e.g., 0.0254" [1 mm]) of silt and clay material and assuming an average cell area of 760,000 square feet, would result in the need to remove 2,493 cubic feet of silt and clay material from each cell. Assuming 40 cells are in operation then each a total of 99,712 cubic feet of silt and clay material would be removed from the spreading basins. Assuming a bulk density of 93 lbs/ft3, the mass of this material would 4,637 tons. If the deposition of atmospheric dust is taken into account the total amount would be 4,672 tons. The contribution from atmospheric fallout is based on an average deposition rate of 0.002 lbs/ft2 for this area (M. Reheis, pers. comm.). The removal and handling of 4,672 tons of silt and clay material could result in the release of significant amounts of PM10. This could be estimated with an emission inventory approach using emission factor values from AP-42 the U.S. EPA's emission inventory guidebook, and estimates of the activity levels required to remove and handle this material. It is recognized here that actually removing 0.0254" of sediment from a spreading basin is not feasible. There will more likely be a critical deposit thickness that would necessitate maintenance to remove it. Assuming that the critical thickness for maintenance is 0.25" of sediment, the total volume of sediment increases to 638,400 ft3, or a mass of almost 30,000 tons. The handling and storage of this amount of fine-grained sediments would produce significant amounts of dust and raises questions concerning its storage such that it would not represent an additional source of dust. G42-174

The storage of this material is of considerable importance. Once it has been removed from the spreading basins it will be in a loose disaggregated state and highly susceptible to entrainment by wind. Estimates of the amount of sediment that would have to be removed from the spreading basins are not provided in the EIR/EIS or its supplement, and so the impact of its removal on air quality is highly speculative. However, it must be recognized that even a conservative estimate of only 0.0254" of deposit yields a considerable amount of sediment when the total area of the spreading basins is taken into consideration. Estimates for the sediment yield in the spreading basins are critical to determine the impact on the air quality environment based on the scale of the G42-175

removal and handling operations and the actions required to safely store this material in a manner that does not leave it susceptible to entrainment by the wind. G42-175

The EIR/EIS supplement also states that the spreading basins would not contribute to PM10 levels any more than the surrounding open desert land (pg. ES-33). However, there are critical differences between spreading basin surfaces and typical Mojave desert surfaces. G42-176

Typical Mojave desert surfaces will have attained some degree of armoring of the surface over time due to the winnowing of loose erodible material, the formation of a desert pavement, or through the establishment of cryptogamic crusts (i.e., crusts of biologic origin). All these processes result in a reduction in the susceptibility of the surface to wind erosion. The settling basins will be areas where fine-grained materials sediment onto the underlying surface and subsequently dries out when the basins are not being utilized. Depending on the textural quality of the material and its ability to form a durable crust, these smooth surfaces of fine-grained material may be inherently more susceptible to wind erosion and dust emissions than the surrounding deserts. In addition due to the fine-grained texture of the material it will be a much richer source of dust-sized particles than the surrounding desert soils. G42-177

The settling basins will be devoid of vegetation and will be subjected to the full force of the wind unlike the surrounding desert environment that has a sparse vegetative cover. Research has shown that even a sparse cover of plants can be extremely effective in controlling wind erosion and dust emissions (Gillies *et al.*, 2000). Plant cover between 6-19% can significantly reduce or eliminate wind erosion depending on the species, the size of the plants, and their distribution (Gillies *et al.* 2000). Without vegetation on the surface the spreading basins may begin to emit dust at lower wind speeds than the surrounding desert surfaces due to a lack of protection from the wind and because of their fine-grained nature.

Disturbance of the Cadiz Dunes.

The EIR/EIS states that due to the construction of the conveyance pipeline, for which three alternative routes are proposed, sensitive dune sands and sand deposits will be temporarily and permanently disturbed. Depending on the routing for the pipeline between 130 to 177.8 acres and 16.5 to 35.2 acres of dunes and sand fields will be temporarily and permanently disturbed, respectively. The disturbance of these soil types that are extremely sensitive to erosion by the wind can create a potentially significant degradation of the local and regional environment. The reasons for this are twofold. Upon initiation of a disturbance in a sand dune community there is a high degree of probability that the disturbance will expand beyond the zone of impact as the sand is transported by the wind along the dominant wind direction vectors. There are many well-documented cases of dune disturbances expanding in areal extent following localized impacts (e.g., Lancaster, 1986; Jungerius and van der Muelen, 1989). How the EIR/EIS has determined what proportions of the dunes and sand fields will be temporarily disturbed or what criteria were applied to determine the size (and hence containment area) of permanently disturbed sandy areas is not provided, and therefore subject to considerable uncertainty. G42-178

The disturbed sand areas present a second potential problem beyond the immediate degradation of the dune areas themselves. The mobilized sand can become available for transport onto the Cadiz and Danby dry lakebeds where it may cause increased dust emissions as it is transported across the lakebed surfaces. According to the climate data presented in the supplement to the EIR/EIS (Figure 2-8, 2-9, pgs. 215-216), there exists significant opportunity for winds above the threshold for sand-sized particles (typically around 15 mph measured at 30 feet above the surface) to transport it onto the lakebeds of Cadiz and Danby. The project weather station wind velocity and wind frequency data (Fig. 2-8) shows NE winds occur up to 25% of the time at speeds often in excess of 10 mph. Winds of this magnitude and from this direction could move sand out of the Cadiz dune area, especially if disturbed by the alternative conveyance alignment for the pipeline and onto Cadiz dry lake. Other wind directions that would be problematic for this conveyance alignment would be from the north through to the east. If the eastern alternative were to be chosen, almost 2 miles of quaternary dune sands would be disturbed that could potentially be transported by winds from the west onto Danby dry lake. Westerly winds are the prevailing wind direction according to data presented in Figs. 2-8 and 2-9 of the supplement to the draft EIR/EIS. Should disruption of the sands in the vicinity of the pipeline lead to the transport of this sand onto the dry lakebeds there is an increased potential for dust emissions to occur from those surfaces. G42-179

Conclusions

In summary, there appears to be critical areas in the draft EIR/EIS and its supplement that do not adequately address the potential affects of the Cadiz project on air quality impacts at the local and regional scale. There is insufficient data in the draft EIR/EIS and its supplement to make the claims within the documents that the Cadiz project will have minimal or no impact on air quality for the points discussed above. Critical areas of concerns include: 1) the potential for drawdown of the brine layer beneath Bristol and Cadiz lakes could result in an increase in wind erosion processes and dust emissions, 2) the management plan for dealing with this potential problem, that is the expected ability to manipulate the level of the brine layer, is totally ineffective as a dust control measure in light of the water delivery requirements, 3) other types of control strategies to mitigate the potential dust emission problem and the associated costs have not been adequately explored, 4) the proposed monitoring network is insufficient to determine long term affects on air quality and for determining compliance with National Ambient Air Quality Standards, 5) the potential for dust emissions from the unused spreading basins has been understated, and 6) impacts to the sand and dune areas may result in transport of the sand by the wind onto Cadiz and Danby dry lakes resulting in increased potential for dust emissions.

For the above stated reasons, the draft EIR/EIS and its supplement do not adequately address the potential impacts of the Cadiz Project on air quality in this region of the Mojave desert. Until these concerns are addressed, this project carries a high degree of uncertainty in terms of its potential to impact the air quality environment and the potential future costs associated with the mitigation of these problem. G42-180

References

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Lancaster, N. (1986). Dynamics of deflation hollows in the Elands Bay area, Cape Province, South Africa. *Catena* **13**: 1390153.

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O_Natl Chloride 1

NATIONAL CHLORIDE COMPANY OF AMERICA
BRISTOL DRY LAKE, 12121 AMBOY ROAD
AMBOY, CALIFORNIA 92304
Producers of Liquid Calcium Chloride

February 1, 2012

Santa Margarita Water District
26111 Antonio Parkway
Santa Margarita, CA 92688

Ref: Draft EIR
Cadiz Inc Water Recovery and Storage Project

This will respond briefly to the subject EIR, as requested.

While the EIR has many errors in its contents, its message is clear. The goal of the CADIZ INC Water Recovery and Storage Project is to capture or obtain all ground water in the area outlined including Bristol Dry Lake, where our mining claims are located.

In making this reply, we need to advise that our understanding of your plan would violate our mining claims and our right to produce valuable minerals from them. Our rights are guaranteed under the United States Laws of 1872. We have been producing mineral brines on Bristol Dry Lake for the past 61 years. 1

Please eliminate the dangers in your plan to our mining claims that will result in damages and trouble.

National Chloride Company
of America

Tom Beeghly
Tom Beeghly

Mailing Address: P.O.Box 604, Norwalk, CA 90651
Phone (562) 926-3712 FAX (562) 404-2195

O_Natl Chloride 2

NATIONAL CHLORIDE COMPANY OF AMERICA
BRISTOL DRY LAKE, 12121 AMBOY ROAD
AMBOY, CALIFORNIA 92304
Producers of Liquid Calcium Chloride

February 27, 2012

Cadiz Valley Water Storage Project
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste 1100
Los Angeles, CA 90017

Ref:Draft EIR, Request for Additional Comments
Cadiz Inc Water Recovery and Storage Project

This will respond to your Notice of Extension of Review Period until March 14, 2012 with a request for written comments on this matter before this date.

Therefore, please know that your plan of action on Bristol Dry Lake would violate our mining claims and our right to produce valuable minerals from them. Please know also that our rights are guaranteed under the United States Mining Laws of 1872. 1

Action to remove our ground water and brine would be considered as acts of thievery and subject to severe damages. Please direct your intended plans of operation elsewhere.

National Chloride Company
of America

Tom Beeghly
Tom Beeghly

Mailing Address: P.O.Box 604, Norwalk, CA 90651
Phone (562) 926-3712 FAX (562) 404-2195

O_Needles Chamber

Needles Chamber of Commerce

P O Box 705 - 100 G Street Needles, CA 92363
760.326.2050 Fax: 760.326.2194
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January 12, 2012

Mr. Tom Barnes
ESA Southern California Water Group
626 Wilshire Blvd, Suite 1100
Los Angeles, CA 90017

Dear Mr. Barnes:

The Needles Chamber of Commerce proudly supports the Cadiz Valley Water Conservation, Recovery and Storage Project. With their commitment to our community over the past few years, we know that this projects' impact with have many positive effects for generations to come.

The support of our Needles businesses, our Needles Unified School District and the region as a whole will help our recovery come about at a faster pace. As a desert community we need more neighbors who are committed to sustainable and reliable water supplies that benefit many, not just a few. 1

This forward thinking Project will have significant value to not just our part of Southern California, but possibly all over the world for it forward thinking technology.

Sincerely yours,

Jeff Williams
President, 2011-2012

Enjoying life on the Colorado River

O_NW Pipe1

Northwest Pipe Company

February 14th, 2012

ESA | Southern CA Water Group
ATTN: Tom Barnes
626 Wilshire Boulevard, Suite 1100
Los Angeles, CA 90017
tbarnes @esassoc.com

Reference: Cadiz Valley Water Conservation, Recovery, and Storage Project
Subject: Draft EIR Comment

Mr. Barnes,

I am writing in support of the proposed water pipeline and well field project noted above in San Bernardino County. We operate a pipe manufacturing facility located in Adelanto, CA, that represents approximately 250 family-wage jobs that are dependent on this type of work to sustain our operations at Adelanto. Our industry is currently suffering from three consecutive years of declining markets and this project represents nearly a full year of production for our employees and our local supplier partners in the Adelanto/Victorville community. 1

This project not only provides jobs. Once completed, the pipeline will deliver thousands of acre-feet of very high quality water which will benefit much of Southern California for years to come. The long-term economic benefits of the water are far greater than we can calculate. We ask for your support for this essential project.

Sincerely,

Gary Stokes

Senior Vice President, Sales & Marketing
Northwest Pipe Company
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Twentynine Palms, Ca 92284
www.officesuppliesplus.org

c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017

RE: Cadiz Valley Water Conservation, Recovery, and Storage Project

To Whom It May Concern:

This letter is in support of the Cadiz Valley Water Conservation, Recovery, and Storage Project.

As long as there have been humans, we have used our natural resources. We have captured, diverted and turned resources into other useful items: clothing, food, medicine, heat, power and more.

I feel that there is sufficient science, oversight and monitoring for this project that most reasonable concerns will be mitigated.

In addition, the economic benefit to the community would be significant.

I support this project and hope that it moves forward without hindrance.

1

Sincerely,

Dee Richhart
President & CEO
Office Supplies Plus, Inc.

CC: cadizproject@esassoc.com

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ORANGE COUNTY COASTKEEPER.
3151 Airway Avenue, Suite F-110
Costa Mesa, CA 92626
Phone 714-850-1965
Fax 714-850-1592
www.Coastkeeper.org

February 6, 2012

Sent via U.S. Postal Service and Electronic Mail

c/o Tom Barnes, ESA
626 Wilshire Blvd., Suite 1100
Los Angeles, CA 90017
Telephone: (213)599-4300
FAX: (213)599-4301
Email: cadizproject@esassoc.com

RE: Cadiz Valley Water Conservation, Recovery, and Storage Project Draft EIR

Dear Mr. Tom Barnes, ESA and Santa Margarita Water District,

Orange County Coastkeeper ("Coastkeeper") is an environmental organization with the mission to preserve, protect and restore the watersheds and coastal environments of Orange County. We write on behalf of our collective membership to express our reservations with the Environmental Impact Report ("EIR") issued for the Cadiz Valley Water Project by the Santa Margarita Water District ("SMWD"), which would result in water from the Cadiz Valley being distributed within Coastkeeper's jurisdiction.

I. Factual Inconsistencies and Misleading Conclusions within the EIR

A. The Project May Result in Serious Harm to Wildlife

The most essential element for a thriving desert ecosystem is water, and it is also the scarcest. Coastkeeper understands that securing water resources for southern California is important. However, we must also choose projects with the least amount of impact to delicate ecosystems. While the land surrounding the Cadiz water project appears abandoned and barren to the naked eye, there are many unique species of desert flora and fauna that reside in the region, and they will certainly be impacted by the removal of water from this region. Although the EIR claims that the water that would be removed by the project would otherwise simply evaporate[1], the water, even when deep underground, actually plays an important role in the desert ecosystem. The EIR does not account for the impacts of the water supply being diverted from its natural course: evaporation through the soil. It is through this evaporation process that much of the soil is kept packed together and plants and animals can utilize the water while it is on the surface. In other words, the water does not evaporate instantaneously when it reaches the surface. 1

The Draft EIR incorrectly states that the project's construction activities would not significantly harm wildlife. According to the EIR, the project's impact on plant and animal, "species identified as a candidate, 2

[1] Cadiz Valley Water Conservation, Recovery, and Storage Project Draft EIR at ES-2 (2011).

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sensitive, or special-status species," would be, "less than significant with mitigation."[2] However, extraction of thousands of acre-feet of groundwater would significantly lower the groundwater table throughout the project area and the surrounding area. This could significantly impair plant growth in the region by lowering the groundwater table to a level where the roots of some species of plants cannot reach. When any species of plant is harmed in this way, it can affect the entire ecosystem, as the animal and insect species that depend on that species of plant lose an important source of food and/or habitat, and the animals that depend on these animals are affected, and so on through the food web. The EIR states that observation wells would be installed to monitor the effects of the project on groundwater outside of the project area. However, once these wells detect significant lowering of the groundwater table outside of the project area, that damage could be permanent. Furthermore, while these wells would be designed to monitor the project's effects on groundwater outside of the project area, there is very little thought given to the potentially harmful effects that a lowered groundwater table inside the project area could have on wildlife. 2

In addition to the harm caused by lowering the groundwater table, the project's construction activities could also significantly harm wildlife. For instance, the EIR acknowledges that some plant and animal species will likely need to be relocated outside of the construction areas. While the project describes this as a mitigation measure, this would actually be extremely disruptive to these species' lifecycles. For instance, the EIR describes the installation of one way doors in the burrows of burrowing owls to keep them out of their burrows within the construction area, presumably to prevent the owls from being killed or injured by construction.[3] Yet, despite the EIR's description of that process as a "mitigation measure," it would actually force the burrowing owls to relocate away from Cadiz property. While this would lessen the likelihood that owls are killed by construction, forcing the owls to find new habitat is not a suitable mitigation measure. Even more dramatic measures will be taken to force American badgers to leave the project area. The EIR states, "If the qualified biologist determines that potential dens may be active, the entrances of the dens shall be blocked with soil, sticks, and debris for three to five days to discourage use of these dens prior to Project disturbance."[4] This would effectively trap the badgers in their dens for several days to get them to flee once the blockages are removed. As with the burrowing owls, the EIR discounts the disturbance that would be caused to the animals by the "mitigation measures." Coastkeeper fundamentally disagrees with the notion that measures which force at-risk animals to relocate from their favored habitat to other areas do not have a significant environmental impact. 3

B. Groundwater Extraction and Storage May Result in Serious Environmental and Economic Harm to Neighboring Landowners

Lowering the groundwater table in the region could have a significant impact on neighboring landowners. One potential problem involves the impact the project could have on nearby wells. The EIR acknowledges that the reduction of available fresh groundwater could significantly increase the salinity of neighboring wells.[5] This could increase neighboring landowners' costs by forcing them to acquire fresh water from other sources. While the EIR lists several mitigation strategies for dealing with decreased water quality in neighboring wells, landowners engaging in agriculture could suffer significant economic harm while the mitigation measures are put into effect. Furthermore, lowering the groundwater table cold have the same effect on wells that it has on plants: it could lower the groundwater out of their reach, forcing the owners of neighboring wells to drill deeper to reach water. 4

[2] Id. at ES-14, ES-17.
[3] Id. at ES-16.
[4] Id.
[5] Id. at 4.9-53.

Water quality could also be seriously affected by the Imported Water Storage Component of the project because the water that would be brought into the area from outside sources is predicted to be more saline than the water already in the aquifer. Furthermore, there is a risk that other contaminants could be brought into the aquifer through the water storage phase of the project. While it is stated that the levels of contaminants such as perchlorate, nitrates, or other unknowns will be monitored before recharged into the system, it is unknown what will happen if the entire imported water storage system gets contaminated, thus limiting the amount of water recharged into the basin. 5

In addition to affecting the quantity and quality of groundwater on neighboring owners' land, the project may cause subsidence of neighboring land because removal of water from the soil reduces the soil's structural integrity. In section 4.6-35, *Geologically Unstable Area*, the analysis lists scenarios under which subsidence of the area surrounding the project will occur due to groundwater extraction. While there is consideration given to the effects of subsidence on the nearby railroad, there is not significant consideration given to the effects of subsidence of levels up to 2 feet on lands bordering Cadiz property, even though Cadiz activities could affect groundwater levels in an area considerably broader than Cadiz' property. The mitigation measures for subsidence near the project area involve the stoppage or reduction of pumping in the project wells, but there are no remediation measures in effect for subsidence on property that is not owned by Cadiz. 6

The EIR also fails to account for the potential impacts of climate change. For instance, the impact scenarios given in table 4.6-4 regarding subsidence do not give an adequate baseline because there is not a worst-case scenario given (e.g. 0 AFY natural recharge). Ignoring this possible scenario does not give an adequate idea of the impact of this project in the region. In light of this, there is not sufficient consideration given to the relationship between subsidence and the replenishment of the groundwater aquifer because the worst-case scenario is not discussed. By not considering the worst possible scenario, the EIR improperly reaches the conclusion that there is a less than significant impact for the Imported Water Storage Component of the project.

Furthermore, the EIR does not properly account for the potential impact of climate change on the aquifer's rate of recharge. The levels of water that are to be taken out of the groundwater system exceed the amount that is recharged every year (32,000 acre-ft/yr(AFY)). Therefore, this is more of a water-mining project than a sustainable water conservation project. At the current moment, Cadiz pumps 5,000 AFY of water for agricultural projects near the project area, and cite minimal impacts to the local ecosystem. In order to make the proposed water project profitable, Cadiz is proposing an increase in the amount of water extracted from the ground by an entire order of magnitude: 50,000 AFY. While this project will last only 50 years, it will take at least 67 years for the water table to recover to present day levels, and only if there is an absence of negative external factors. However, the EIR's conclusion of "no negative impacts" is based on the assumption that this ecosystem will not be altered during the 50-year duration of the project or the 67 years following it. Yet, the draft EIR states, "decreases in spring runoff and increases in evapotranspiration due to higher temperatures could reduce the amount of water available for groundwater recharge."[6] While the EIR cites global warming and the associated decrease in precipitation as a hazard for San Bernadino and Riverside counties, it does not discuss how the impacts of decreased precipitation will harm the water table's recharge rate. 7

The project significantly impacts the groundwater table levels and two nearby dry lakes, where the groundwater and surface runoff evaporates. The project area is in close proximity to both Bristol and 8

[6] Id. at 4.9-14.

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Cadiz dry lakes, where surface water drainage and groundwater currently flows. Due to this project, the normal flow into these dry lakes will not exist and this could lead to extensive drying of the area, resulting in an increase in dust in the air, much like the change that has occurred at Owens Lake. We have seen the environmental harms of the Owens Dry Lake bed over the past half century, sending toxic dust into the air and costing millions in management and cleanup costs. While both Cadiz and Bristol Dry Lakes are smaller in size, the loss of surface water to these lakes would have a significant impact on the air quality in the region. This could negatively affect both agriculture and public health in the region. Furthermore, the elimination of groundwater reaching these lakes would be extremely detrimental for the salt mines that operate there. Those mines depend on the evaporation of water from the dry lakes to produce salt. The loss of surface water in these lakes would eventually halt the production of salt at these sites, destroying those businesses' economic viability. 8 9

C. The EIR Fails to Adequately Consider Alternatives to the Project

The EIR fails to adequately consider more environmentally safe alternatives to the project. Two alternatives in particular that we believe are preferable to the project because of their far less significant environmental harms are the Other Supply Sources Alternative and the No Project Alternatives. All three of these alternatives would avoid a number of the potential harms of the Cadiz project which are unique to that project. These include the potential distribution of contaminated water, lowering of the water table, disruption of the delicate desert ecosystem by removal of groundwater and habitat loss, ground subsidence, and economic harm to both nearby landowners' wells and the salt mines at Bristol and Cadiz Dry Lakes. The discussions of these alternatives are perfunctory and misleading. 10

Of particular concern are the omissions of potential benefits of these alternatives and the illogical reasons each of these environmentally preferable alternatives has been rejected out of hand by the SMWD. For instance, the Other Supply Sources Alternative would remove all of the numerous environmental harms which are discussed above as unique to the Cadiz project. Yet, incredibly, the EIR suggests that the only benefit of choosing this alternative would be the reduction of greenhouse gas emissions.[7] This misleading statement about the benefits of the alternative follows directly from the EIR's repeated omission of various serious potential environmental harms of the project. The EIR goes on to say that this alternative was rejected because such a, "pursuit of other water supplies would likely occur with or without the proposed Project."[8] This statement assumes that projects which are currently planned or still in the planning stages would go forward even after developing the Cadiz project. However, it seems likely that, if the Cadiz project does go forward, some of the other proposed projects would be shelved. Thus, the development of other water sources is not guaranteed to occur, and therefore should be considered as an alternative to the Cadiz project. Finally, the EIR's discussion of the Other Supply Sources Alternative ends by saying, "Nor does this Alternative meet several other objectives."[9] However, one of the objectives the alternative supposedly fails to meet is, "Locate, design, and operate the Project in a manner that minimizes significant environmental effects and provides for longterm sustainable operations."[10] We believe that the Other Supply Sources Alternative would actually meet this objective more effectively than the Cadiz project would. 11

Similarly, the No Project Alternative is rejected out of hand, despite its obvious environmental benefits. The EIR states that the No Project Alternative was rejected because it would meet none of the project 12

[7] Id. at 7-10.
[8] *Id.*
[9] *Id.*
[10] *Id.* at 7-17.

objectives.[11] However, the project is repeatedly described as a conservation project throughout the EIR. Therefore, it seems logical that conservation would be one of the project's objectives. Despite this seeming importance of conservation, the only reason given for the No Project Alternative's rejection is that, "Domestic water supply reliability and storage would not be developed."[12] This ignores the important consideration of wildlife conservation, an objective which would be furthered by the adoption of the No Project Alternative. 12

II. The EIR Does Not Meet the Legal Requirements for EIRs

EIRs are required by the California Environmental Quality Act ("CEQA")[13]. CEQA's purpose is stated as follows:

> It is the intent of the Legislature that all agencies of the state government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment, *shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian*.[14] (emphasis added)

CEQA also lays out the substantive requirements for EIRs:

> **(a)** The purpose of an environmental impact report is to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided.
> **(b)** Each public agency shall mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so.[15]

California courts have elaborated on CEQA's requirements for EIRs, frequently finding EIRs insufficient when they do not meet certain thresholds. The EIR is insufficient because it fails to fully inform the public of the potential harms of the project. "To facilitate CEQA's informational role, the EIR must contain facts and analysis, not just the agency's bare conclusions or opinions… An EIR must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed project."[16] As we have discussed above, the EIR fails to do this with respect to a number of areas. Among the project's potential harmful effects which are not adequately described by the EIR are harm to delicate desert ecosystems, lowering of the groundwater table, contamination of drinking water with perchlorate, economic harm to businesses both near the extraction site and near the dry lake beds, and ground subsidence. 13

Failure to adequately discuss such serious potential harms of a project has been found by California courts to be sufficient cause to reverse the approval of an EIR. In *Save our Peninsula Committee v. Monterey County Board of Supervisors*, the California Court of Appeal for the Sixth District held that an EIR for a proposed residential development had been improperly approved, in part due to its failure to fully describe the potential effects of the project.[17] The court held that, "[t]he ultimate decision of whether to approve a project, be that decision right or wrong, is a nullity if based upon an EIR that does not provide the decision-makers, and the public, with the information about the project that is required by CEQA."[18]

[11] *Id.* at 7-19.
[12] *Id.*
[13] Cal. Pub. Resources Code § 21000 et seq.
[14] Cal. Pub. Resources Code § 21000(g).
[15] Cal. Pub. Resources Code § 21002.1(a-b).
[16] Laurel Heights Improvement Assn. v. Regents of University of California, 47 Cal.3d 376, 404–405 (1988).
[17] 87 Cal.App.4th 99, (Cal. App. 6th Dist. 2001).
[18] *Id.* at 118.

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The EIR is also insufficient because it does adequately discuss possible alternatives to the project that would be less harmful to the environment. In *Citizens of Goleta Valley v. Board of Supervisors,* the Supreme Court of California stated that, "[I]t is the policy of the state that public agencies should not approve projects as proposed if there are *feasible alternatives* or *feasible mitigation measures* available which would substantially lessen the significant environmental effects of such projects…."[19] In addition, "[t]he fact that an alternative may be more expensive or less profitable is not sufficient to show that the alternative is financially infeasible."[20] SMWD has not adequately addressed possible alternatives to the project. Furthermore, the project's potential harms to the natural environment and to the economic well-being of the people and business in the area surrounding the project area are so great that simply refraining from proceeding with project may be a preferable alternative to the project. The EIR states that, "The EIR must briefly describe the rationale for selection and rejection of alternatives and the information the lead agency relied on when making the selection… Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are infeasible, or do not avoid any significant environmental effects."[21] However, the Court of Appeal has stated that the project's potential, "alternatives and the reasons they were rejected 'must be discussed in the EIR in sufficient detail to enable meaningful participation and criticism by the public.'"[22] The alternative measures discussed above are not adequately considered in the EIR. 14

Coastkeeper recognizes the need for sustainable sources of fresh water to support the growing population of southern California during a period of water scarcity. However, we have serious reservations about the Cadiz Valley Water Conservation, Recovery, and Storage Project's environmental impact. The potential environmental harms of the project appear to be far more significant than the Draft EIR suggests. Furthermore, we find the EIR's reasoning for rejecting the more environmentally safe alternatives to the project to be unsupported by fact and wholly unconvincing. For the reasons outlined above, we cannot lend our support to this project, and we recommend that the EIR be significantly revised to reflect our concerns. 15

Regards,

Colin Kelly
Staff Attorney
Orange County Coastkeeper

[19] 52 Cal.3d 553, 565 (1990), citing Cal. Pub. Resources Code, § 21002 (original emphasis).
[20] *Citizens of Goleta Valley v. Board of Supervisors*, 197 Cal. App. 3d 1167, 1181 (Cal. App. 2d Dist. 1988).
[21] Cadiz Valley Water Conservation, Recovery, and Storage Project Draft EIR at 7-2 (2011).
[22] *Sierra Club v. County of Napa*, 121 Cal. App. 4th 1490, 1504 (Cal. App. 1st Dist. 2004), citing *Laurel Heights Improvement Assn. v. Regents of University of California*, 47 Cal.3d 376 (1988).

March 13, 2012

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COMMENTS ON THE CADIZ CONSERVATION, RECOVERY, AND STORAGE PROJECT DRAFT ENVIRONMENTAL IMPACT REPORT

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Research for People and the Planet

Summary

The Pacific Institute, an independent non-partisan research institute in Oakland, California, has reviewed the Draft Environmental Impact Report (DEIR) for the Cadiz Groundwater Recovery and Storage Project, released in December 2011. Based on that review, we find several critical flaws and limitations of the DEIR. Specifically, we find that:

- There are considerable, unresolved uncertainties about natural recharge and evaporation rates, which call into question the viability of the project.
- The project relies on overdrafting the groundwater basin, with highly uncertain recovery times.
- The cumulative water conservation via preventing evaporative loss from the Cadiz and Bristol Dry Lakes is greatly over-estimated.
- The proposed alternative pumping scenario may lead to irreversible perturbations of the groundwater basin.
- The DEIR fails to adequately demonstrate that the springs and groundwater basin are not connected.
- Groundwater overdraft could have significant impacts on the springs and critical desert habitat.
- The Groundwater Management Plan will miss significant impacts after project completion.
- The DEIR ignores the potential impacts of a long-term drought or climate change on recharge and evaporation rates.

Below, we provide additional information on each of these findings. We note that while this brief focuses on natural recharge estimates and the potential impacts of the project on natural springs, the project raises a number of other major concerns not addressed here.

1

Project Background

Cadiz Inc. (Cadiz) owns approximately 70 square miles (34,000 acres) of property in the Cadiz and Fenner Valleys. The land overlays a vast alluvial groundwater basin within the Fenner Watershed and the Blossom Wash, located in the Eastern Mojave Desert. It is estimated that this basin holds approximately 17 million to 34 million acres-feet (AF) of fresh groundwater (CH2M Hill, 2010). The annual average precipitation (both rainfall and snowfall) ranges from 4 inches in Cadiz Valley to 12 inches in the surrounding mountains. The groundwater basin is naturally recharged through percolation of precipitation in fractured bedrock exposed in mountainous terrains and infiltration of ephemeral stream flow in washes, especially in higher elevations of the watershed. The most recent estimated rate of annual natural recharge in the basin ranges between 5,000-33,000 acre-feet per year (AFY) (Table 1). The basin naturally drains toward the Bristol and Cadiz Dry Lakes, where some of the water evaporates.

Cadiz is proposing to develop a two-phase groundwater recovery and storage project ("the project") that would serve some of the water districts in southern California for the next 50 years. The first phase of the project is designed to extract and convey an average of approximately 50,000 AFY of groundwater from a wellfield in Fenner Gap to southern California water users through the Colorado River Aqueduct (CRA). The second phase is to develop a conjunctive use project to recharge the basin at the Fenner Gap with surplus water from the Colorado River or the State Water Project, when (and if) it is available, and to extract it during drought years. Cadiz has joined forces with a few Southern California water agencies, including Santa Margarita Water Agency (SMWA), Three Valleys Municipal Water District, Suburban Water System, Golden State Water Company, Jurupa Community Services, and California Water Service Company, to help move the project forward. SMWA is currently acting as the lead agency for the project's California Environmental Quality Act (CEQA) environmental review and permitting.

Comments on the Draft Environmental Impact Report

There are Considerable, Unresolved Uncertainties about Natural Recharge and Evaporation Rates, which Call Into Question the Viability of the Project

During the past few decades, there have been several attempts to estimate the natural recharge rate in the basin. Table 1 presents a summary of estimated recharge rates by various research and consulting groups, showing the large variability among the estimates, even when the same methodology was used. In 1975, for example, the California Department of Water Resources estimated that the natural recharge rate was 3,000 AFY (California Department of Water Resources, 1975). More recent estimates range from 5,000 to 30,000 AFY (Durbin, 2000; CH2M Hill, 2011). It is of note that most of the high recharge estimates presented in Table 1 have been commissioned by Cadiz and done in support of the project. Given the importance of recharge to the project, this high degree of uncertainty poses tremendous risk to the viability of the project and its overall environmental impact.

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Table 1: A summary of the recharge estimates

Investigator (Date)	Methodology	Estimated Recharge Rate (AFY)
California Department of Water Resources (1975)	Not provided	3,000
Freiwald, USGS (1984)	Darcy's Law	270
Todd, Consulting Engineer (1984 a,b)	Darcy's Law	11,000
GEOSCIENCE Support Services Inc. (1991)	Darcy's Law using site-specific data	6,300
GEOSCIENCE Support Services Inc. (1995)	Darcy's Law using additional site-specific data	13,000-33,000
GEOSCIENCE Support Services Inc. (1999)	Watershed Model	15,000-37,000
US Geological Survey-WRD "Comment Letter" (2000)	Maxey-Eakin Model	5,000
Bredehoeft (2000)	Maxey-Eakin Model	5,000-6,000
Davisson, LLNL (2000)	Maxey-Eakin Model and Isotopic analysis of groundwater	11,000-33,000
CH2M Hill (2010)	INFIL 3.0 Soil-Moisture Budget-USGS	30,000

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Project Relies on Overdrafting the Groundwater Basin With Highly Uncertain Recovery Times

Despite the high uncertainties about the recharge, the project as designed is clearly unsustainable, since the proposed average water extraction scenario (50,000 AFY) exceeds even the most optimistic recharge rate (32,000 AFY). Even under this scenario, the groundwater basin is overdrafted by an average of 18,000 AFY, and Cadiz is considering even higher overdraft rates in the early years of the project. Figure 1 illustrates the groundwater storage condition for an annual extraction of 50,000 AFY over 50 years and a 50-year recovery period that commences after the project is terminated under three recharge scenarios: 1) 32,000 AFY, 2) 16,000 AFY, and 3) 5,000 AFY. As shown, under the most optimistic recharge rate, 32,000 AFY (a number provided by Cadiz consultants rather than independent scientists), the groundwater basin needs approximately 30 years to recover to pre-project levels after the end of the 50-year operation. Under the intermediate recharge estimate (16,000 AFY), more than 100 years are required for the groundwater basin to refill and recover. Under the low recharge estimate (5,000 AFY), the groundwater basin effectively never recovers; indeed, we estimate that at least 450 years would be required under current climatic conditions to recover from the 50-year operation under this scenario.

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While groundwater levels can recover in some areas and under some conditions, groundwater overdraft raises two major concerns. First, the land might subside and collapse before the underground basin has a chance to refill and recover from overdrafting (Figure 1). Once the land subsides, the potential groundwater storage is permanently lost. They estimate that the cumulative land subsidence in various parts of the basin after 100 years is between 0.2-0.9 feet under Scenario 1 with a recharge rate of 32,000 AFY and between 0.7 and 2.7 feet under Scenario 3 with a recharge rate of 5,000 AFY (GEOSCIENCE Support Services Inc., Sep, 2011a). Second, overdraft can lead to saline water intrusion from surrounding areas. This degradation of the groundwater is a real possibility in this part of the Mojave Desert.

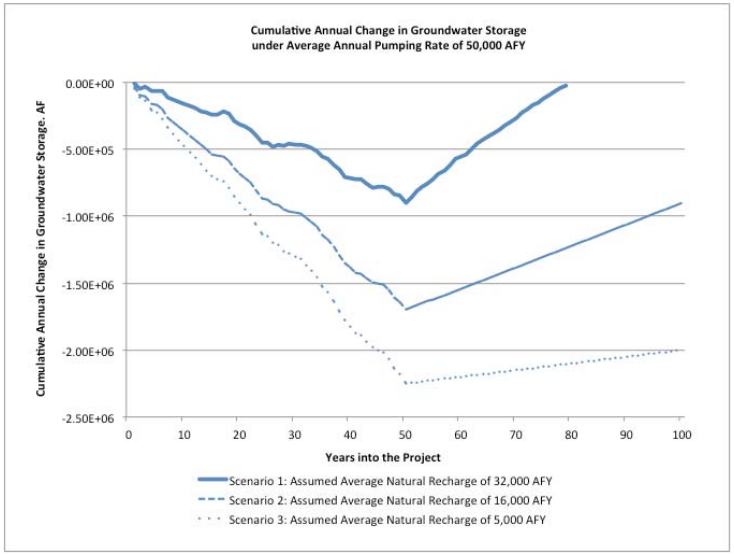

Figure 1: Cumulative Annual Change in Groundwater Storage[1]

[1] This graph was prepared by the Pacific Institute based on the information provided in the DEIR. A similar graph is presented in Appendix H1_Part 1 (Figure 76 in Geoscience, 2011a). The difference between the two graphs under the 32,000 AFY recharge scenario is related to evapotranspiration estimates from the Dry Lakes.

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The Cumulative Water "Conservation" via Preventing Evaporative Loss from the Cadiz and Bristol Dry Lakes is Greatly Over-Estimated.

Cadiz claims that the project is maximizing beneficial use of water that otherwise would be lost through evaporation from the Cadiz and Bristol Dry Lakes. By changing the depth of the water table at the Fenner Gap through an average pumping rate of 50,000 AFY, they plan to reverse the groundwater flow to the Dry Lakes playas, preventing evaporative loss ("lost" water) from the Lakes. They argue that the pumping rate should be higher than the assumed 32,000 recharge rate (the high end of estimated recharge rate, Table 1) in order to deplete the groundwater storage and draw down the water depth at the Fenner Gap to the level that would reverse the hydraulic gradient.

In the supplemental study, the Net Water Savings (NWS) is calculated as a difference between Reduced Evaporative Loss (REL) from the Dry lakes and Depletion of Storage (DS) over 100 years, giving the basin an additional 50 years to recover and refill after the project ends and pumping is terminated. Their analysis demonstrates that cumulatively after a 100-year period, a considerable amount of water will be "saved" (preventing evaporative loss from the Dry Lakes) under 32,000 and 16,000 AFY natural recharge rates (1,990,000 AFY and 674,000 AFY, respectively). However, if the natural recharge is only 5,000 AFY the results demonstrate no cumulative net water savings.

A few other things to consider regarding the analysis:

- Analyzing these results after 50 years (by the end of the project term) demonstrates a considerably smaller cumulative NWS of 260,000 AF under the 32,000 AFY natural recharge rate. Therefore, most of the reported water saving of 1,990,000 AF in the DEIR happens after the end of the project when the pumping stops and natural recharge starts replenishing the aquifer storage to its natural state. The DEIR fails to evaluate the consequences if the recharge rate decreases considerably (i.e., under a long-term drought or more permanent climatic changes) and the aquifer is not replenished in the expected rate.
- The project would not have any NWS under the 16,000 AFY natural recharge rate by the end of the project term (50 years), because the proposed average pumping rate (50,000 AFY) will lead to overdrafting of the storage. The groundwater basin may need another 100 years to possibly deliver some net savings, if any (Figure 1).
- Under the 5,000 AFY recharge scenario, there will be no net water saving and the basin will suffer from a considerable and possibly unrecoverable state of storage depletion (Figure 1). Such overdrafting can cause intrusion of saline water from beneath the Dry Lakes playas into the fresh water aquifer and, as noted above, lead to land subsidence.

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Proposed Alternative Pumping Scenario May Lead to Irreversible Perturbation of the Groundwater Basin

The project proponents consider an alternative pumping scenario, which would increase the pumping rate to 75,000 AFY for the first 25 years and 25,000 AFY for the remaining 25 years. This scenario is economically more beneficial to Cadiz, as it allows them to extract 550,000 AF more water earlier in the project, thereby maximizing early profits in case the project has to be terminated after 25 years due to environmental impacts. This approach, however, can have significant impacts on the groundwater basin. For example, if the natural recharge rate is 5,000 AFY, this scenario leads to significant non-renewable mining within the first 25 years, which has a higher risk of causing significant and irreversible damage to the groundwater basin. When analyzing this alternative pumping scenario, GEOSCIENCE failed to evaluate the possible impacts under a natural recharge rate of 5,000 AFY.

5

The DEIR Fails to Adequately Demonstrate that the Springs and Groundwater Basin Are Not Connected

According to the survey conducted by Freiwald (1984) for the US Geological Survey and the Bureau of Land Management, the Lanfair and Fenner Valleys include naturally occurring springs at higher elevations. The closest of these springs to the project's production wells and spreading basin is the Bonanza Spring, which located more than 11 miles north of the Fenner Gap in the Clipper Mountain. The DEIR includes a study and a field survey prepared by CH2M Hill (2011) assessing the possible impacts of the project on these springs -- especially Bonanza Spring -- under various recharge scenarios with an average withdrawal of 50,000 AFY. The technical memorandum states that, "there is **no information** demonstrating a physical connection of the identified springs in the local mountains to groundwater in the alluvial aquifer where Cadiz's pumping will take place" (CH2M Hill 2011, page 1). The DEIR suggests that the springs are therefore not hydraulically connected to the groundwater basin. The lack of evidence of any connection, however, is ***not*** the same as evidence for a lack of connection. This sentence could just as easily have said "there is no information demonstrating that the springs are not connected hydraulically to the alluvial aquifer where Cadiz's pumping will take place." Their subsequent argument that "the project would not likely to have any impact on springs" is, therefore, inaccurate and not based on substantive and conclusive information.

6

Groundwater Pump Could Have Significant Impacts on the Springs and Critical Desert Habitat

As part of their study, the project proponents developed a conceptual model to analyze possible impacts of the project under the assumption that there exists a hydraulic continuity between groundwater aquifer and the groundwater feeding springs. They assume various hydraulic continuity scenarios and vary the recharge rate and location during their study. The results under most of these cases are

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consistent, demonstrating a lag time of about 50 years between the time the project is in operation and the time the springs would be impacted. This lag time is mostly caused by the distance of the springs from the project elements and the rate that impacts migrate through the aquifer. Their results show that a 10 feet drop in groundwater levels could result in a gradual drawdown between 1.5 to 6.5 feet at the springs from the time the project is ended (after 50 years) to 450 years after that until the basin reaches a new steady state. In a parallel study, the GEOSCIENCE Support Services Inc. (GEOSCIENCE 2011b) estimated that at the end of 100 years (50 years after termination of pumping), the water table decline at the wellfield could be 5 and 55 feet for a recharge rate of 32,000 to 5,000 AFY, respectively. This would translate into a much larger decline of water level at the springs after 100 years. Such an impact could effectively eliminate these water sources, which provide water to critical desert habitat.

7

Groundwater Management Plan Will Miss Significant Impacts After Project Completion

Cadiz has put together a Groundwater Management, Monitoring, and Mitigation Plan (GMMMP). The plan proposes to manage some of the impacts through careful monitoring of the watershed. However, as the model results show, serious impacts may be delayed in time until many years after the project is completed. Real-time and early warning signs can be subtle. Therefore, monitoring during the project term cannot lead to effective and timely impact management and mitigation.

8

DEIR Ignores the Potential Impacts of a Long-Term Drought or Climate Change on Recharge and Evaporation Rates

Large changes in the natural recharge rates could render all of the project analysis as either incorrect or at least incomplete. If the recharge rate is less than in the past or if the evaporation rates are higher, then the long-term effects of the project might be even more significant than assessed in the DEIR. The DEIR does not include any site-specific analyses demonstrating possible impacts of the climate change on the Cadiz groundwater basin. In their climate change discussions, they rely on various climate change impact studies conducted with a focus on California and Western United States. They conclude that "due to the great uncertainty in the ongoing studies of the effect of climate change on groundwater, it is not possible to predict whether annual recharge rates at the Project site will increase, decrease, or remain the same due to climate change."

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Concluding Remarks

Based on our review of the Cadiz DEIR, we find several critical flaws and limitations. Cadiz claims that the project will facilitate the beneficial use of groundwater that would otherwise be "lost" to evaporation at Bristol and Cadiz Dry Lakes. The project proponents' characterization of the water lost to evaporation as non-beneficial, however, is inaccurate in two ways. First, some of the water that evaporates from the basin is "beneficial" to local ecosystems, and these ecosystems would be adversely

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affected by removal of this water. Second, the project is intentionally designed to mine groundwater at a rate exceeding natural recharge. In other words, it uses water in excess of the estimates of the water lost to evaporation, which is a non-renewable use of groundwater.

We note, however, that even with the information and range of uncertainties provided by the DEIR, the project is clearly unsustainable from a hydrological and ecological perspective, given both the characteristics of project design and the remaining unresolved uncertainties about the regional hydrology, including a growing uncertainty about the likelihood of availability of any surplus water at all from the Colorado River system – an issue we do not address here but is fundamentally tied to both project recharge and economics.

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From: office@riveraha.com
To: SupervisorMitzelfelt@sbcounty.gov; SupervisorDerry@sbcounty.gov; SupervisorGonzales@sbcounty.gov; SupervisorOvitt@sbcounty.gov; SupervisorRutherford@sbcounty.gov; cadizproject@smwd.com; Tom Barnes; Cadiz Project
Subject: 90-day extension request
Date: Friday, February 10, 2012 4:11:49 PM
Attachments: RiverAHA_request_extension_CadizProposal 2-10-12.docx

Dear San Bernardino County Supervisors and potential Cadiz water customer, Santa Margarita Water District.
Thank you for the 30-day extension, however we really need a 90-day extension. See Attached Correspondence.
Sincerely,
Ruth Musser-Lopez for
River Branch of the Archaeological Heritage Association (RiverAHA)

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February 10, 2012

San Bernardino County Board of Supervisors via email.
Santa Margarita Water District
c/o Mr. Schatz
General Manager,
Santa Margarita Water District
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Via Email: cadizproject@smwd.org

RE: REQUEST FOR EXTENSION ON THE PUBLIC REVIEW PERIOD OF THE CADIZ PROPOSAL FOR THE USE OF MASSIVE WATER SUPPLIES IN SAN BERNARDINO COUNTY.

Dear San Bernardino County Board of Supervisors and Santa Margarita Water District:

We herewith petition the County Board of Supervisors to redress our grievances and intercede on behalf of the Citizens whom they represent to direct Santa Margarita Water District (SMWD) to cease and desist as Lead Agency under the California Environmental Quality Act (CEQA) for the so-called "Cadiz Valley Water Conservation, Recovery and Storage Project" hereafter referred to as "Cadiz Proposal" **AND** to extend by an additional 90 days, the period allotted for public comment on the Draft Environmental Impact Report (DEIR) assessing the potential devastating direct and indirect irreversible and irreparable impacts for the reasons addressed below. The Archaeological Heritage Association (AHA) was established in 2010 to preserve and protect natural and cultural heritage places and landscapes through a program of documentation, monitoring and stewardship. Our River Branch of AHA (RiverAHA) located in Needles, California (within the area of potential direct impact of the proposed project area) documents, patrols and monitors the Lower Colorado River and the adjacent East Mojave Desert including the proposed project area and has a standing stewardship relationship with cultural resources in the proposed project area and vicinity many of which are linked to prehistoric, historic and contemporary springs and lake shorelines.

First, we submit that the Cadiz Proposal has never heretofore been submitted to the San Bernardino County Planning Commission and Department for review and approval as part of a countywide plan for the disposal of important and valuable water resources. Clearly, the massive water disposal of water resources which is under review by an outside jurisdiction, a water district from Orange County, is rightfully within the preview and scrutiny of our county's citizens via the planning department and Planning Commission for prior identification as to the most appropriate and beneficial use for its own Citizens of the identified water resource.

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Second, the nature of the proposal would result in a massive reduction if not depletion of the water supplies in the East Mojave and the area of potential direct and indirect impact is therefore, also massive. On its surface, the current Draft EIR is written in a technical, methodical and seemingly empirical manner and as a result, is very lengthy. Contained in its 4 volumes, 10 appendices, are +250 figures, tables, and fold out maps, altogether totaling hundreds of pages with Volume 1 alone having 11 chapters. However, the DEIR was distributed at a workshop in Joshua Tree 85 miles west of the proposed project site on

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January 11, 2012 and the public review period is said to close on February 13, 2012, thus the window of opportunity, 30 days for public review is statutorily minimal even if it was a small, inert project, but for a proposed project of this magnitude, a month to review the proposal and DEIR is not adequate by any stretch of the imagination and violates the spirit of the law expressed in CEQA. 3

Third, this inadequate, debilitating review period is compounded by the fact that the distribution of the DEIR never occurred in the proposed project area east of Kelbaker Road--one copy placed at the Needles Public Library, 70 miles east of the proposed extraction area can hardly be said to be "distribution" to the public most directly impacted by the proposed project in the East Mojave, east of Kelbaker Road and west of the Colorado River along the I-40/Route 66 corridor. Many of the citizens who live in the proposed project vicinity are economically impoverished, physically impaired and have no access to the internet much less the economic means to be burdened with a 150 or so mile, three to four hour round trip to Needles or Joshua Tree. Many of these people are farm workers who could potentially loose their job and livelihood as a result of this proposal This constitutes inaccessibility under the American Disability Act. 4 5

Fourth, since the title assigned to the Cadiz Proposal as reflected on the cover of the DEIR is a ridiculous misnomer and thus on its surface is a misleading characterization of the proposal as it is described in the DEIR, our associates anticipate a biased document and have concluded that a thorough review of all aspects of the document is necessary. We more accurately characterize the document as the "Revised East Mojave Groundwater Depletion Proposal" –in other words, we need more time to review the Cadiz Proposal to determine if our own understanding of the Cadiz Proposal on the outset is substantiated by the facts presented or if SMWD can convince us otherwise. The problem for SMWD is that all the facts have not been made available to us so the document is already fatally flawed, which brings us to the next reason why there should be an extension. 6

Fifth, but probably the best reason for an extension on the review of the document is the withholding of certain studies and information that we have reason to believe would, by their inclusion, lead to the identification of impacts that could only be alleviated by implementing the "No Project" alternative. Since the proposal is to remove massive amounts of water from the East Mojave aquifer, our most pertinent task is to review the geology and hydrology component of the Cadiz Proposal. This task has been made literally impossible because the Santa Margarita Water District (SMWD has withheld, from the document, hydrologic data included in certain critical modflow files which should have been made part of the record. 7

The California Environmental Quality Act (CEQA) encourages full public disclosure of proposed project details so any environmental impacts can be adequately assessed and that measures to alleviate said impacts may be identified. The withholding of these document defeats the purpose of public scrutiny as provided in the California Environmental Quality Act (CEQA). This act is perceived as deceptive and furthers our conviction that SMWD is a biased potential customer of the Cadiz Corporation with no real statutory standing to be "Lead" on the environmental review under the authority of CEQA; AND our further belief that the abrogation of your duties as County Supervisors to both plan for such a massive proposed project in a vicinity larger than many states and to be Lead on the CEQA document as you are bound to be in CEQA* is a violation of not only CEQA but potentially other laws including the Conflict of Interest Act considering that at least one Supervisor Mitzelfelt was accepting campaign contributions from Cadiz on or about the time around June of 2010 when a decision by the Supervisors was likely made to turn over the Lead position on the CEQA document to SMWD who on or about that time entered into a cost share agreement with Cadiz for the purpose of "complying" with CEQA. 8

Sixth, as the Cadiz Proposal is (with the exception of the location of the pipeline corridor to the MWD canal) essentially the same proposal as was rejected by the Public, including our organization's associates, 9

* 14 CCR § 15051 Cal. Admin. Code tit. 14, § 15051 (b) If the project is to be carried out by a nongovernmental person or entity (IN THIS CASE, CADIZ), the lead agency shall be the public agency with the greatest responsibility for supervising or approving the project as a whole.(1) The lead agency will normally be the agency with general governmental powers, such as a city or county, rather than an agency with a single or limited purpose such as an air pollution control district or a district which will provide a public service or public utility to the project.

after carefully reviewing it 10 years ago, it should have been known to you and SMWD and Cadiz that Ruth Musser-Lopez, one of our associates, had already submitted comments expressing strong objection to a virtually similar proposal and should have been notified. Since none of our associates were notified of the scoping and only recently learned of the revisit of of the Cadiz Proposal, this unfairly shortens the period of time that we have to review the revisit of the Cadiz Proposal. 9

In summary, due to the perceived biased nature of the "Lead" agency SMWD, the bias reflected in the name of the Cadiz Proposal and the bias reflected in the initial description of the Cadiz Proposal and the fact that we still await pertinent hydrological models that have been withheld, an extension on the review period is necessary for our associates to thoroughly review the existing document to assess whether all of the potential impacts have been identified and potential means for alleviating those impacts have been addressed, but also to receive the supplement data that was not included in the document for purposes of performing due diligence of our fiduciary responsibilities as pertinent members of the Public.

The Santa Margarita Water District has expressed its commitment to make the draft EIR accessible to diverse communities and stakeholders so that they may submit meaningful comments about its scope and impact. The professional archaeological community and its advocates are stakeholders and have long standing professional associations with the proposed project area and its educational, interpretive and heritage values associated with its significant volume of sites, places and landscapes which stand to be irreparably and irreversibly harmed by the proposed project if implemented. In summary, a review of the potential impact of the Cadiz Proposal has resulted in a massive body of technical data, and you cannot expect us to be able to adequately complete the task of reviewing, analyzing, processing and preparing comments for a DEIR of this size, magnitude and proportion---more time is required than the statutorily minimal amount you have allotted (typically reserved for smaller inert projects), in order for RiverAHA to submit meaningful comments. 10

More time is needed to consider the consequences of this large-scale endeavor. The Cadiz Proposal has potentially adverse impacts to regional groundwater and air quality and, even in the best-case scenario, will affect aquifer water levels for over a century. The Cadiz Proposal if implemented could potentially adversely impact federally-designated Bureau of Land Management wilderness areas, the Mojave National Preserve, the Native American Land Conservancy Preserve in the Old Woman Mountains, a historic railroad line and the Southern Paiute Salt Song trail and traditional collecting area. These resources are of substantial regional and national concern. Interested parties must have sufficient time to consider the Cadiz Proposal and provide detailed comments concerning proposed methods of alleviating those impacts and weighing the consequences against the benefits to a single corporation if those impacts cannot be alleviated.

Thank you for your time and consideration. By copy we herewith notice the Santa Margarita Water District of our request for an extension and the supporting evidence included here. I look forward to hearing from both you and SMWD before February 12, 2012, the date of the Public Comment period close announced in the DEIR.

Sincerely,

Ruth Musser-Lopez
River Archaeological Heritage Association (RiverAHA)
c/o 420 E Street (mailing address)
Needles, CA 92363

cc: tbarnes@esassoc.com

O_RiverAHA2

From: ruth@riveraha.org
To: Cadiz Project
Subject: attention Mr. Tom Barnes, ESA - Request for Cadiz PROJECT Documents
Date: Tuesday, March 13, 2012 7:52:49 PM
Attachments: o Barnes-Request for documents.doc

SANTA MARGARITA WATER DISTRICT
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
Telephone: 213-599-4300
FAX: 213-599-4301
BY EMAIL: cadizproject@esassoc.com

March 13, 2012

Dear Mr. Barnes
I am requesting that you send me copies of Appendices D and E of the Appendix G1 "Phase I Cultural Resources Assessment" of SCH#2011031002 (2011 Cadiz DEIR).
I intend to file some comments by the deadline tomorrow, but I would also request an extension on the time allowed to me for the purpose of review of the Appendices D and E of Apendix G1 that was not included in SCH#2011031002. I am requesting an extension of 20 days following my receipt of the requested documents.

I am a professional archaeologist who has worked in the East Mojave area since 1978. I have a current Cultural Resource Use Permit with the California Bureau of Land Management, am a member of the Society for California Archaeology in good standing, have obtained a degree in Anthropology and my experience emphasized archaeology. I am a former federal government archaeologist (BLM, USFS, FWS). I am also permitted to conduct archaeological work in San Bernardino County under permit which is filed at the San Bernardino County Museum. I wish to access the confidential documents as a part of my firm's (River Archaeological Heritage Association's) review of the project and the potential impact upon properties potentially eligible for the National Register of Historic Places including those properties which were found by your team to be not eligible. 1

Also, please provide me with a copy of the Memorandum of Understanding (MOU) between the County Board of Supervisors, San Bernardino County and Santa Margarita Water District dated June 28, 2011, which pertains to the establishment of a Lead Agency. Also, please provide me with copies of any correspondence, applications, permits, agreements or other binding documents made between Cadiz Inc. and the County of San Bernardino or the Bureau of Land Management with respect to the project or project activities or preparation of the environmental impact report and related assessments/documentation for of the project referenced above and currently under review.

Please send the documents to RiverAHA, c/o Ruth Lopez 1747 Wilson Ave. Upland, CA 91784.
My phone number is 760/885-9374 should you have any questions or concerns.

Sincerely,

Ruth Musser-Lopez
temporary mailing address: 1747 Wilson Ave., Upland CA 91784
permanent mailing address: RiverAHA 420 E Street Needles, CA 92363

Ruth Arlene Musser-Lopez | Principal | River Archaeological Heritage Associates (RIVER AHA) | 760 885-9374 (mobile) 760 326-2519 (fax)

O_RiverAHA2

RIVER AHA
Archaeological
Heritage
Association

www.RiverAHA.org
1704 Needles Hwy.
mailing: 420 E. street
Needles,CA 92363
(760)885-9374
office@RiverAHA.com

March 12, 2012

Santa Margarita Water District
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
Telephone: 213-599-4300
FAX: 213-599-4301
BY EMAIL: cadizproject@esassoc.com

Re: Supplemental documentation requested for report refereced as SCH#2011031002 (2011 Cadiz DEIR).

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2

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2

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Ruth Musser-Lopez

temporary mailing address: 1747 Wilson Ave., Upland CA 91784

permanent mailing address: RiverAHA 420 E Street Needles, CA 92363

From: ruth@riveraha.org
To: Cadiz Project
Subject: attention Mr. Tom Barnes, ESA - Request for Cadiz PROJECT Documents
Date: Tuesday, March 13, 2012 8:44:42 PM
Attachments: o Barnes-Request for documents.doc

SANTA MARGARITA WATER DISTRICT
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
Telephone: 213-599-4300
FAX: 213-599-4301
BY EMAIL: cadizproject@esassoc.com

March 13, 2012

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RiverAHA3

Please send the documents to RiverAHA, c/o Ruth Lopez 1747 Wilson Ave. Upland, CA 91784. My phone number is 760/885-9374 should you have any questions or concerns. 1

Sincerely,

Ruth Musser-Lopez
temporary mailing address: 1747 Wilson Ave., Upland CA 91784
permanent mailing address: RiverAHA 420 E Street Needles, CA 92363

Ruth Arlene Musser-Lopez | Principal | River Archaeological Heritage Associates (RIVER AHA) | 760 885-9374 (mobile) 760 326-2519 (fax)

RIVER AHA
Archaeological
Heritage
Association

www.RiverAHA.org
1704 Needles Hwy.
mailing: 420 E. street
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(760)885-9374
office@RiverAHA.com

March 12, 2012

Santa Margarita Water District
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
Telephone: 213-599-4300
FAX: 213-599-4301
BY EMAIL: cadizproject@esassoc.com

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Archaeological
Heritage
Association

www.RiverAHA.org
1704 Needles Hwy.
mailing: 420 E. street
Needles,CA 92363
(760)885-9374
office@RiverAHA.com

March 13, 2012

San Bernardino County Board of Supervisors
Santa Margarita Water District Board Members
c/o Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
Telephone 213-599-4300
Fax: 213-599-4301
VIA EMAIL AT CADIZPROJECT@ESASSOC.COM

RE: Review of the Draft Environmental Impact Report "Cadiz Valley Water Conservation, Recovery, and Storage Project" State Clearinghouse: SCH#2011031002 which assesses the impact of a Proposed San Bernardino County Groundwater Management, Monitoring and Mitigation Plan (GMMMP) in its Appendix B. Review of Appendix G1.

Dear San Bernardino County Board of Supervisors and Santa Margarita Water District Board Members:

The Archaeological Heritage Association (AHA) was established in 2010 to document, preserve and protect natural and cultural heritage places and landscapes in its service area through a program of documentation, monitoring and stewardship. The service area of our River Branch of AHA (hereafter "RiverAHA") located in Needles, California, documents, patrols and monitors the Lower Colorado River and the adjacent East Mojave Desert and has a standing stewardship relationship with cultural resources in these areas many of which are linked to prehistoric, historic and contemporary springs and lake shorelines. As RiverAHA assumed the business, entitlements and the identified service area of its predecessor sole source proprietorship, PARDners Consulting, the standing relationship with the East Mojave and Colorado River Valley region extends from 1986.

RiverAHA's service vicinity is located within the Area of Potential direct and indirect Effect (hereafter, "APE") described in the "Draft Cadiz Valley Water Conservation, Recovery, and Storage Project Environmental Impact Statement" (hereafter "DEIR") assessing the potential environmental impacts of an undertaking (hereafter, "Project" or "UNDERTAKING") including a proposed "Groundwater Management, Monitoring and Mitigation Plan" (hereafter, "GMMMP-B") included in Appendix B of the DEIR. RiverAHA relies upon public water resources including springs and wells within the APE of GMMMP-B for use during its reconnaissance and monitoring activities. The springs in the APE are a natural component of many of the archaeological sites within RiverAHA's service area and as such, are monitored as an element of the archaeological sites in RiverAHA's stewardship program; springs are also included in RiverAHA's multiple resource-monitoring program. 1

Issue 1: Objection to the UNDERTAKING, GMMMP-B and ALTERNATIVES analyzed in the DEIR; Other Objections. 2

First of all, we object to the insufficiency of the DEIR to distinguish what is being reviewed: Is it an UNDERTAKING of Santa Margarita Water District's (hereafter, "SMWD"'s) to buy water from Cadiz? Is it a review of the GMMMP-B? Is it a review of the ALTERNATIVES? We also object to the insufficiency of the document to address an obvious alternative, the one which RiverAHA supports. RiverAHA supports an alternative that was not proposed or evaluated in the DEIR for the PROJECT.

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The alternative that RiverAHA supports is "NO UNDERTAKING, NO GMMMP " alternative. This alternative calls for the Cadiz Agricultural Operations" to come into compliance with all current laws including California and COUNTY groundwater laws and would outlaw Memorandum of Understanding (hereafter, "MOU") between San Bernardino County (hereafter, "COUNTY") and Cadiz Corporation (hereafter, "CADIZ") and any other entity. This alternative would include no new projects and would require a change in the current operations at the Cadiz Farms which would bring the CADIZ agricultural operations into compliance with State of California (hereafter, "STATE") and COUNTY law rather than allowing CADIZ to operate under the current Groundwater Management, Monitoring and Mitigation Plan (hereafter, "GMMMP-A") and MOU (hereafter, "MOU-A") with the COUNTY.

We object to the UNDERTAKING AND GMMMP-B and the objectives of the UNDERTAKING identified in the DEIR and oppose the approval of a new UNDERTAKING GMMMP-B since these plans would enable CADIZ to engage in acts that are non-compliant with state and local groundwater law. The approval by the COUNTY of the GMMMP-B would essentially waive the provisions of law that requires safe yield, and make provisions for CADIZ to privatize the now public groundwater and deplete the Fenner Valley groundwater aquifer for the purpose of corporate profit, violating the spirit and substance of the COUNTY's Desert Groundwater Management Act (hereafter, "ACT") and implementing ordinance (hereafter "ORDINANCE"). We object to the proposed UNDERTAKING and GMMMP-B and enabling DEIR, since together they attempt to thwart the ACT's purpose which is "to protect groundwater resources within San Bernardino County" because it "is of utmost importance." Further the ACT states that "The public health, safety and general welfare of the people of the State of California and of the County depend upon the continued availability of groundwater through ensuring that extraction of groundwater does not exceed the safe yield of affected groundwater aquifers, considering both the short and long-term impacts of groundwater extraction, including the recovery of groundwater aquifers through natural as well as artificial recharge. The protection of the groundwater resource within San Bernardino County also includes the consideration of the health of individual aquifers and the continued ability of those aquifers to store and maintain water." 2

We also object to all of the UNDERTAKING ALTERNATIVES identified in the DEIR, because all of these would in essence result in either the privatization of presently non-adjudicated, shared public East Mojave groundwater or violate the ACT and, or other laws, regulations, policies, and mandates as identified and addressed herein since they incorporate the use of GMMMPs and MOUs to get around the will of the People who voted and created laws AND are not sufficienty evaluated in the DEIR to understand their potential impacts.

We concur with the findings of Johnston Wright, Inc. and incorporate these by reference, who in summary state this UNDERTAKING is "a high risk enterprise given that per the analysis in the DEIR, should a significant impact occur to a spring, or other sensitive receptor, there are no means to address the impact and recovery may take a century or substantially more time. As shown in the supporting documentation to the DEIR, impacts will continue to propagate after pumping ceases. Therefore a project of this type demands a higher level of confidence than is provided by the hydrogeologic impact analyses. Based upon JWI's review of the hydrogeologic analyses and monitoring and mitigation plan, insufficiencies with the environmental review of the proposed project." We also assert that the proposed monitoring locations to determine static water level drop in the Fenner Valley are not sufficient and would yield ineffective trigger points, too late to stop or slow water extraction damage. In the words of one resident of Fenner Valley "alluvium of the East Mojave acts like a sponge; during an infrequent rain, more water runs out of the springs and seeps, but if the sponge is dried up, as Cadiz Inc. proposes, then rainfall is not enough to recharge the sponge, thus the springs and seeps will dry up even though it may rain periodically." We also object to the volume of water proposed to be extracted as it has not been shown to be unsustainable and that there is insufficient monitoring well data to show otherwise; and that no mechanism is in place to protect property owners and the environment from profiteers who would walk away from the Project after two years of extreme profits and extreme environmental damage from massive water export. 3 4

We submit the following which was either not addressed or not sufficiently addressed in the DEIR: that the well data from various studies pertaining to a proposed undertaking in Ward Valley which was never approved for the "Low Level Radioactive Waste Disposal Facility" shows that modflow patterns which connect the Cadiz aquifer with aquifers to the south toward Rice, California and Blythe, California. Further that modflow patterns are east out of Fenner Valley via Paiute Creek and Homer 5

Wash to Sacramento Wash then to the Lower Colorado River valley in the vicinity of Needles. Thus approval of the UNDERTAKING, ALTERNATIVES, GMMMP-B in conjunction with the enabling DEIR will potentially harm RiverAHA and our associates who rely upon the groundwater yield of the East Mojave/Fenner aquifer to contribute to the groundwater in the Needles vicinity where our headquarters are located. 5

Issue 2: Objection to LEAD AGENCY and RESPONSIBLE AGENCY. Failure to disclose APPROVAL PROCESS and APPEAL PROCEDURE; Other Objections including objection to Malfeasance in Office.

We submit our further comments with the caveat that we do not presume that this DEIR is a valid, legal document under the California Environmental Quality Act (hereafter, "CEQA") or that the current process is legal; on the contrary, we assert that the entire DEIR and process should be invalidated since the COUNTY Board of Supervisors or Management (hereafter, "BOS") and Santa Margarita Water District Board or Management (hereafter, "SMWD") entered into a Memorandum of Understanding, (hereafter, "LEAD MOU") dated June 28, 2011 in which the BOS in essence abdicated the statutory responsibility as lead agency (hereafter, "LEAD") under CEQA and the ACT.

Our objections to and comments on the DEIR is also made with the caveat that we object to the presumption that the DEIR is a valid, legal document under CEQA since we assert that SMWD's claim to "Lead Agency" under CEQA "as the first public agency with a discretionary decision regarding the Project" is improper on the grounds that any "discretionary decision" SMWD would make pertaining to a Project is limited only to the approval or rejection of their own project to participate as a customer of water and does not pertain to a public statutory obligation under any California State law or County of San Bernardino law or ordinance pertaining to the GMMMP-B or the DEIR This assertion is supported by the DEIR Table 3.8 on page 3-53 which states the approval authority is limited to "has discretion to approve or reject its participation in the proposed Project" where participation is limited to having an option to purchase water from Cadiz. 6

The public including our associates have spent considerable time and financial resources unraveling who the truly responsible agency and lead agency is with statutory authority to make a decision to approve, certify and adopt the DEIR and GMMMP-B and we object to the insufficiency of the document to clearly and forthrightly state who or what government Agency has the authority over approval, the approval process and appeal procedure for the DEIR. We refer to the comments of Ruth Musser-Lopez, dated 3-13-12, to address this issue in more detail, however we will go on record as objecting to the MOU (hereafter "LEAD MOU") dated June 28, 2011 entered into by the COUNTY and SMWD in which the COUNTY Board of Supervisors in essence abdicated the statutory responsibility as LEAD agency which we assert should be investigated as a criminal act and malfeasance in office and we object to the insufficiency of the DEIR which failed to include reference to this document which we obtained through the offices of the COUNTY's District Attorney's Office of Public Integrity. 7

Issue 3: We object to OMMISSIONS

We object to the omission, failure and apparent attempt to mislead the public throughout the DEIR document by not clearly disclosing pertinent COUNTY legal requirements and that the purpose of the GMMMP-B concealed in Appendix B of the DEIR is for the purpose of compliance with the COUNTY's ORDINANCE specifically Section 33.06552 (b) (1) and (2) for this PROJECT. Instead, information on this ordinance is couched wrongfully in a section on "Existing Agreements and Permits" in a section discussing the existing agreement for the agricultural operations. We refer to the comments of Ruth Musser-Lopez, dated 3-13-12, to address this issue in more detail. 8

Issue 4: We object that the proposed PROJECT has never heretofore been submitted to the COUNTY Planning Commission and Department for review and approval as part of a countywide plan for the disposal of important and valuable water resources and any cultural resources that may stand in harm's way of such exploitation.

Certainly, the massive disposal of water resources is rightfully within the preview and scrutiny of our county's citizens via the Land Use Planning Department (hereafter, "LUSD") and Planning Commission for prior identification as to the most appropriate and beneficial use for its own Citizens of the identified water resource. 9

Issue 5: We assert that the opportunity for public review of this DEIR is insufficient.

The nature of the proposal would result in a massive reduction if not depletion of the groundwater supplies in the East Mojave and the area of potential direct and indirect impact is therefore, also massive. On its surface, the current DEIR is written in a technical, methodical and seemingly empirical manner and as a result, is very lengthy. Contained in its 4 volumes, 10 appendices, are +250 figures, tables, and fold out maps, estimated at 3000 pages with Volume 1 alone having 11 chapters. However, the DEIR was distributed at a workshop in Joshua Tree 85 miles west of the proposed project site on January 11, 2012 and the public review period, which was extended to March 14, 2012 from its initial close date on February 13, 2012 is minimal for a project of this magnitude, thus the window of opportunity, even though a few people had 90 days for public review, is statutorily minimal and violates the spirit of the law expressed in CEQA.

This inadequate, debilitating review period is compounded by the fact that the distribution of the DEIR never occurred in the proposed project area east of Kelbaker Road—not even one copy was said to have been placed at the closest public library in Needles, California, thus the DEIR was not "distributed" to the public most directly impacted by the proposed project in the East Mojave, east of Kelbaker Road and west of the Colorado River along the I-40/Route 66 corridor, particularly in the Goffs/Essex/Fenner Valley area. 10

We also object to the failure of the Lead Agency to distribute copies of notifications to those who were on record as being concerned with the similar Cadiz proposal and DEIR in 1999. One of our associates, Ruth Musser-Lopez was on record as being opposed to that project and should have been notified of all public actions with regard to the current DEIR including notification of any action item pertaining to the DEIR which was to be voted on by the BOS. We assert that the concerned public was not provided sufficient notice that the BOS was to vote on the LEAD MOU to turn over the LEAD position on the DEIR to SMWD.

We refer to the comments of Ruth Musser-Lopez to address the inadequacy of the review period and opportunity for public comment on this project. We want to be placed on record as saying that SMWD was misleading and deceptive in its characterization of the Project and omitted pertinent Project description in the body of its notification including reference to the GMMMP-B as being critical to the project and the need for an environmental assessment to review the GMMMP-B's impact and that it would be the COUNTY's ultimate responsibility to approve the GMMMP and an MOU. Therefore, the notification should be reinitiated and the review period restarted.

Issue 6: We object to the withholding or omission of pertinent documents from public disclosure in the DEIR.

Withheld document may include as can be shown but may not be limited to 1) hydrologic data included in certain critical modflow files critical to evaluating the sustainability of the massive groundwater extraction program which is proposed in the PROJECT; 2) pertinent applications and permits for construction of and, or use of monitoring wells or other activities on public and private land made to, and related reports shared with, the Bureau of Land Management (hereafter, "BLM") and, or the COUNTY; 3) Memorandum of Agreement (hereafter, "MOA") or Understanding (hereafter, "MOU") and other pertinent legal documents entered into with the BLM and, or COUNTY pertaining to this project, particularly the MOU dated June 28, 2011, entered into by the COUNTY and SMWD (which we object to) in which the COUNTY's malfeasance in office is revealed by its abdication of its statutory responsibility as LEAD agency (which we object to) in the environmental review under CEQA of the GMMMP-B. We also object to the location of the GMMMP-B in an Appendix to the DEIR when it is essentially the project under review. We refer to and concur with the comments of Ruth Musser-Lopez for further discussion, objections and insufficiencies of disclosures made in the DEIR and the legal implications of acts, which were hidden, from public. 11

Comments on Appendix G1: Phase I Cultural Resources Assessment

Description. This is an 86 page document with large colored photographs, tables and a fewmaps which do not disclose locations of cultural resources, unnumbered pages in the five appendices including two appendices which were withheld from public review as confidential. 12

Issue G1-1: Insufficient documentation and failure to identify ownership of cultural properties. Other objections.

We object to insufficient documentation and the failure of this assessment to evaluate or sufficiently evaluate cultural properties on public land within the constructs of the National Historic Preservation Act and failure to address the treatment of cultural properties in harms way, cultural properties potentially eligible for listing on the National Register of Historic Places (hereafter, "REGISTER") or California Register of Historic Resources (hereafter, "STATE REGISTER") or local registers, all of which are included hereafter as, "ELIGIBLE") properties or already listed properties (hereafter, "LISTED").

RiverAHA asserts that the activities associated with the GMMMP and some of the ALTERNATIVES if implemented could potentially adversely impact significant cultural properties on public land currently managed by the Bureau of Land Management (hereafter, "BLM") and used by the railroad under a Right of Way (hereafter, "ROW") issued by the United States government which properties are potentially ELIGIBLE. We predicate this objection with the citation from page ES-1. "The Project, located on private lands…" We object to the sweeping statement that the Project is located on private land. The pipeline between the well field and the canal is proposed to be located on public lands granted under federal law as a ROW for use by a railroad company. 13

Issue G1-2 Eligibility of Resources in the Parker Cutoff Railroad District. Other objections.

Among the significant properties identified in the DEIR is a district of historic structures and associated appurtenances associated with an early 20th Century steam engine railroad line and associated water stops. First, we object to the exclusion of any of the isolated historic artifacts, features and sites along the railroad as not significant or ineligible. The documentation must be supplemented and is currently insufficient because these individual artifacts, features and sites must be evaluated in terms of their association with, contribution and value to the historic Parker Cutoff Railroad District as a whole.

Issue G1-3 Objection to failure to use appropriate statutory criteria to evaluate the Parker Cutoff Railroad District and other cultural properties.

While some of the historic structures and appurtenances may have belonged to the previous railroad company or may have been transferred to the current railroad corporation is a moot question, the land upon which these resources are located is public land under a current right-of-way (hereafter, "ROW") to Arizona California Railroad (hereafter, "ARZC"). The fact that a ROW exists upon public land does not render the protection afforded to cultural resources located on public land to be moot. Both the ROW and the cultural resources are on public land managed by the Bureau of Land Management (hereafter, "BLM"). The cultural resources on public land are protected by law under the provision of the National Historic Preservation Act of 1966, as amended (NHPA), 16 USC 470, (hereafter, "NHPA"). The Cultural Resource Assessment fails to address the provisions of NHPA and its implementing regulations therefore it is fundamentally insufficient and must be revised or invalidated. The cultural resources must be assessed under the framework of federal law including Section 106 of the National Historic Preservation Act, and the eligibility standards as outlined in 36 CFR Section 60.2. 14

Page 79, paragraph 2 "…The remaining 31 resources are recommended not eligible for listing in the CRHR and are therefore not considered significant resources under CEQA." ES-2 paragraph 5 "The remaining 31 resources are recommended not eligible for listing in the CRHR and are therefore not considered significant resources under CEQA." This statement in two places reveals a fundamental failure to evaluate cultural properties under statutory criteria; to say they are not eligible therefore they are not significant is as senseless as putting a cart before the horse.

Issue G1-4 Objection to Non-Compliance with other Federal Law. 15

The assumption that the APE is located entirely on private lands constitutes a defect of the Cultural Resources Assessment and the DEIR since cultural properties on federal public lands must be

reviewed under an additional set of other federal laws, case law, Executive Orders, regulations, policies and procedures. The railroad right-of-way is located on federal land thus must be reviewed under NHPA and also the American Indian Religious Freedom Act of 1978, 42 USC 1966, Antiquities Act of 1906, 16 USC 431-433, Archeological and Historic Preservation Act of 1974, 16 USC 469, Archaeological Resources Protection Act of 1979 (ARPA), 16 USC 470, Executive Order 11593, Protection and Enhancement of the Cultural Environment, 1971, Historic Sites Act of 1935, 16 USC 461-467 and the Native American Graves Protection and Repatriation Act, 1990 (NAGPRA), 25 USC 3001-3013. 15

Issue G1-5 Failure to provide a treatment plan for ELIGIBLE properties and failure to evaluate the impact of the treatment plan under NEPA guidelines and standards.

Further, any treatment plan for cultural properties considered to be eligible for the National Register of Historic Places must first be submitted for review under , National Environmental Policy Act of 1969 (NEPA), 42 USC 4321-4347. Though a Department of the Interior Solicitor opined that the GMMMP-B or Project and ALTERNATIVES as a whole need not be reviewed under the National Environmental Protection Act (hereafter, "NEPA"), no opinion was provided as to the statutory obligation to review under NEPA the treatment plans developed under NHPA.

The NEPA review of the treatment plan must be made a part of the CEQA review of the project in its entirety to be able to adequately assess the potential impact and cumulative impact that the GMMMP-B or any of the ALTERNATIVES as a whole and cumulatively would have upon the environment. The NHPA process and the NEPA process for the treatment plan for identified National Register eligible resources must not be separated from the CEQA process, thus the DEIR is presently insufficient and we object to these insufficiencies.

On page ES-2 paragraph 5 the assessment reads: "However, if the Project will impact any of the 10 recommended-eligible resources, a treatment plan that identifies procedures to reduce impacts to these resources should be developed by a qualified archaeologist and implemented prior to the issuance of Project permits." We object to the inference that ESA archaeologists makes decisions and not just recommendations as to significance of resources under CEQA. We object that no statement as to the approval process and appeal procedure for a proposed treatment plan for potentially eligible resources subject to impact including those that may be avoided. We object to the inference that a "qualified archaeologist" makes the decision as to treatment and that the decision is in the hands of the archaeologists at ESA as to the determination of significance under CEQA. ESA needs to be corrected: they may make recommendation but they do not make the decision. We object to the disregard for the role and recommendations of public interest, Native American concerns, SBCo Planning and Land Use Department and the State Historic Preservation Office in the decision as to the treatment of significant, potentially eligible cultural resources that would be irreversibly damaged or destroyed by PROJECT activities. 16

A statement was also made: "The remaining 31 resources do not require further work as part of this Project." We object to ESA's usage of the word "work" as it is undefined and we object to the presumption that further treatment with regard to the identified 31 "resources" is unnecessary since consultation with the State Historic Preservation Office was not shown to have been completed and public comments on this assessment have not closed. We object that ESA's Cultural Resource Assessment does not distinguish ESA's recommendations from a bonified treatment plan approved by the government agencies statutorily charged with review and decisions to deny or approve the treatment plan for cultureal resources.

A statement was made: "A total of 43 resources were recorded or updated during the survey, two of which are no longer located within the Project area." Did they move? 43 Resources or 43 Sites or 43 Districts? We object to evasive language and reporting. Without an accurate statement of the facts it is impossible to adequately review this document.

Issue G1- 6 : Objection to map in Figure 3 – Survey Areas. Location of well fields and areas submitted to intensive field inventory of archaeological resources. We object to the map identified as "Figure 3" and its obfuscation similar to that found throughout the entirety of the DEIR as to exactly where and on whose land the wells are to be located. The map shows red blocks of land that have not been surveyed, and does not distinguish between lands surveyed in 1999 and those not currently surveyed. While the 17

assessment report discusses the findings of a previous survey, the public has no way to scrutinize where that cultural resources inventory was conducted in the field. The map does not indicate who owns these red blocks and the red blocks do not line up with the Green blocks said to be "Cadiz Property."

17

Issue G1-7: Failure to identify Traditional Cultural Places.

While some cultural properties have been identified in the DEIR other properties known in the literature and in Native American oral history were either ignored or unknown to the document preparers thus were not identified in the DEIR which constitutes a deficiency of the DEIR. Apparently not utilized for identifying Traditional Cultural Places (hereafter, singular "TCP" or plural "TCPs") was the list on file with the California Desert Conservation Area, Bureau of Land Management. Other published literature, Leivas, Klasky, Fowler, Laird and that by Musser-Lopez on file at the Society for California Archaeology's website was not referred to and local knowledgeable people and Native Americans were apparently not consulted.

Among the significant properties not identified in the DEIR is a TCP associated with the Southern Paiute Salt Song trail and traditional collecting area. This resource is of substantial concern to the Nuwuvi who have in recent years worked hard to preserve the remnants of this important traditional cultural property that encompasses the salt collecting areas around Amboy, Cadiz and Danby Pleistocene lakebeds. The pipeline portion of the project on federal public land bears directly through the TCP and thus must be assessed, evaluated and treated under NHPA and NEPA and the other federal laws listed above.

18

The DEIR is insufficient because the Salt Song Trail and traditional salt collection area has not been identified, described or evaluated in the DEIR. Interested parties, particularly the pertinent tribes and Native American individuals must be sufficiently informed and have sufficient time to consider the Cadiz Proposal in the GMMMP and DEIR and provide detailed comments concerning proposed methods of alleviating impacts to TCPs and weighing the consequences against the benefits to a single corporation if those impacts cannot be alleviated.

Issue G1-8: Failed Confidence in findings—failure to disclose qualifications of personnel. Other objections.

The Cultural Resource Assessment was completed by cultural resource professionals however previous experience or published research pertaining to the East Mojave Desert was not shown. Appendix A is a listing of individual projects participated in, large and small, but provided no critical evidence of prior experience in the East Mojave desert and no known professional publications concerning the area. The contextual background of prehistory provided in the assessment indicates a fundamental lack of understanding of the basic dynamics of the interface between the Aha Macav and expanding Numic speaking tribes in the eastern Mojave desert during the last 500 years and misrepresents the continued role of the Aha Macav in the East Mojave and the project area throughout this period until present; we object to this misrepresentation and the understatement of current theory. It does not mention important new research on prehistoric trails and resource procurement that pertains directly to the project area. The latest cultural overviews cited are dated and were published in the 1980s or prior.

Madalein Bray's undergraduate studies in archaeology were in Minnesota and it is not reported when she graduated from UCLA with an M.A. Her reported 10 years of archaeology experience includes no experience in the East Mojave and only a very limited amount of work near the East Mojave, a) "Fast and Furious 5" Project in Rice and Vidal (date and endurance unknown)--she assisted in preparation of technical studies for a project area involving a Special Use Film permit; b) conducted archaeological field survey at the project site of the Joshua Tree Water District Recharge Basin and Pipeline Project (date and endurance unknown), conducted research, wrote and prepared cultural reports for environmental documents for that project. Cadace R. Ehringer, RPA, Brian Marks, PhD., RPA, Monica Strauss, RPA, report no relevant publications or experience in the East Mojave prior to this Cadiz Project.

19

On page 26, 27 an insufficient Field Survey methodology is described. We lack confidence in and therefore object to the flawed cultural resources assessment on the grounds that ESA has not shown that the field crew is qualified to identify or assess prehistoric cultural resources in the East Mojave region, only new historic resource sites were recorded and the crew failed to complete an intensive inventory of the entire APE. The ESA assessment failed to state the names and experience of the survey crew led by ESA archaeologists Madeleine Bray and Cadace Ehringer and how many days were spent in

the field by the crew, how many crew members total, how many person days total were spent and who was performing the archaeological reconnaissance on each day in the field. The statement "In general, two surveyors walked on either side of the railroad tracks" (on page 26, paragraph 3 of "Field Survey") gives pause for objection…we object to the term "surveyors" as we do not know if these are qualified archaeologists, if a visual scan was made or if they simply "walked" along the tracks. We do not know if they walked in a straight line or in some other pattern. Most importantly we object to the failure of ESA to base conclusions concerning the impact of the UNDERTAKING upon cultural resources without a complete survey and inventory of the entire project area since the well field and the CRA tie-in Options 2a and 2b were never submitted to a field inventory.

19

Issue G1-9: Insufficient analysis of Cumlative Effect.

Page ES-1 Paragraph 3 states, "certain elements of the second phase of the project are still under conceptual development" making it impossible to analyze cumulative effect of the project and the consequences of implementing or not implementing the proposed second phase recovery component of the project. The CEQA analysis of the PROJECT is premature and must be invalidated because the design elements for the Imported Water Storage Component of this PROJECT proposal is not available to review

The impacts and the cumulative impact upon cultural resources in the APE cannot be determined because the Cultural Resources Assessment is phased and only the impact upon cultural resources within a portion of the APE of the first phase have been submitted to an in-field, on site, ground surface visual inventory for cultural resources, thus the analysis of potential impacts to cultural resources is insufficient. We object to the deficient description of the project design as stated in the cultural assessement, making it impossible to determine the exact potential direct impacts of the project upon eligible cultural resources in harm's way. We object to the fact that we are not afforded an opportunity to review a proposed treatment plan for the potentially eligible cultural properties that would be disturbed or destroyed by the project and not avoided and that the treatment plan was not provided on the pretense that the details of the project design are uncertain.

In Volume 1, page 5-3, the issue cumulative impacts are addressed, however the cumulative impacts to cultural resources was not stated. The failure to state the cumulative impacts to cultural resources is a deficiency of the assessment and the DEIR. The impacts and cumulative impacts to cultural resources within the potentially eligible Parker Cutoff Railroad District could be quite significant considering the future construction plans being considered in conjuction with the pipeline installation along the railroad right-of-way (hereafter "ROW"): fire hydrants, railroad car washes, offices, power lines and meters, passenger terminals, water delivery services "vegetation control" and "other contemplated improvements."

20

Cumulative impact should address isolated artifacts not considered eligible yet associated with a potentially eligible district. We object to the insufficient analysis of the potential cumulative and disconcerting impact of destruction, disturbance, alteration or introduction of new and foreign characteristics to ELIGIBLE or LISTED Cultural and Traditional Places such as the Salt Song Trail and Collection Area and the Parker Cutoff Railroad District with respect to the integrity of these resources potentially being a part of and of value to the justification for Feinstein's proposed Mojave Trails National Monument which would link Joshua Tree National Park with the Mojave National Preserve and 13 wilderness areas.

Issue G1-10: Failed confidence in findings – unverified, expired or dated data.

We object to the reliance upon a plus decade old study (Applied Earthworks, Inc., 1999) for the recommendations made with regard to areas not submitted to a field inventory (Class III inventory) for the current undertaking. We object to all of the recommendations to exclude from potential eligibility any of the recorded cultural properties and resources on the grounds that a thorough examination and documentation (Class III inventory)for this undertaking has not been completed.

21

On page 19, concerning the Wellfield, we object to the insufficient characterization of the cultural resources in the well field component of the APE. The assessment relies upon a 13 year old document which was not verified for the present report. Ca-SBr-3243, a prehistoric site and CA-SBr-3281H, a portion of the historic town of Cadiz was not evaluated for their potential ELIGIBILITY. We object to the mischaracterization of the historic, early 1900s era town as a "camp."

22

Issue G1-11 Insufficient data, descriptions, characterizations.

On page 19, concerning the Wellfield, we object to the insufficient characterization of the cultural resources in the well field component of the APE. The assessment relies upon a 13 year old document which was not verified for the present report. Ca-SBr-3243, a prehistoric site and CA-SBr-3281H, a portion of the historic town of Cadiz was not evaluated for their potential ELIGIBILITY. We object to the mischaracterization of the historic, early 1900s era town as a "camp." 22

The CA-SBr-9852 collection. We object that the findings of Inoway et al. (1999e) with regard to CA-SBr-9852 are not included in this report. Obsidian was collected presumably to obtain an approximate age for the site and inferences with regard to trade and travel. Formed tools were collected presumably to analyze for similar reasons and to identify cultural affiliation. An update, including details of the findings of the data recovery effort and the present status of the artifacts collected and their current provenance should be reported particularly since the site was altered though the 1999 proposed Cadiz undertaking was never approved. 23

While some of this information may be in confidential appendices that were not included in the body of the report, we are unable to review that information because we do not have the appendices. We have requested the confidential appendices and we request 20 days following receipt of the documents for review. 24

In general, we object to insufficient description of the cultural properties excluded from the list of ELIGIBLE properties and the failure to address statutory criteria for these properties, making it difficult for the public to review significance.

Issue G1-12 Failed Confidence. Lithics Specialist and Native American Monitor necessary.

We lack confidence in the in-field on-the-ground, visual cultural assessment and in the field examination and the findings. Insufficient information was provided concerning the qualifications or identification of all of the field Archaeologists. The assessment was insufficient because it was limited only to the pipeline ROW. While one prehistoric site CA-SBr-9852 was previously recorded there in 1999, no update was provided in the current assessment. The present report states that only the formed tools and obsidian was collected previously in 1999 as part of an effort to "exhaust the information potential" thus lithic debitage of various materials must still be present. The site was not updated in Table 4, page 29. The failure to report on the status of the remains of this site is pause for concern with regard to the field examiner's ability to identify East Mojave prehistoric lithic materials for not just this site but perhaps the entire pipeline corridor since only historic resources were recorded or updated. We object to the survey of the pipeline corridor and the failure to survey the well field for the current undertaking and recommend a resurvey with the presence of a qualified lithics expert and Native American monitor in consideration of the undertakings location encompassed within a significant TCP. 25

Issue G1-13 Unprofessional Structure of the Assessment.

Appendix B of appendix G1--correspondence, maps, etc. are on unnumbered pages making it difficult to refer to. The report sections are not numbered making it difficult to review. 26

Issue G1-14 We object that the pertinent tribes and Native American individuals have not been adequately notified.

Correspondence dated 11-17-10 to pertinent tribes from Madeline Bray, Cultural Resource Associate of ESA was misleading and deceptive in its characterization of the Project and omitted pertinent Project description in the body of the letter to the tribes including reference to the GMMMP-B as the UNDERTAKING and the need for an environmental assessment to review its impact and that it would be the COUNTY's ultimate responsibility to approve the GMMMP and an MOU. Further, we object that the correspondence did not disclose that a TCP may be impacted by the Project.

APPENDIX B OF APPENDIX G1, correspondence to tribes on unnumbered pages referred to on page ES-2 paragraph 1. We object to the description of the Project in the correspondence "…The Project is a water supply and conjunctive use storage project that would actively manage the groundwater basin within the Fenner Watershed in the Eastern Mojave Desert for the purposes of developing a new reliable water supply and storage facility for the Santa Margarita Water District (SMWD) and other participating water agencies. Groundwater extraction wells would be constructed on land owned by Cadiz, Inc. within 27

Fenner Gap area and a 44-mile pipeline would be installed…" We object to the mischaracterization and misleading description of the project in the correspondence to the tribes and other pertinent parties included in Appendix B of the Cultural Resources Assessment (CRA) that does not state how many wells or how much water. The project is more correctly described as "privatization of San Bernardino County's now public unadjudicated groundwater and sell for corporate gain by a few which transfer of wealth is a proportionate cost and loss to San Bernardino County's now public resource holdings" along with an accurate description of the action including facts such as size and location of well field, number of wells, current ownership of the water, amount of water annually to be transferred, potential corporate profit, potential public loss. The failure to state ownership of the water and the biased inference that the water is private because some of the wells are to be dug on private land is a misleading PROJECT description bordering on fraud and is at a minimum an omission and willful neglect to represent the truth by not accurately characterizing the project. The effect of this mischaracterization of the project only in terms of its benefit to SMWD and "other participants" is willful misconduct and an attempt to purposely mislead pertinent members of the public into believing that this project is benign and should be of no concern to them. We object to the representation in the DEIR that this letter to the tribes, dated November 17, 2010 and signed by the Cultural Resource Associate of Environmental Science Associates (ESA) with its omissions, inaccurate portrayals, mischaracterizations, and inferences constitutes proper notification…it does not. Certainly more than two responses would have been received as indicated in Par. 2, page ES-2, from those groups and individuals listed by the Native American Heritage Commission (NAHC) as pertinent, had an accurate description of the project area been included in the consultation letter. So called "notifications" such as these misleading letters should be sanctioned, but at a minimum should be invalidated and a proper notification process initiated. 27

Issue G1- 15 Mischaracterization of the UNDERTAKING, GMMMP and Alternatives.

Page ES-1 states "The Project….would develop a new reliable water supply and storage facility for SMWD and other participants…The first phase involves the conservation and recovery of native groundwater that is now lost due to evaporation."

Characterizing the project as recovery of evaporating water in Appendix G1 and in the body of the DEIR is misleading and fraudulent since evaporating water is not what is proposed to be extracted from the ground. Extracting the water from the ground, putting it into a canal and on yards in Orange County WILL CAUSE evaporation and we object that evaporation on yards in Orange County is not identified as a negative consequence and adverse impact of the proposed Cadiz Project if approved. The extraction of 2 million-acre feet of groundwater is not going to stop evaporation but promote evaporation which goes against the purported objective of this project.

Diversion of water that would otherwise evaporate in the Cadiz Valley region will contribute to global warming over a large area of San Bernardino County. By handing over the decision-making role of lead agency to a external entity (Santa Margarita Water District), the County of San Bernardino has abrogated its responsibility to abide by the "landmark settlement" with the State of California which requires the County to adequately analyze the effects of land use decisions on global warming. 28

Point 1: CADIZ' justification for taking and selling for their own profit, the East Mojave groundwater is the unsound theory propounded in the DEIR prepared by ESA which states that "the project would manage the aquifer and conserve water from nearby watersheds otherwise being lost to evaporation in local dry lakes. Conserved water would be collected and delivered to SMWD and other water agencies. The Cadiz Valley Project will capture and utilize billions of gallons of renewable, native groundwater that is currently being lost each year to evaporation." Really ESA? billions of gallons of water evaporating from Cadiz Valley? where is the evidence of billions of gallons of water evaporating in Cadiz Valley? If so, why would you suggest to put Colorado River water back into that valley for conservation?

Point 2: Is water really "lost" when it evaporates? Can Cadiz prove that the current amount of water evaporation is NOT a beneficial use? Last September, scientists from Carnegie's Global Ecology department concluded that evaporated water from vegetation helps cool Earth as a whole, not just the local area of evaporation, demonstrating that evaporation of water could have a cooling effect on the entire atmosphere. These findings, published Sept. 14, 2011 in Environmental Research Letters, have major implications for land-use decision making.

Point 3: In 2007, then-California Attorney General Jerry Brown successfully sued San Bernardino County to make reducing global warming part of its growth plan. Brown contended that the plan, a blueprint for the physical development of land until year 2030, did not adequately analyze the effects of development on global warming nor did it identify feasible mitigation measures.

SUPPORTING EVIDENCE
Brown's global warming suit says county must rewrite growth plan
http://www.legalnewsline.com/news/193605-browns-global-warming-suit-says-county-must-rewrite-growth-plan

Brown Announces Landmark Global Warming Settlement
http://oag.ca.gov/news/press_release?id=1453

San Bernardino Global Warming Plan Settles California Lawsuit
www.ens-newswire.com/ens/aug2007/2007-08-21-091.asp

Water Evaporated from Trees Cools Global Climate, Researchers Find
http://www.sciencedaily.com/releases/2011/09/110914161729.htm

The Cadiz Valley Project
http://www.smwd.com/operations/the-cadiz-valley-project.html

29

To briefly summarize, the DEIR and its Cultural Resource Assessment fails, is insufficient and does not identify, evaluate or provide a treatment plan for a significant Traditional Cultural Property, the Salt Song Trail and Traditional Salt Procurement Area that has been identified for some time in the anthropological and archaeological literature. Further significant cultural resources including an early 1900s historic steam engine railroad district complete with water stops, townsites, cemetery and charming appurtenances providing a flavor of the past is in the path of destruction—yet its preservation and protection is far more deserving than the Project proposed in this DEIR which should sensibly be discarded.

30

Sincerely,

Ruth Musser-Lopez
River Archaeological Heritage Association (RiverAHA)
c/o 420 E Street (mailing address)
Needles, CA 92363

O_RoscoeMoss 1

TELEPHONE: (323) 263-4111
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P.O. BOX 31064
LOS ANGELES, CALIFORNIA 90031

ROSCOE MOSS COMPANY

4360 WORTH STREET
LOS ANGELES, CALIFORNIA 90063

7 March 2012

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

Dear Mr. Barnes:

I am writing to urge strong support for the Cadiz Valley Water Conservation, Recovery and Storage Project. The project is based on sound scientific and technical studies. The Draft Environmental Impact Report released last year contains extensive analysis that the project will not have negative effects in the desert environment. In addition, the project will improve the reliability of the water supply for Southern California individuals and businesses.

Our family owned company has been in business in Los Angeles for 100 years and we have a facility in San Bernardino County. Being in the groundwater industry for so long, we understand the importance of this project. Specifically from the research and the engineering, this project will save from water from wet years to dry years and meet the greatest critical water supply and storage need by conserving water that would otherwise be lost to evaporation.

Over the long-term, it can help to sustainably meet the region's critical water supply and storage needs by conserving water that would otherwise be lost to evaporation. In the near term, the Project will create good paying construction and manufacturing jobs. With the Inland Empire suffering one of the highest jobless rates in the nation and local governments struggling to maintain -- let alone invest in -- new infrastructure, the Cadiz Project presents a unique opportunity for San Bernardino County.

The proposed Project represents an approximately $350 million investment in water infrastructure, and local vendors and workers are available to bring it to completion. We use steel manufactured locally by California Steel Industries. This project represents a significant local investment and job creation opportunity.

Once completed, Cadiz Valley water will serve thousands of Southern California employers for years to come, allowing them to grow their businesses with a reliable water supply at a firm cost.

1

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Cadiz Inc. is a company with a twenty-eight year track record in San Bernardino County. Our company is proud to support this environmentally sustainable project that can help serve our long-term water needs and get the Inland Empire back to work.

1

Very truly yours,

ROSCOE MOSS COMPANY

Robert A. Van Valer
President

O_SaltProducts

From: surplussalt@gmail.com
To: Cadiz Project
Subject: Cadiz Valley Project Response
Date: Wednesday, March 14, 2012 9:24:08 AM

March 14, 2012

It has come to my attention about the Cadiz Valley Project. This is of a deep concern to me and my fellow local miners. As you plan on drawing down the water table the wells on Danby Lake as well as Bristol Lake will be affected.

Salt Products is a small family owned business that was established on the lake in 1961. It is located on the Danby dry lake and extends out to the railroad tracks. The processing plant is next to the railroad tracks. Salt Products Company uses Danby Dry Lake for it's underground brine water source. We use both wells and trenches to draw from to evaporate in ponds. The salt is then refined to size and sold to various customers throughout the southwest. We base our entire operations on the levels of our wells. You drawing them down in the dry years and replenishing it in the wet years is going to cause erratic fluctuations in our trenches. We also have a fresh water well near the railroad tracks which we need for our brine operation which would also be affected. My other concern is that Salt Products Company is the only one that maintains the road between Cadiz and Hwy 62 off mile marker 102. It is a constant struggle to maintain the longer highway with just the little amount of traffic we have already. As this is the only road in and out, your equipment would beat up the road further, thus driving up my shipping costs and impacting us economically. 1

I look forward to your response on this matter.

My contact information is:

Neal Bratt
Salt Products Company PO Box 1270 Yucaipa CA 92399

760-709-7198 office. 760-218-4557 cell. 760-406-5776 fax.

Society for the Protection and Care of Wildlife
10500 Christenson Road
Lucerne Valley, CA 92356-8335
760- 812-7030
waterforwildlife@gmail.com

http://waterforwildlife.us

These comments are for the Cadiz Valley Water Conservation, Recovery, and Storage Project Environmental Impact Report (EIR). These comments are being submitted for myself and for the Society for the Protection and Care of Wildlife (SPCW), an organization which I represent. I am a desert resident and have been for almost 20 years. I have served 9 years in prior times as a member of the California Desert Conservation Area Advisory Committee. I have served as a member of all Desert Tortoise Technical Review Teams except for the last one. I have also been a member of the Joshua Tree National Park Advisory Committee.

The Society for the Protection and Care of Wildlife (SPCW) has been in existence since 1972 and incorporated in California in March of 1977. Our first effort was to restore the Tule Elk and this has been done.

The SPCW has also been involved in the desert with Water For Wildlife projects, since its inception. The Society for the Protection and Care of Wildlife is an organization which represents many individuals who have joined together to ensure that desert wildlife have sufficient water to prosper.

The EIR has failed to address a number of issues and addressed other issues inadequately.

The EIR suggests that there has been detailed scientific analysis of the Project's watersheds over many years and this has confirmed that the groundwater in the system is naturally renewable at sustainable rates.

The Project claims a variety of scientific models have been used to estimate the amount of recharge occurring annually in the watersheds. These models and others have produced a range of recharge amounts between 2,000 and 40,000 acre-feet per year. The model the project proposes, uses the United States Geological Survey's (USGS) new model called INFIL 3.0, which uses real data about a local area and local conditions, to estimate groundwater recharge. The Proposed project does not verify the data it utilized in applying the INFIL 3.0 model, which incorporates extensive data about local soils, vegetation, precipitation, temperatures, rock types, and field research in the Cadiz and Fenner Valleys. An estimated 32,000 acre-feet per year was projected by the INFIL 3.0 model, as the long-term average amount of water that reaches below the root zone to become groundwater at the Project area. 1

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The Project proposes to over-draft water in excess of any of the projected recharge amounts by amounts ranging from 10,000 acre feet per year to 87,500 acre feet per year depending on the study/model used. The Project EIR seems to choose a recharge amount of 32,500 acre feet per year. Most of the studies of recharge rates for the area reflect a much smaller recharge rate. These recharge rates range from 2,000 to 17, 500 acre feet per year. The EIR fails to reveal all of the potential recharge rates and seems to have arbitrarily chosen a number the proponents like and proceeded with the document.

The EIR uses NOAA data when it supports the recharge the proponents are seeking to demonstrate. Because there are few "Carbonate rock aquifers common in California, so there are not many examples to use for comparison and as a reality check on the groundwater flow model results; therefore, it is necessary to look outside the area for comparable hydrogeologic settings." So what do the proponents pick as the carbonate rock aquifer to model those scenarios on. Of course they pick one which is considered and is described as one of the most permeable and productive aquifers in the world ……the Edwards aquifer in San Antonio Texas. They then attempt to tie the results of studies of this aquifer to the Cadiz basin.

The proponents ignore the recent 12 year drought and resultant lack of recharge. The worst case scenarios are not really worst case and do not represent a complete range of alternatives. 1

The region is mostly comprised of public lands managed by the Bureau of Land Management (BLM), and it is believed no public lands will be directly impacted by this project. However the cones of depression at the well field will impact BLM lands. The draw-down of the basin will directly impact springs and seeps utilized by area resident and migratory wildlife. /The draw down will negatively impact the Mojave National Preserve and its wildlife. 2

The document is replete with hypothetical designs, possible alignments, every kind of weasel word and concept available to the proponents. The well field is a potential. The impoundment basins are conceptual as are some of the localized pipelines. The day after the project was approved the designs could change, the local pipelines moved, the impoundment basins and well fields moved. 3

No where do I find a discussion of the amount of water to be utilized by the railroad. It is not enough to merely say the railroad plans to use water from the pipe line. The Solicitor's opinion rendered several years ago is quite clear that the pipeline if placed in the railroad right of way must be utilized by the railroad for water for railroad use. 4

I did not discover how the proponents propose to get around San Bernardino County's ordinance which does not allow transfer of water from one basin to another. 5

I did find it interesting that the EIR attempted to present the dust issues as nothing to worry about when their own observations proved there would be a significant dust problem yet the proponents continue on as if this were an unimportant issue. 6

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As the climate change continues its onward progression from the ice age, the amount of rainfall in the California Desert is expected to be less and less each year or at least increased variability in the amounts. The premise of the EIR is that over 50 years the average draw down will be 50,000 acre feet per year. This allows for a draw down of 105,000 acre feet per year in some years with no possible recovery in any time frame which will not hurt the basin. 7

No where did I see a discussion of the lost revenue (one company 2008 - $10,000,000.) and jobs. Nor did I see a discussion which dealt with the issue which surfaced with Hurricane Kathrina. One of the companies was unable to utilize facilities and sources in the East and the West was totally dependant on the resources of Bristol and Cadiz Lakes. 8

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The proponents suggest that this is a water conservation measure. The Notice describes facilities to be used if needed in phase II as above ground reservoirs. I saw no discussion of this in this EIR. Nor did I see any discussion of the Phase II proposal to being Colorado River Water to the basin. I believe California Law is quite clear in that no degradation of water quality should occur. This would occur should Colorado River Water be allowed into the basin. 10

The EIR fails to meet the standards of CQUA and should be remanded back to the proponents to remove all of the smoke and mirrors with the requirement they answer the unanswered questions. 11

Respectfully,

H. Marie Brashear, President

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March 14, 2012

VIA EMAIL [cadizproject@esassoc.com] AND FIRST CLASS MAIL

Mr. Tom Barnes, ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017

Re: Comments to Cadiz Valley Groundwater Conservation, Recovery and Storage Project Draft Environmental Impact Report

Dear Mr. Barnes:

Tetra Technologies, Inc., is a Delaware corporation doing business in California as Delaware Tetra Technologies, Inc. ("Tetra"). Tetra submits these comments regarding the Draft Environmental Impact Report ("DEIR") for the Santa Margarita Water District Cadiz Valley Water Conservation, Recovery, and Storage Project.

Tetra's Operations

As you are aware, Tetra operates brine mining facilities at Bristol Lake and Cadiz Lake (collectively, "the Dry Lakes") in the Bristol and Cadiz Watersheds. Brine is created when water from surrounding aquifers reaches the Dry Lakes and dissolves underground calcium and sodium salts. Tetra's mining operations produce calcium chloride brine and sodium chloride salt by extracting those minerals from the brine. The resultant products are used in California's vegetable growing and canning industries, in the oil and gas industry, and to treat water, soil and roads. Significantly, the mining operations at the Dry Lakes have been in continuous production for approximately 80 years.

Tetra's mining operations consist of both (i) the use of surface collection pits into which underground brines percolate, and (ii) pumping underground brines into evaporation ponds. The underground brines are concentrated in the ponds through evaporation. The surface pits are designed for collection from the water table levels. Tetra's current wells produce brines from the only permeable zones that allow the flow of water that makes the minerals soluble for extraction from the brines. Zones below the depth of Tetra's current producing wells are primarily a series of nonporous salt layers that do not produce liquid that can be pumped using current technology.

Because the stated purpose of the Project is to divert *all* groundwater recharge from the Dry Lakes for 50 years, the Project will undoubtedly adversely impact Tetra's mining operations at the Dry Lakes. The project will also adversely impact the environment in general. Because of 1

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the potentially disastrous impacts the Project will have, it is imperative under CEQA that the DEIR (i) scrupulously identify and evaluate each of the Project's impacts, as well as alternatives to the Project that might alleviate those impacts, and (ii) impose enforceable, effective mitigation measures to address those impacts. Unfortunately, the DEIR completely fails to meet its CEQA obligations in this regard. Thus, the DEIR should be revised and recirculated before the Project is considered by the decision-makers. 1

The DEIR Fails To Meet Its Obligations Under CEQA

An Environmental Impact Report, with all its specificity and complexity, is the mechanism prescribed by the California Environmental Quality Act ("CEQA") to enforce informed decision-making and to expose the decision-making process to public scrutiny. An EIR is the "heart of CEQA," "an environmental alarm bell," and a "document of accountability." An EIR provides the public and responsible government agencies with detailed information on the potential environmental consequences of a project *before* the agency approves it. The EIR serves not only to protect the environment, but also to demonstrate to the public that it is being protected. Thus, CEQA requires that the lead agency identify and disclose all of the significant environmental impacts of a proposed project. CEQA also requires the public agency to consider feasible alternatives to the project which would lessen any significant adverse environmental impact. (Pub. Res. Code §§ 210002, 21081; CEQA Guidelines § 15003(b).) Unfortunately, the DEIR here completely fails to meet these obligations. 2

As discussed in detail below, the DEIR does not adequately analyze the Project's impacts on hydrology, mineral resources, air quality, biology, and other resource areas. There are numerous legal deficiencies in the Project DEIR, including its failure to accurately describe the Project, to identify the significant environmental effects of the Project, to mitigate those adverse effects through the imposition of adequate mitigation measures, to evaluate a reasonable range of alternatives, and to enable the public to have meaningful input in the process. Those deficiencies include, but are not limited to, the following:

1. The Project Description Is Misleading, And The Dispositive Decisions Concerning The Project And Its Impacts Will Be Determined By Entities Who Have A Conflict Of Interest. 3

First, the DEIR misstates that the Project's fundamental purpose is to "*save* substantial quantities of groundwater that are *presently wasted* and lost to evaporation by natural processes." (DEIR at 3-5.) That Project description is highly misleading because: (i) rather than "saving" groundwater, the Project would overdraft the aquifer by diverting all of the purported 32,000 AFY of groundwater recharge, and at least another 18,000 – 43,000 AFY for 50 consecutive years, and sell that groundwater to customers in south Orange County and elsewhere; and (ii) the groundwater migrating to the Dry Lakes that is purportedly "wasted" and "lost to evaporation by

natural processes" has been used for close to a century to help produce agricultural, mining, and commercial products, and is essential to Tetra's operations and continued existence. Thus, the purpose of the Project is not to extract and *conserve* groundwater (DEIR, 4.9-5), but to extract and *redirect* the annual recharge currently migrating to the Dry Lakes, as well as to extract indigenous groundwater, and to pump that recharge and indigenous groundwater to other areas outside of the County. 3

Based on the DEIR's recharge assumptions, there will be a net withdrawal of local groundwater of close to 1.0 MAF over the term of the Project. If the natural recharge rate is overestimated in the DEIR, then the net loss of groundwater will be even greater, and the evaluations in the DEIR would not be representative of what would actually occur. The DEIR does not address the effects, pertaining either to water quality or to the local environment, of mining the indigenous groundwater, and the fact that the Project "mines" indigenous groundwater without replacement is troubling.[1] 4 5

Moreover, the DEIR does not define the authority of the lead agency (i) to allow groundwater withdrawals from the Fenner basin, and/or (ii) to divert one hundred percent of the groundwater recharge for 50 consecutive years from areas that have received such recharge for thousands of years. All of the monitoring and mitigation is controlled by the project proponents, who have a great incentive to maximize water withdrawals regardless of the collateral damage to other resources. Monitoring and mitigation must be controlled by the agencies that administer the public lands that may be impacted, and also by the National Park Service and BLM. Moreover, the criteria that might be used to shut this Project down before it causes irreversible damage must be spelled out in the DEIR, and the decision left to unbiased, objective decision-makers (not Cadiz and SMWD, who have financial interests in selling the groundwater). 6

2. <u>The DEIR Unlawfully Defers Impact Evaluation And Mitigation Through Unenforceable Monitoring Requirements.</u> 7

The proposed Project is designed specifically to extract water originating in the Fenner and Bristol Watersheds that would otherwise migrate to the area under the Dry Lakes, and to pump it and other groundwater in the aquifer to customers outside of the area. The Project

[1] The second component of the Project, the importation and storage in the aquifer of excess water from the Colorado River Aqueduct, is addressed only at a programmatic level in the DEIR, apparently in recognition of the fact that it is highly unlikely to ever occur. Not only does the DEIR improperly segment the Project by doing that, but the DEIR also fails to adequately evaluate what the environmental impacts of the second component would be on the first component (*e.g.*, would the importation of groundwater recharge in the second component counterbalance the effect of the groundwater drawdown in the first component that prevents the migration of groundwater recharge to the Dry Lakes?). 5

would accomplish this by modifying the underlying groundwater gradient in the Fenner Gap area to prevent the present outflow of groundwater to the Bristol and Cadiz Watersheds from occurring. However, despite the obvious adverse impacts this deprivation of groundwater recharge to the Dry Lakes would have on Tetra's mining operations, the DEIR is content to completely defer environmental evaluation of the groundwater pumping impacts to a future time -- the plan apparently is to install the pumps, fire them up, and discover what the ramifications of doing that is later, after the Project is a *fait accompli*. Tetra's major concern is that the actual rate of recharge is unknown. Stemming from this unknown, the actual impacts to the water table, water flow, and brine interface are also unknown. Monitoring these impacts, while necessary, may be ineffective because the actual impacts may be noticed at too late a date to repair any negative effects. 7

The GMMMP is not adequate to evaluate the potential impacts to the natural water sources. The basis for the presumption that monitoring certain wells will provide adequate data to evaluate what is going on in the groundwater aquifer system is deficient. Although several wells have been constructed relatively recently in the area, the monitoring will rely on a single well, far removed from Tetra's operations, a significant deficiency in light of the fact that a drop of less than one foot in water table level has the potential to cause devastating impacts to Tetra's mining operations. What are the exact modifications that will prevent those adverse impacts? Such details are of the utmost importance in preventing adverse impacts, and need to be disclosed, and made fully enforceable. The GMMMP merely sets forth vague alternative suggestions as to how adverse environmental impacts might be addressed, with no indication as to who will decide which measures will apply, when the measures will be applied, or how the measures will be enforceable. It appears that all monitoring and decision-making will be made by the Project proponents, who have built-in incentives to favor continued groundwater extraction. Indeed, Cadiz, a private entity, will be a part owner of the Fenner Valley Municipal Water Company ("FVMWC"), which presents a conflict of interest situation. In order to protect the public interest, independent monitoring should be done, and the decision-making process should have full representation by the interested public. What guarantees does the public have that the Cadiz/Fenner area will not become another Owens Lake or Mono Lake? Promises of faithful monitoring are easily given, but corrective action must be based on more than consultation among parties with a financial interest in selling groundwater to developers who need it to develop their landholdings. 8

Ultimately, any Project approval should include, at a minimum, criteria from monitoring the net groundwater extraction, and for assessing water quality, air quality, and land subsidence objectives; the parties that will bear the responsibilities should those objectives not be met should also be clearly indicated. Although the DEIR states that a monitoring program will be followed that promises to provide decision-makers with information needed to make critical decisions in the future regarding the protection of desert landscapes, flora, fauna, water quality, air quality, and Tetra's operations, what the DEIR does not do is give interested present-day commentators

and decision-makers adequate information to assess the merits of the Project today, *before* major public and private funds are dedicated to its construction. Before the Project receives approval and before irrevocable commitments of funds are made, an objective and comprehensive analysis of the Project's merits should be publicly presented. Crucial to this assessment should be the formulation of legally enforceable assurances that the impacts of the Project will not be ignored or sacrificed in favor of fulfilling the Project's water supply obligations. 8

3. Hydrology and Water Quality.

a. The DEIR Overestimates Groundwater Storage.

The DEIR overestimates the total groundwater underlying the Project area, assuming that 17 to 34 million acre feet of groundwater exists. However, in 2000 – 2001, the EIR/EIS for a similar Cadiz Project assumed that that amount of groundwater was only 3.65 to 6.69 MAF. The current DEIR's assumption that up to ten times more groundwater underlies the Project area than in 2000-2001 is not substantiated. Nor does the DEIR adequately evaluate whether 50,000 AFY per year over the 50 year Project period can be safely extracted. The DEIR does warn that groundwater mining could be a problem in terms of mining and subsidence impacts to the Dry Lakes and of saline groundwater intrusion into the groundwater levels under the well field. The DEIR, however, fails to adequately evaluate what those specific impacts are or what the specific mitigation measures to address those impacts should be. 9 10

b. The DEIR Overestimates Recharge Rate.

The error regarding the amount of groundwater in storage is compounded by the DEIR's overestimation of the groundwater recharge rate. The accuracy of the DEIR's assessments is heavily dependent on its assumption that the natural recharge to the underlying aquifer is 32,000 acre feet per year. An analysis by the United States Geological Survey ("USGS"), however, suggests that this estimate may be significantly in error. The USGS has in the past offered persuasive evidence that the natural recharge is much lower than the estimates provided in the DEIR, and may be as low as 1,710 acre feet per year.

As set forth in the accompanying report prepared by Shaw Environmental and Infrastructure Group (addressing the DEIR's hydrological, air quality, biological resources, and cumulative impacts analyses), which report is incorporated herein by reference as though set forth in full, the DEIR fails to use the best reasonably available science to evaluate important issues such as the aquifer's recharge rate, air quality and biological impacts, the efficacy of the monitoring program, the efficacy of potential mitigation measures, and groundwater overdraft. 11

The discrepancies regarding natural recharge to the aquifer must be resolved, and a new draft EIR issued, which uses the best available technical information and which sets forth the

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responsibilities and policies of the lead agency regarding the groundwater basins involved. The Project should not be allowed to move forward in any form unless it includes operational criteria that specifically address whether any net extraction of groundwater is acceptable as a matter of federal and state policy, and if it is, how much and under what conditions.

The recharge analysis in the DEIR is deficient because the actual rate of recharge is simply an educated guess, and prior studies estimating the recharge rate have come to very different conclusions. Studies prepared in the 1980s on recharge for the Fenner Watershed concluded that the recharge rate at various ranges was as low as 780 AFY. (DEIR at 4.9-33-34). In the 1990s, the recharge rate was estimated to be as low as 13,000 AFY depending on the model employed. The 1999 Geoscience study estimated a range between 15,000 and 37,000 with an average annual estimate of 30,000 AFY. (DEIR at 4.9-34). Using the Maxey-Eakin Model, various studies estimated recharge at between 2,550 and 11,200 AFY; at 5,000 AFY; between 5,000 and 6,000 AFY; or between 16,214 and 29,185 AFY. (DEIR at 4.9-36).

Incongruously, the C2HM Hill study, relied upon in the DEIR, estimates the annual recharge at 32,000 AFY. (DEIR at 4.9-38). The DEIR, however, fails to adequately discuss the C2HM Hill study and the parameters used in the study, and does not fully explain why the variables chosen in the C2HM Hill study provide a better estimate as to the rate of recharge. A more detailed discussion of the C2HM Hill methodology should be included in order to establish its use as the preferred methodology. 11

Moreover, the C2HM Hill study was also prepared for Cadiz, Inc, and an independent technical review of the study should be conducted by other governmental agencies such as USGS, National Park Service, and/or Bureau of Land Management due to the large discrepancy among the studies conducted for the area of the estimated annual recharge for the Fenner Valley. Further, most of the prior estimates are wide ranges. The C2HM Hill estimate of 32,000 AFY is at the high end of some of these estimates, and off the chart in other estimates. The DEIR does not provide enough information for the public to resolve these discrepancies both in terms of methodology and the proper estimate. There needs to be a more thorough discussion of the prior hydrologic investigations, methodologies employed, and reasons for rejecting those studies and adopting the C2HM Hill findings.

It is clear that the Project would have a significant effect with regard to hydrology and water quality because it would "substantially deplete groundwater supplies' and "interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level." (*See* CEQA Guidelines, Appendix G, IX (b).) Although the DEIR considers two "sensitivity scenarios" that estimate annual recharge at 16,000 AFY and 5,000 AFY (DEIR at 4.9-46) (apparently recognizing that its assumed recharge rate of 32,000 AFY is suspect due to the discrepancies in the rate of recharge in the prior studies), the DEIR unreasonably concludes that under the two sensitivity scenarios, the impacts

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also are not significant. The DEIR concedes that under the 5,000 AFY recharge rage, full recharge would take *390 years* after the Project ceases to pump groundwater out of the area for 50 consecutive years (or in the year 2452, were the Project to begin pumping in 2012). (DEIR at 4.9-71). The DEIR's conclusion that waiting *440 years* for full recharge does not produce permanent adverse impacts simply because full recharge will eventually occur (DEIR at 4.9-72) is absurd on its face. Recharge after 440 years would be a significant impact as it would permanently impact existing land uses, biological resources, and geologic resources. 11

The DEIR's analysis is further flawed because it used different models for the 16,000 and 5,000 AFY recharge scenarios, with different hydraulic conductivity and other assumptions, than the model used to evaluate the 32,000 AFY recharge scenario. The same model, with the same assumptions, should have been used for all three scenarios, so that consistent comparisons could be made. 12

Even under the circumstances assumed in the DEIR with a 32,000 AFY recharge rate, full recharge to pre-Project conditions would not occur for 67 years after Project completion (or by the year 2129, were the Project to begin pumping in 2012). (DEIR at 4.9-71). There is simply insufficient analysis of these potential impacts in the DEIR, which analyzes impacts only through a 100 year period, or 50 years after cessation of the Project. 13

In addition to the need for further analysis, HYDRO-3 must also be revised as it provides inadequate mitigation for impacts to existing operations as discussed below. 14

c. Impacts Related to Water Table Decreases.

The DEIR concedes that the water table would drop and that the fresh water/brine interface would be affected by the Project pumping. However, the DEIR is deficient because it is inconsistent in its description of existing conditions, variously assuming that the water table below the Dry Lakes is 8-10 feet bgs in some sections, less than 15 feet bgs in other sections, and 18 feet bgs in yet other sections. Obviously, constantly shifting assumptions regarding the existing depth of the water table precludes an adequate evaluation of what the impacts of the Project drawdown will be to Tetra's operations. Further, the DEIR fails to recognize that (i) even a one foot drop in the water table would result in Tetra being unable to produce its product, and (ii) Tetra will not be able to wait for full recharge to resume its operations. Thus, the Project would result in the loss of availability of a known mineral resource and two mineral recovery sites that are of value to the region and the residents of the state. (*See* CEQA Guidelines, Appendix G, XI (a), (b).) These are significant, unavoidable impacts as Tetra would have to close its operations. Therefore, in addition to concerns regarding the recharge rates, Tetra also has concerns regarding mitigation measures Hydro-2 and Hydro-3. 15

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HYDRO-3 is the mitigation measure most closely tied to a reduction in the water table and is designed to mitigate impacts to salt mine operators. Specifically, if a well owner submits a written complaint regarding decreased yield, degraded water quality, or increased pumping costs, corrective measures *may* be implemented. (DEIR at 4.9-58). These measures, however, are inadequate to fully mitigate adverse impacts to Tetra's operations.

First, an interim water supply is not likely to contain the concentration of minerals that would allow Tetra to produce the same quality of product in the same amount of time as its current production. Deepening impacted wells is at best a short term solution and wells can only be deepened to a certain extent before the well would hit salt plates. Specifically, at a depth of approximately 400 feet the geology consists of less permeable salt plates from which brine cannot be extracted. Deepening existing wells would therefore not adequately mitigate the adverse impacts to Tetra's operations. Blending impacted well water with water from another source is problematic for the same reason that an interim water supply is problematic. 15

Construction of replacement wells is also only a temporary solution. While payment for increased pumping costs might financially enable Tetra to continue to mine, and could provide for payments for additional wells, this mitigation measure does not address brine concentration or well flow. If the Project takes water that would otherwise flow into the Dry Lakes and create the brine required for Tetra's mining operations, the well flows and concentration of the remaining brine would be impacted and could impact how the brine solution would be mined for calcium and sodium chlorides, as well as the processing time required to obtain a saleable product. Modifying Project operations is a temporary solution and may conflict with the lead agency's water delivery obligations.

Finally, the DEIR does not adequately address all impacts associated with the proposed mitigation measures. The deepening of existing wells and the construction of replacement wells would result in construction impacts that have not been identified, evaluated, or mitigated. If a mitigation measure would cause one or more significant effects in addition to those that would be caused by the project as proposed, the effects of the mitigation measures must be discussed in the DEIR. (CEQA Guidelines, § 15126.4(a)(1)(D).) That has not been done here. 16

The above concerns need to be addressed to insure that impacts are mitigated to a Less Than Significant Level as provided in the DEIR.

d. Impacts Related to Interface Changes.

The Environmental Setting section of the DEIR related to climate change (4.9.1) describes the basin's groundwater supply as "mainly generated by precipitation (both rain and snow) that occurs in the upper elevations of nearby mountain ranges. Once it has infiltrated and becomes groundwater, precipitation moves very slowly down gradient toward the Project area. 17

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Groundwater beneath the Project area has been found to be hundreds of years old." (DEIR at 4.9-15). Further, the primary sources of replenishment to the groundwater system is direct infiltration of precipitation (both rainfall and snowfall) into fractured bedrock exposed in mountainous terrain and infiltration of ephemeral stream flow in sand-bottomed washes, particularly in the higher elevations of the Watersheds. (DEIR at 4.9-22).

As a result of the Project, the current saline water/freshwater interface is expected to migrate east and north toward the Cadiz production wells. The amount of migration varies depending upon the recharge rate. (DEIR at 4.9-49). In all cases, however, the interface is moving away from Tetra's operations. The DEIR is concerned with preserving water quality for freshwater wells, which may be impacted if the saline interface moves northeast. The DEIR specifically mentions salt production companies in existence and states that they will not be impacted by this shift as their wells already produce overly saline groundwater. (DEIR at 4.9-49). With this purpose in mind, mitigation measures HYDRO-2 and HYDRO-3 are proposed. That ignores, however, the fact that the "overly saline groundwater" is precisely what Tetra's wells are intended to produce.

HYDRO-2, relating to the migration of the brine/freshwater interface, is inadequate to mitigate impacts to Tetra's operations. As stated, the DEIR is concerned with impacts to freshwater wells. HYDRO-2 provides for the deepening of impacted wells; blending impacted well water with another source; construction of replacement wells; payment to the impacted well owner for any increased material pumping costs incurred by the well owner; modification of Project operations until adverse effects are no longer present at the affected wells; or installation of an injection or extraction well(s) in conjunction with appropriate injection of lower-TDS (total dissolved solids) water or extraction of higher-TDS water to manage the migration of high-TDS water from the Dry Lakes. (DEIR at 4.9-57-58). However, HYDRO-2 will not mitigate impacts to salt mine operators, as its measures do not relate to impacts to brine operators like Tetra. Deepening wells would not allow Tetra to produce more brine because at a depth of approximately 400 feet the geology consists of less permeable salt plates from which brine cannot be extracted. Moreover, the groundwater in the aquifer can be over 100 years old and is the result of infiltration of precipitation. This water travels to the Dry Lakes where it dissolves the calcium and sodium chloride salts and produces the required brine. Replacement water would not go through this process and it is unlikely that the replacement water would have the same mineral content required to produce quality calcium chloride and sodium chloride of the type Tetra is currently producing. Problematically, the DEIR does not discuss where replacement water would come from. Even if the construction of replacement wells could serve as adequate mitigation in the short term, without a recharge of the water table, these replacement wells would not be effective. Further, the DEIR does not discuss impacts from construction of replacement wells, nor does it discuss permitting or payment for these wells.

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Nor will payment to the impacted owner mitigate the long-term effects of the Project, especially if the water table drops too low to allow the continuation of mining or if the concentration of brine is altered, irreversibly impacting operations. Installation of an injection or extraction well poses the same problems as providing replacement water. There is also no discussion of the impacts of the construction of these wells.

Finally, the vague option of modifying Project operations to resolve adverse impacts to mining operations also raises concerns. Reduction in pumping from Project wells, or stoppage of groundwater extraction for the "duration necessary to correct the predicted adverse effect on existing wells" may conflict with FVMWC's obligations to its shareholders in instances where adverse effects on existing wells are so great that pumping must be greatly reduced or stopped for a long period of time. The DEIR does not address instances where there would be a conflict between halting production to mitigate adverse effects to existing wells and meeting contractual obligations. In these instances, the DEIR should clarify which obligation would take precedence.

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4. Mineral Resources.

In addition to hydrology concerns, Tetra is also concerned with impacts to its calcium chloride and sodium chloride products. The DEIR concedes that potentially there will be an impact to salt mining operations, and that the Project would make it more difficult or costly to mine, and would require a change in mining operations or facilities. (DEIR at 4.11-9). Although the DEIR proposes certain mitigation to make these impacts less than significant, the trigger for the mitigation measures to take effect occurs too late in the process and would not alleviate significant impacts to Tetra's operations.

Specifically, MIN-1 provides for similar mitigation measures to those described in the Hydrology and Water Quality section above. For MIN-1 to take effect, however, there must be changes in the groundwater levels larger than projected by the groundwater model simulations, or if changes occur in groundwater or brine water levels that are greater than 50 percent of the water column above the intake of any of the salt mining companies' wells in comparison to pre-operational static levels in wells at the margins of the dry lakes. (DEIR at 4.11-10). As described above, the groundwater levels vary depending on the amount of recharge. The DEIR needs to be clear as to which level in the groundwater model simulation is used as the baseline. Further, if the projection is too high, there is no method to reexamine this mitigation measure to actually mitigate significant impacts to operations. The only alternative would be to use the 50 percent difference in the water column. This too is problematic, as mining operations can be affected by even a one foot decrease in the water table. Decreases in the water table would impact both pumping and brine concentration, which in turn impacts the length of time for evaporation and processing, or the quality of the product. MIN-1 needs to be revised to address these concerns in order to mitigate impacts to less than significant.

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The Project's stated purpose is to capture water before it interfaces with brine under the Dry Lakes and is lost to evaporation. By that very purpose, mining on the Dry Lakes, which relies on continued renewal of the brine by infusion of fresh water, will be impacted. Due to the sensitive nature of the product and precise chemical components, impacts that reduce the water table, move the fresh/saline interface zone, or change the concentration of brine, will impact mining operations. As Tetra and other operators are existing uses, impacts to their operations need to be clearly considered and mitigated to a less than significant impact after taking into consideration all potential impacts. 18

5. Additional Concerns.

a. Air Quality.

As stated, the Project poses a serious threat to the groundwater system underlying the whole of the Cadiz – Fenner basins and the surrounding environment. Among the harms likely to be caused by the Project are catastrophic depletion of the aquifer that could take centuries to be remedied. By substantially drawing down the aquifer, the Project also threatens to dry out the moist lake beds, or playas, of Bristol and Cadiz Lakes. As has been noted in the past by the USGS, significant net extraction of groundwater may result in a drying out of the upper layer sediments at the Dry Lakes and the creation of dust problems, reminiscent of the problems caused by water project operations in the Owens Valley. 19

b. Agriculture and Forestry Resources.

Because the rate of recharge is not sufficiently justified, additional questions arise regarding other potential impacts. Five Wilderness areas are located near the Project site. These Wilderness areas may be impacted by a decrease in the water table, a capture of water discharge, or impacts to natural springs. Impacts to Wilderness areas meeting the definition of forest lands under Public Resources Code Section 12220(g) need to be analyzed and discussed. Although the Project is not located on forest lands, impacts to forest lands may occur as a result of the Project. These impacts need to be analyzed. (*See* DEIR at 4.2-9) 20

c. Biological Resources.

In terms of Biological Resources, impacts to local important species were not adequately analyzed. The DEIR claims the Project is exempt from local zoning laws under Government Code Section 53091. (DEIR at 4.4-33) While SMWD may be exempt during the construction of the Project facilities to produce, store, and transmit water, FVMWC would not fall under the local agency definition of section 53090, and the section 53091 exemption would not apply. As such, impacts arising due to the operation of the Project need to be analyzed. 21

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In addition, the draining of the aquifer could cause springs in the surrounding mountain ranges to dry up, spelling extinction for the local populations of Big Horn Sheep. The vast area of fresh water spreading basins on the Project site will also be a major attraction for ravens and other birds that will prey on the fragile desert tortoise population in critical habitat areas within the basin. These are only some of the devastating environmental impacts from the Project, impacts that in practical terms will be permanent and very expensive to even attempt to mitigate. 22

San Bernardino County Code section 88.01.060 provides that desert native plants, including all Joshua trees and smoke trees, shall not be removed except for under a Tree or Plant Removal Permit. BIO-16 and BIO-17, however, do not adequately address impacts to specified desert native plants that may occur as a result of a lower water table or other Project impacts. While the trees would not be proactively "removed," impacts up to and including the death of desert native plants protected under the San Bernardino Development Code would violate the stated purposes of the Plant Protection and Maintenance Ordinance. Those purposes are to "promote and sustain the health, vigor and productivity of plant life and aesthetic values within the County through appropriate management techniques," and to "conserve the native plant heritage for the benefit of all, including future generations." (San Bernardino County Code § 88.01.010)

To maintain consistency with the San Bernardino County General Plan and Development Code, the DEIR needs to include a detailed analysis of impacts to specified desert native plants as a result of Project operation. Adequate mitigation measures need to be proposed, which may include monitoring of these species, which will address adverse impacts due to a change in habitat. 23

The DEIR does not fully examine the potential problems that could result from draining a desert ecosystem of its precious and scarce water supply, and specifically the effect at fluctuation of the water table and quality it will have on the plant communities. Some of these plant communities are sensitive to the elevated levels of total dissolved solids while others (halophytes) require saline conditions to persist. Many of the halophytic chenopod communities (desert iodine brush scrub, greasewood and others) are considered rare and worthy of consideration under CEQA communities by the California Department of Fish and Game, and could be impacted through groundwater/TDS fluctuations.

d. Geology and Soils.

Of particular importance to Tetra is any potential subsidence of the area around its operations on both Bristol Dry Lake and Cadiz Dry Lake. As stated in the DEIR, the area with the greatest potential for subsidence would be under Bristol and Cadiz Dry Lakes. (DEIR at 4.6-36) Tetra's operations fall squarely within the area with the greatest potential subsidence as a 24

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result of the Project. In either of the sensitivity scenarios, subsidence could significantly and adversely impact Tetra's operations.

Although GEO-1 would implement corrective measures, such as reduction in pumping from Project wells, revision of pumping locations, or repair of any structures damaged as a result of subsidence attributable to Project operations (DEIR at 4.6-38), these mitigation measures suffer the same inadequacies as those described in HYDRO-2, HYDRO-3 and MIN-1 above. Further, Tetra's mining operations are contingent upon compliance with approved Reclamation Plans. Any additional reclamation measures incurred as a result of the Project need to be discussed and mitigated in the DEIR. Without such mitigation, there will be significant impacts to Tetra's existing use. 24

e. Land Use and Planning.

As stated, the mining operations at the Dry Lakes have been in continuous production for multiple decades. The Socioeconomic Impact section, however, does not mention the loss of jobs to Tetra employees, or other employees of mining operators, that may occur as a result of the Project. Further, the section assumes that all Project job creation would occur in San Bernardino County. The DEIR needs to analyze potential job loss as a result of the Project, and should not assume that all job creation would occur in the County unless a mitigation measure is imposed that only San Bernardino County residents would be considered for any jobs that would be created. (*See* DEIR at 4.10-21) 25

Moreover, the DEIR should discuss any inconsistencies between the proposed project and the applicable regional plans, identifying specific policy-by-policy numbers with a discussion of consistency or support with each policy. 26

f. Alternatives.

A reasonable range of alternatives has not been evaluated. For example, there has been no analysis of an alternative that would pump less than 50,000 AFY, even though a significantly smaller amount of pumping arguably would meet Project objectives at a reduced environmental cost. 27

In short, the DEIR does not adequately address these and other serious problems with the Project. Among the glaring deficiencies, the DEIR: is based on a deficient and inconsistent description of the Project and the physical conditions of environmental resources in its vicinity; inadequately assesses the purpose and need for the Project; and fails to examine the Project's feasibility and its likely adverse environmental impacts. The DEIR attempts to sidestep all substantive problems by proposing to defer the identification of problems and the decisions about how to deal with those problems to a future date, and to delegate the mitigation of those 28

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problems to unaccountable committees dominated by the Project's proponents under a vague and inadequate monitoring and management plan. The DEIR should be revised to address the concerns set forth herein and in other commenters' letters, and recirculated for further public comment. 28

Very truly yours,

RUTAN & TUCKER, LLP

Robert S. Bower

RSB:dmo
cc: Bass Wallace, Senior Vice President, General Counsel, & Secretary, Tetra Technologies
Alicia Boston, Senior Counsel, Tetra Technologies
Jim Funke, Vice President and General Manager, Tetra Technologies
Greg McKnight, Director Chemical Manufacturing, Tetra Technologies
Jeff Meier, Regional Manufacturing Manager, Tetra Technologies
Alex Naughton, Shaw Environmental, Inc.
John Ramirez, Rutan & Tucker, LLP

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COMMENTS

Shaw Environmental, Inc. for TETRA Technologies and Rutan and Tucker, LLP
Cadiz Valley Water Conservation, Recovery, and Storage Project
State Clearinghouse No. 2011031002

March 14, 2012

Prepared by Alex Naughton, REA

Experienced professionals with Shaw Environmental, Inc. (Shaw) reviewed the Draft Environmental Impact Report (DEIR) for the Cadiz Valley Water Conservation, Recovery, and Storage Project (Project) on behalf of TETRA Technologies (TETRA) and found numerous significant technical flaws in the DEIR's hazard analysis and mitigation measures. In general, Shaw's review concluded:

- The Project's hydrologic evaluation does not meet CEQA standards requiring adequate investigation to allow a full consideration of environmental impacts in accordance with CEQA standards (Title 14 § 15125). Our review found the environmental investigations upon which the DEIR relies to be limited to the Fenner Gap area and did not adequately study the entire Project-impact area, specifically the Bristol and Cadiz Playas, and deep geology upon which key hydrologic assumption rest. As a result, the DEIR's analysis is insufficient to predict the full magnitude of Phase I impacts on significance criteria including saline intrusion, land subsidence, and water depletion.
- Hydrologic sections of the Project's Groundwater Management, Monitoring, and Mitigation Plan rely on unreliable modeling and the document is not consistent with San Bernardino County guidelines.
- The Project's air quality evaluation disregards the current Ozone Attainment Plan and did not study direct or cumulative Project impacts on Joshua Tree National Park as a Class I Area Designation.
- The Project's cumulative impacts fail to analyze growth induced impacts to South Orange County which will occur as a direct result of expanded water availability, not do they adequately evaluate impacts to San Bernardino County related to loss of water resources which would otherwise be available for local projects, such as solar energy and Marine Corps base-expansion projects.

1

Because its foundations are significantly flawed, the DEIR must be recirculated to fully and reliably analyze project impacts. The following sections detail observations and comments generated through Shaw's review of the DEIR and supporting documents.

HYDROLOGIC ANALYSIS IMPACT ANALYSIS COMMENTS

Multiple registered professionals from Shaw reviewed portions of the DEIR and supporting documents related to hydrology. Shaw groundwater professionals included Dan Wynne, PG, PH, CHG; Julian Isham, PG, PH, CHG; and Gary Gaillot, PG, CGWP. Shaw staff credentials are summarized in Attachment 1.

The Project's hydrologic evaluation does not meet CEQA standards requiring adequate investigation to allow a full consideration of environmental impacts in accordance with CEQA standards (Title 14 § 15125). Our review found the DEIR did not adequately study the entire Project-impact area, specifically the Bristol and Cadiz Playas, and deep geology upon which key hydrologic assumptions rest. As a result, the DEIR's model is insufficient to predict the full magnitude of Phase I impacts on significance criteria, including saline intrusion, land subsidence and water depletion.

2

Additionally, Shaw found hydrologic elements of the Project's Groundwater Management, Monitoring, and Mitigation Plan (GMMMP) to be based on unconfirmed relationships and unreliable modeling. Our review concludes that the GMMMP does not provide adequate protections to San Bernardino County groundwater aquifers to saline contamination and long-term depletion. In addition, the long term lowering of the water table in the aquifers could lead to irreversible land subsidence that could alter the surface water runoff patterns. We find the GMMMP is, therefore, inconsistent with the San Bernardino County Desert Groundwater, and County guidelines Ordinance (San Bernardino Co. Article 5 § 33.06552(b)(1).

3

The following sections detail our observations and conclusions.

HYD-01: The Project area was not adequately investigated and the lack of data prohibit consideration of significant effects of the Project in their full environmental context in accordance with CEQA requirements of Title 14 § 15125.

CEQA requires planners to demonstrate that the significant environmental impacts of the proposed project were adequately investigated and discussed so that the significant effects of the project may be considered in the full environmental context. This DEIR hydrologic analysis fails to reach this standard.

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Shaw's review found that DEIR contributors failed to utilize available information that could have been used to improve model calibration and reliability. Specifically, DEIR planners did not contact representatives from either TETRA or TETRA's long-time geologic consultant GSi/water, Inc. (personal communication, March 9, 2012) to identify relevant data applicable to the Cadiz and Bristol Playas. Impacts to the proposed groundwater extraction are expected in the areas and an EIR that does not attempt to review available information for likely impact areas is not consistent with CEQA.

GSi/water (GSi) has worked at both dry lakes since approximately 1961 and its Fenner-area projects have included subsurface investigations for TETRA since the mid-1990s, Cargill and the Leslie Salt Company prior to the 1990s, a large mid-1990's "rail to landfill" project (Rail-Cycle, LLP), and Southern California Edison. It is apparent that sources of readily available data that would have contributed towards constructing a reliable model were not pursued. Available data that should have been considered include:

- A 1999 report by GSi[1] that documented a static, average depth to water less than 25 feet in approximately 20 brine field pits at the TETRA salt mining facility on Bristol Playa. Instead of using this information, the DEIR estimated depth to water near the Bristol Playa at 35 feet from a low-resolution Google Earth image (DEIR Appendix F4, Figure 6).
- A 1972 report by GSi[2] that could have provided refined information for a dozen or more "cells" (building blocks of the groundwater model) of model Layer 1. This report describes multiple geophysical methods used to identify lithologic and brine conditions over traverses that were approximately six "cell models" in length. The GSi report contains information that could have been used to assign values of hydraulic conductivity (K) to model Layer 1, and assign salinity values for use in the special model applied to predict the migration of salinity at the playas due to the Project.
- The northernmost Cadiz Dry Lake salt mine has 7 water wells (e-mail, Pond Site Well Maps, March 6, 2012, from David Morrow [TETRA] to Daniel Wynne [Shaw]) and that each of the three mines further south along the playa also have several wells. Together these wells provide to TETRA an abundance of depth to water information that could have been used to accurately calibrate the Project groundwater model – or to provide accurate depths to water. This was not done and the groundwater model did not include this critical area in its domain, as it stopped short, approximately 1 mile away.
- The northernmost Cadiz Dry Lake salt plant has three wells with late 2011 static (non-pumping) water level of 10 feet (email, *Well Data From Cadiz Play Field Reconnaissance*, attached to *Ground Water Recharge Sources for Bristol and Cadiz Playas*, Third Draft, GSi/water, February 10, 2012; Well Completion Reports No. e0144738 and e0144739, State of California Department of Water Resources, January 2012). It has a nearby well with water at ground surface according to TETRA Technologies supervisor Mr. David Morrow (personal communication, David Morrow to Daniel Wynne, March 5, 2012). This critical information was not utilized.
- Mine Reclamation Plans (for the operations at both lakes) submitted to San Bernardino County in 2000 in accordance with state law cited in Section 4.11 of the

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[1] *Review of Brine Pit Extraction Practices and Exploration for Calcium Chloride Brine at Bristol Dry Lake*, November 1999, GSi/water.
[2] *Exploration for Brine at Saltus, Bristol Basin, California*, April 1972, Geothermal Systems, Inc. (predecessor of GSi).

DEIR. The reclamation plans contain large detailed drawings, land surveyors notations, and other information that were ignored.

The attached Plate 1: Location of Various Exploration Boreholes, Coreholes, Wells, and Production Pits at Bristol Dry Lake, California (GSi/Water, 1999[3]) depicts the abundance of geologic data available to Geoscience that was not included in their model. The DEIR groundwater model extends across the Bristol Dry Lake and generally relies on unconfirmed assumptions to predict impacts to businesses, mineral resources, brine migration, and settlement over approximately 100 year. Shaw concludes that limited data has been used during the Playa-area analysis and we find the efforts inconsistent with CEQA Guidelines. Data available from GSi should be used to calibrate key model-Layer 1 parameters including depth to water, hydraulic conductivity, transmissivity, and storativity to allow for full consideration of significant Project effects in their full environmental context.

4

Despite the wealth of site specific data available to DEIR preparers, review of Geoscience's model indicates they relied on limited data in the vicinity of Bristol and Cadiz Playas (see DEIR Appendix H[4], Figures 20 and 24). One clear result of DEIR planners in not considering available historic data for Bristol and Cadiz Playas is their gross miss-estimation of the abundance of clay at the southern edge of the model area. Indeed, available 2011 well logs filed with the state Department of Water Resources identify approximately 150 feet of clay in the upper 220 feet of model Layer 1 at the north end of the Cadiz playa (Well Completion Report No. e0144739, State of California, January 2012; Well Completion Report No. e0144738, State of California, January 2012). However, the DEIR model assumed only three (3) feet of clay in this area (DEIR Appendix H[5], Figure 20). It is unknown the degree to which Geoscience's reliance on assumptions throughout its model may have led to similar incorrect mode inputs with unpredictable results. In this case, however, the lapse in conformity with CEQA appears particularly significant because the data is readily available.

Shaw's review concludes that available data used by Project planners is insufficient to predict impacts extending 100 years into the future. We found that key parameters of the groundwater model, upon which much of the hydrologic analysis is based, are estimated or are based on "best fit" responses from non-unique models. Critical model input parameters that have not been established include:

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- **Effective Porosity Storativity:** Modelers estimated storativity initially based on character of the aquifer materials and adjusted it during calibration. No aquifer specific values are presented and compared to the model results.

[3] GSi/water Inc., 1999. *Review of Brine Pit Extraction Practices and Exploration for Calcium Chloride Brine at Bristol Dry Lake*, November 24.
[4] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Figures 20 and 24.
[5] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Figure 20.

- **Vertical Leakance between Model Layers:** Leakance rates between layers were based on model calibration. There are no measured values.
- **Groundwater Elevations:** Groundwater elevations used in the model were calibrated against water levels measured in 1964 (DEIR Appendix H[6], page7). Elevations were adjusted through steady state model calibration under the three model recharge rates; then applied to the three transient models.
- **Dispersivity:** Modelers assumed dispersivity values for each of the models.
- **Evapotranspiration:** The evapotranspiration surface was based on surface elevations taken from a topographic map, and the evapotranspiration extinction depth was assumed to be 15 feet below ground surface. The evapotranspiration rate for the dry lakes was determined by the model during calibration.

5

The models also contain these limitations which are all related to a fundamental lack of data and limited investigation:

- Geoscience has ignored the highly faulted conditions of the Fenner Valley and Fenner Gap aquifer system. Geoscience should demonstrate that the faults do not create barriers to groundwater flow or high permeability conduits that should be included in the model.
- Geoscience has not presented a water budget for the calibrated (best fit to known site conditions) current condition model showing water inputs to and outputs from the model with comparisons to known values. Geoscience should prepare this water budget to include recharge, evapotranspiration, current pumping rates, fluxes across model boundaries and across model layers. These modeled values should be compared to known or calculated values to evaluate the reasonableness of the model to represent the aquifer system and use as a predictive tool (Reilly and Harbaugh, 2004[7]).
- Geoscience has not presented calculated groundwater velocities throughout the model domain, especially in the Cadiz Playa area where groundwater pumping test data are available. The model-generated groundwater velocities should be compared against calculated values using measured hydraulic gradients, porosity, and hydraulic conductivities to further evaluate the accuracy of the model.
- Geoscience has not verified the accuracy of the calibrated (i.e. "best fit" to known site conditions) model under long term pumping conditions. In order to verify the degree of confidence in the model and model predictions, the calibrated model should be used to simulate a different set of aquifer stresses for which field measurements have been made. Long term aquifer pumping test data (measured groundwater drawdown in multiple observation wells and test well pumping rates) should be simulated to test the

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[6] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Page 7.

[7] Reilly, T.E., and Harbaugh, A.W., 2004, "Guidelines for evaluating ground-water flow models:" U.S. Geological Survey Scientific Investigations Report 2004-5038, pg. 30

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model accuracy in reproducing a known aquifer response (groundwater velocities, drawdown and impacts of boundaries) to pumping.

Shaw's review concluded the Geoscience groundwater model is not unique to the Project area's hydrologic system and the DEIR does not provide evidence supporting key elements of the model's construction. Furthermore, as discussed in greater detail below, we conclude the Geoscience 2011 model is not suitable for predictions of future impacts from large-scale groundwater pumping. Unreliability of the model stems directly from a lack of reliable data which should have been collected throughout the entire Project Area.

6

It is clear from our review that insufficient data was collected by Cadiz to adequately analyze the environmental setting. Two significant environmental impacts which are not reliably or adequately analyzed by the DEIR are saline intrusion and groundwater depletion, as discussed below. This failure by the DEIR prohibits an adequate analysis of significance criteria described in Appendix G of the CEQA Guidelines.

Aquifer salinity levels, described by total dissolved solids (TDS) concentrations, throughout the modeled area are based on extrapolations of available TDS data which are limited and generally located near the town of Cadiz. The location of saline water/freshwater interface is based on groundwater and solute transport model predictions which have not been determined or confirmed with field measurements. Predictions of the movement of the saline water/freshwater interface rely on an accurate groundwater flow model which should be rigorously questioned based on its reliance on generalized assumptions over broad Project areas.

For instance, Layer 1 of the model casts the Bristol Playa as a relatively homogenous area. On the contrary, information available from GSi indicates the Playa environment is highly complex. The true complexity of the hydrology represented by Layer 1 is evident in comparison of the lithologies and well yields (gallons per minute of water) from four test wells installed in September 1980 a few miles northeast of Bristol Dry Lake, and within the groundwater model area (GSi, 1980[8]). GSi Geothermal Surveys, a predecessor to GSi/water, installed four test borings spread over an area approximately 7000 feet x 2000 feet (e.g., an area encompassing nearly 40 cells of the groundwater model). Boring depths were very close to 300 feet, e.g. approximately ½ the assumed thickness of model Layer 1. Testing of the four wells found variation in water production from 8 to 293 gallons per minute, and lithologic evaluation found clay content to vary from less than 50 percent to over 90 percent (as shown in Attachment 3 which includes Table 1 and Figure 1, Summary and Locations of Testhole Results (GSi, 1980).

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The groundwater model parameters for hydraulic conductivity and for clay thickness within Layer 1 should have been customized using data from the four 1980 GSi test wells. Because each well is located in a different cell of the groundwater model and there are additional cells

[8] GSi Geothermal Surveys, Inc, 1980. *Exploratory Drilling for Calcium Chloride Brine near Amboy, California.* October 8.

between the well-occupied cells, kriging or a variety of statistical methods could have been used to populate cells of model Layer 1 in this region.

As a result of the model's reliance on untested assumptions of "predictable" aquifer response, there is no adequate, reliable discussion of potential TDS impacts to San Bernardino County resources. The discussion set forth on page 11 of DEIR Appendix H (Geoscience, 2011[9]), which suggests violations of TDS water quality standards are limited, is not an adequate evaluation of project impacts because:

1. Saline migration is based on unreliable modeling.
2. The model does not analyze the extent of impacts related to the California Code of Regulations, Title 22, Chapter 15 recommended maximum of 500 milligrams per Liter TDS. Instead, the study concentrates on impacts from 1,000 mg/L TDS.

The DEIR's discussion suggests that saline intrusion impacts will be limited under each of the recharge rates modeled for the Project. However, these predictions are unreliable, as noted above, and the discussion does not genuinely characterize the degradation which may be associated with saline intrusion. As suggested by Dr. Bredehoeft during his review of the previous Cadiz pumping project (Bredehoeft, 2001[10]):

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> *I ran a groundwater transport model to simulate the movement of the brine beneath Bristol Lake... the dissolved solids start to increase slightly in year 30. By year 45 it increases to 1,000 milligrams per liter (mg/l); by year 50 the concentration is 1,300 mg/l. This water is still useable; but again this is only the beginning. The concentration increases to more than 7,500 mg/l by 100 years, and it is still increasing—again the project was halted 50 years earlier.*
>
> *The point shown especially by the brine movement is that we would have to halt the pumping of native groundwater very early on in order for there not to be a significant degradation in water quality at this location. I selected only one location to make my point, but this is not an isolated location; the degradation in water quality between Bristol Lake and the project will be widespread and continuing out to at least 100 years. The groundwater flow into the cone of depression will still be significant at 100 years. The groundwater flow from the region of Bristol Lake will bring with it brine from beneath the lake. The outward flow of brine will render the groundwater unusable without costly treatment. The modeling suggests an area more than 10 square miles will be impacted.*

[9] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Page 11
[10] Bredehoeft, John. 2001. Revised Comments – *Cadiz Groundwater Storage Project, Cadiz and Fenner Valleys, San Bernardino County*, California. August.

Review of the current Project DEIR indicates the issue of increasing TDS concentrations following "project completion" has not been resolved in the decade since Dr. Bredehoeft noted his observations. As set forth in Figure 75 of DEIR Appendix H (Geoscience, 2011[11]).

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Shaw also concludes that the amount of water downgradient of the wells has been quantified based on inadequate model input data, as discussed above. Therefore the "temporary surplus" has not been adequately defined" and the Project analysis does not adequately discuss risks associated with overdraft. The DEIR suggests they understand the volume of "temporary surplus" waters south of the Fenner Gap and provide a range of between 4 and 10 million acre feet for the freshwater zone south of the Fenner Gap in the Orange Blossom Wash and the northern portion of the Bristol Watershed (DEIR page 4.9-32). Aside from being an extremely wide range, the values provided are based on unreliable modeling. DEIR planners have not adequately estimated the volume of the "temporary surplus" they assert they are conserving, and therefore risk "overdraft" as defined in the City of Los Angeles v City of San Fernando opinion.

8

HYD-02: The Project's GMMMP is based on unconfirmed relationships and unreliable modeling and is therefore inconsistent with the San Bernardino County Desert Groundwater Ordinance and County guidelines.

As introduced in comment HYD-01 and as discussed in further detail below, Shaw found the hydrologic model has numerous shortcomings. Comment HYD-02 asserts that, while the purpose of the Project's GMMMP is to satisfy San Bernardino County requirements for a plan that will protect their desert groundwaters, the GMMMP's action criteria and decision processes are based on modeled relationships which were assumed during model construction and which have not been confirmed. Because poorly-modeled impacts and assumed relationships form the foundation of the GMMMP, we assert strongly that it cannot be protective of San Bernardino County Desert Groundwater Aquifers or compliant with County guidelines.

9

A necessary background to Shaw HYD-02 comment is a more developed discussion Shaw's conclusions regarding the 2011 Geoscience model. As discussed above, we found the model to be based on inadequate data. More importantly, perhaps, our review concluded the model contains several key flaws in its construction. In summary, we found that Geoscience did not prepare one model for the project with three recharge scenarios (DEIR12, page 4.9-46). Instead, Geoscience calibrated six different models which included three steady-state models for three groundwater recharge values and three transient models for three different groundwater recharge values. Geoscience performed 100 year projections of groundwater pumping impacts using the three distinct transient groundwater models for these three different recharge values. It is clear from our review that each of the three models are distinctly different, with different hydraulic conductivities and other key parameters for the same subsurface strata.

[11] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Figure 75
[12] ESA, 2011. Draft Environmental Impact Report, Cadiz Groundwater Conservation and Storage Project. December.

An example of distinct variances between the models is set forth in a table on page 33 of DEIR Appendix H (Geoscience, 201113). Their report describes that hydraulic conductivity values were estimated based on pumping test data and "were then modified within pre-established upper and lower bounds during model calibration in order to match the observed groundwater levels in the model area."14

To paraphrase, Geoscience states that when they reduced recharge in their three model scenarios, they reduced hydraulic conductivity values to calibrate against the observed water levels. This approach to model calibration is not correct (ASTM 1996[15], and Reilly and Harbaugh, 2004[16]) and assumes that hydraulic conductivity values are dependent variables for the aquifer system. On the contrary, hydraulic conductivity (HC) is a fundamental property of the aquifer and does not vary as a result of changes in recharge rates.

Geoscience's use of three different hydraulic conductivities to model project impacts begs the question – which HC is most accurate? Furthermore, Shaw questions which of the distinct models is correct. Because they vary considerable in their internal constructions, they cannot all provide an accurate and reliable model of the Project Area and potential impacts extending over 100 years. . This is crucial flaw in a basic understanding of the hydrogeologic principles that govern groundwater flow.

Proper modeling procedures would have been to calibrate the groundwater computer model for the best fit to known aquifer parameters such as: groundwater recharge, groundwater discharge, measured hydraulic conductivities, and measured storage coefficients, then test the model reliability under different hydrologic conditions (e.g., higher and lower recharge and discharge values and under stress (pumping) conditions). The number of distinct hydrologic conditions that a calibrated model is capable of representing is an important measure of the performance of a model. By using site-specific data to identify different hydrologic parameters the uniqueness of the model is addressed because the range of acceptable model input parameters becomes much more limited (ASTM 199317, ASTM 199618). Not fixing one or the other hydraulic property independently may result in the non-uniqueness of the model results (Reilly and Harbaugh, 200419) where it is possible to achieve the same degree of correspondence between simulated

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[13] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Page 33
[14] Geoscience, 2011. *Cadiz Groundwater Modeling and Impact Analysis*. September 1. Page 32
[15] ASTM Standard D5981, 1996 (2008), *Standard Guide for Calibrating a Groundwater Flow Model Application*, ASTM International, West Conshohocken, PA, 2008, www.astm.org.
[16] Reilly, T.E., and Harbaugh, A.W., 2004, *Guidelines for evaluating ground-water flow models: U.S. Geological Survey Scientific Investigations Report* 2004-5038
[17] ASTM Standard D5490, 1993 (2008), *Standard Guide for Comparing Groundwater Flow Model Simulations to Site-Specific Information*, ASTM International, West Conshohocken, PA, 2008, www.astm.org.
[18] ASTM Standard D5981, 1996 (2008), *Standard Guide for Calibrating a Groundwater Flow Model Application*, ASTM International, West Conshohocken, PA, 2008, www.astm.org.
[19] Reilly, T.E., and Harbaugh, A.W., 2004, *Guidelines for evaluating ground-water flow models*: U.S. Geological Survey Scientific Investigations Report 2004-5038.

and measured calibration targets using different model input parameters, as has occurred with the 2011 Geoscience models.

9

The above-discussion of Shaw's comments on the Project's groundwater model are offered as a prelude to our criticism of the Project GMMMP (DEIR, Appendix B[20]). As stated in the GMMMP "This Management Plan is designed to prevent adverse Project impacts traditionally associated with groundwater pumping by collecting data and determining if observed changes in groundwater levels, groundwater quality, and land subsidence are consistent with projected changes from groundwater modeling as described in this Management Plan."21 However, when the GMMMP describes the "projected changes from groundwater modeling" it is unclear to which model it will rely on. The GMMMP does not state whether it will respond to the more conservative impacts associated with the Project Scenario model, or the more deleterious impacts associated with Sensitivity Scenario 2. As is noted above, each of the three Scenarios are portrayed by Project Planners as being equally valid and predictive.

The GMMMP's attachment to modeled-predictions of groundwater impacts is key to our concerns noted in comment HYD-02. Because the groundwater models are not unique, and not adequate predictors of Project impacts, we gain no confidence from our review of the GMMMP that impacts to TETRA and San Bernardino County desert groundwaters will be adequately monitored or responded to. Shaw approves of the multiple suggestions within the GMMMP that the model will be "further refined based upon a thorough analysis of the available hydrogeologic data for the modeled area as additional information is collected from installation of the monitoring wells and extraction wells, and as monitoring data are compiled during the operations stage."[22] However, San Bernardino County should recognize before they approve the GMMMP that there is no explicit criteria or procedures set forth in the GMMMP to require model updates.

10

The inadequacies of the groundwater model to predict Project impacts are exacerbated by the flexibility provided to the Fenner Valley Mutual Water Company (FVMWC) in deciding when and if an impact is attributable to the Project, despite its consistency with "the model." We believe it is highly inconsistent with the Plan's intent to provide the FVMWC, an unregulated company whose shareholders will include Project Participants and Cadiz Inc.23 with primary decision making-authority over impacts which directly threaten TETRA, San Bernardino County resources, citizens, and investors. It is noted that while the GMMMP suggests that SMWD will retain overall permitting authority, and technical guidance will be provided by the Project's Technical Review Panel (TRP), it is clear from our review that "FVMWC will assess whether

[20] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29.
[21] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29. Page 2.
[22] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29. Page 38.
[23] ESA, 2011. *Draft Environmental Impact Report, Cadiz Groundwater Conservation and Storage Project.* December, page 3-5

the triggering of any action criteria is attributable to Project operations."24 Furthermore, the TRP is required to respond in writing only if "FVMWC determines that the measured change is a precursor or predictor of a potential adverse impact to a critical resource."25 Given their investment in the Project, FVMWD will have a clear conflict of interest with regards to the maintenance of profit-generating water extractions and transfers.

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Our review concludes that the general framework of the GMMMP is inconsistent with the San Bernardino County Desert Groundwater Ordinance and County guidelines. However, this matter is compounded by the poorly designed monitoring measures which are technically flawed.

For instance, the GMMMP proposes to use water elevation declines observed in the Danby well to assess impacts to the Bristo and Cadiz Playa operations of TETRA (GMMMP, Section 6.226). A Shaw registered hydrologist reviewed the Plan and concluded the Action Criteria in Section 6.2 is inappropriate because the features to be safeguarded – water levels in the wells used at the dry lakes – are a half-dozen miles downgradient of the Fenner Gap, the Project's well-pumping area, while the action criteria well (Danby well, near the Clipper Mountains) is many miles upgradient of the (Project's well-pumping area) Fenner Gap. Our review found that the location of the test and criteria wells in relation to the extraction wells was highly flawed in that it is generally wrong to use water levels from one side of a large area of drawdown, in order to evaluate effects on the other side of the same area of drawdown. The inappropriateness of the proposal is exacerbated because the dry lakes and the Danby-Clipper Mountain area are on opposite sides of a bedrock-defined gap in otherwise very broad alluvial aquifers, that pinches and complicates groundwater flow.

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Shaw's hydrogeologist also found issue with proposed monitoring of saline intrusion as described in GMMMP Section 6.4. The Plan states a network of "cluster type" observation wells will be established between the Project wellfield and the margins of Bristol and Cadiz Dry Lakes27. Groundwater TDS concentrations in the well clusters will then be regularly monitored.

Shaw concludes there are fundamental flaws with this proposal. We believe a single tightly-spaced group of wells will not suffice to monitor the saline front near the Cadiz dry lake, nor will three groups of such wells likely suffice near the Bristol dry lake. The saline/freshwater interface is neither a sharp break, nor vertical. It is a diffuse zone that varies by depth, and will migrate both seasonally and in response to pumping at the Project operations and possibly at the dry

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[24] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29. Page 80
[25] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29. Page 80
[26] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29. Page 81
[27] Cadiz Inc., 2011. *Groundwater Management, Monitoring, and Mitigation Plan for the Cadiz Groundwater Conservation, Recovery and Storage Project*, November 29. Page 85

lakes. Because it is a complex feature, it must be monitored over time in three dimensions: with depth, up and downgradient, and across-gradient.

Placing the wells for monitoring the saline/freshwater interface based on "the modeled locations" is not recommended. The location of the saline/freshwater interface should be confirmed by drilling, and a multiwell monitoring network established after that. We recommend that a multiport well system (such as the Westbay® system used by the Orange County Water District) be used, and that five wells be placed between each of the two dry lakes and the Fenner Gap wellfield. Placement of the wells should be iterative, based on results of the first ones drilled and sampled in each dry lake basin.

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Comments provided by Dr. John Bredehoeft to the Cadiz Project's first attempt (Bredehoeft, 200128) reaffirm Shaw's conclusions regarding the inadequacy of the proposed GMMMP. He explained his concerns in his conclusions as follows:

> *Water table groundwater systems respond slowly to perturbations. Impacts occur at long times into the future. This poses a challenge for monitoring and control. The delayed reaction of the groundwater system combined with the fact that the subtle indications of overdraft tend to be masked or easily confused with fluctuations due to other causes will profoundly undermine the early warning system that has been proposed. The weight of evidence indicates that the recharge to the Cadiz/Fenner for the project. Furthermore, trigger levels of what constitutes an early warning sign of adverse consequences have not been specified. One is left with only verbal assurances that careful monitoring will inform the project staff when bad consequences are anticipated. What triggers a response and what the response will be is left unspecified.*

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Furthermore, he cautioned:

> *Models are useful tools in the monitoring. They can be used to assess long-term impacts. However, future predictions made using models carry a degree of uncertainty inherent in the analysis. Given 1) the fact that a model analysis indicates an unwanted future adverse impact, and 2) the uncertainty inherent in the analysis, the question arises* ***will such an analysis be sufficiently persuasive to modify or halt the mining of native groundwater—especially given the project investment?***

AIR QUALITY IMPACT ANALYSIS COMMENTS

Shaw professionals Arjit Pakrasi and Marissa Spata reviewed the air quality impact discussion set forth in the DEIR and found the study omitted several analyses which are critical to a full analysis of air impacts and consistency with attainment plans.

[28] Bredehoeft, John. 2001. *Revised Comments – Cadiz Groundwater Storage Project, Cadiz and Fenner Valleys, San Bernardino County, California.* August.

AQ-1 – The EIR must adequately asses the significant and unavoidable air quality impacts the Project activities will have on the regional environmental setting of the Mojave Desert Air Basin.

The DEIR asserts that the despite mitigation efforts, the Project will generate significant and unavoidable increase of NOx emissions during construction (p. 4.3-25). This assessment, among the data produced in Appendix E3 (Emissions Worksheet), is based upon anticipated emissions criteria generated by the emissions modeling system, URBEMIS 2007. It is unclear—however anticipated to be unlikely due to limitations of the modeling system—whether the URBEMIS data presented in the DEIR includes both short-term and long-term significant air quality impacts for both the immediate Project location, as well as, the regional environmental setting. Figure 1-4 (Geographic Context of Project Assessment) on page 1-12 of the DEIR illustrates that the extent of regional environmental impact analysis will include the "Local Resource Assessment (Groundwater Basin, Air Bain, etc)" and "Regional Cumulative Assessment." These identified assessment areas encompass the Mojave Desert Air Basin (MDAB), a portion of the South Coast Air Basin (SCAB), and all federally protected lands within Joshua Tree National Park and Mojave National Preserve.

Despite the abovementioned extent of regional impact analysis, the DEIR fails to adequately assess how the Project's activities (both construction and operational, and cumulative) will have a significant and potentially unavoidable increase on regional NOx and PM_{10} emissions within the MDAB. Furthermore, the EIR should assess how Project activities will consequently have a potentially significant effect on increased NOx emissions on the SCAB. These secondary effects are of concern due to estimated vehicle trip generation during construction. Pursuant to §15126.2 (a) of the CEQA Guidelines:

> *Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved, physical changes, alterations to ecological systems, ...health and safety problems caused by the physical changes, and other aspects of the resource base such as water, historical resources, scenic quality, and public services.*

In order to more adequately assess the significant air quality impacts associated with the Project's environmental setting in the MDAB and adjacent sensitive regions, the final EIR should generate a second data set of projected emissions using the California Emissions Estimator Model (CalEEMod). CalEEMod–developed by ENVIRON in collaboration with the South Coast Air Quality Management District (SCAQMD)–is a land use emissions computer model that is designed to provide a uniform platform that quantifies potential air pollutant and greenhouse gas (GHG) emissions associated with both construction and operational phases of land use projects. CalEEMod quantifies direct emissions from construction and operation (including vehicle use), as well as indirect emissions, such as GHG emissions. The model also

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identifies mitigation measures to reduce criteria pollutant and GHG emissions along with calculating the benefits achieved from measures chosen by the user. According to the South Coast Air Quality Management District, while both URBEMIS and CalEEMod modeling systems for CEQA document emissions estimate analysis, the primary advantages of CalEEMod are the following features and functions:

- CalEEMod calculates indirect criteria pollutant and GHG emissions from processes "downstream" of the project under evaluation such as GHG emissions from energy use, solid waste disposal, vegetation planting and/or removal, and water use.
- In addition to quantifying CO2 emissions, CalEEMod includes two additional combustion GHG pollutants: methane and nitrous oxides.
- CalEEMod includes the usage of consumer products at non-residential facilities.
- CalEEMod modifies methods for calculating fugitive dust from grading and site preparation.
- CalEEMod provides ability to insert spreadsheet for large projects (e.g., EMFAC2007, construction equipment list).
- CalEEMod allows for the user to select different vehicle classes for construction worker, vendor, and hauling trips.
- CalEEMod uses CARB's BURDEN model (a component of the EMFAC model) emission factors to provide more accurate characteristics (fleet mix, vehicle miles traveled, etc.) of the affected area.
- CalEEMod uses weighted average trip rates to reflect accurate vehicle activity from a specific land use type.[29]

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At this time it is our conclusion that the DEIR's air quality data is deficient does not satisfy the level of impact analysis required by CEQA. The application of CalEEMod will allow the final EIR to address these deficiencies and illustrate the Project's short-term and long-term significant air quality impacts imposed on the MDAB and indirectly to adjacent sensitive populations previously mentioned.

AQ-2 – The EIR must analyze how Air Quality impacts from Project construction and operations will be mitigated to a less than significant effect on Joshua Tree National Park as a Class I designated National Park.

Within the 2008 MDAQMD's Ozone Attainment Plan, the California Air Resources Board (CARB) identifies the Village of Joshua Tree as the site within the Mojave Desert Air Basin (MDAB) with the highest ozone concentration for an 8-hour period. The Village of Joshua Tree is approximately 40 miles south of the proposed Project area and downwind of all Project construction and operation activities described in the DEIR. The close proximity of Joshua Tree

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[29] South Coast Air Quality Management District, http://www.aqmd.gov/caleemod/

to the Project, and it's presently fragile environmental setting with respect to ozone pollution, should be given close consideration as an sensitive population within the Project setting with regard to air quality impacts.

Narrowly adjacent to the Village of Joshua Tree is an area of even greater sensitivity to air pollution, Joshua Tree National Park (JTNP). JTNP spans across approximately 492,690 acres of San Bernardino and Riverside Counties and currently holds a Federal Clean Air Act Class I designation which classifies it as a national park with a high susceptibility to severe air pollution degradation. Similar to the Village of Joshua Tree, the Project location is upwind and approximately 40 miles north of JTNP. The DEIR fails to analyze the exposure sensitive receptors such as JTNP the Village of Joshua Tree to substantial pollutant concentrations. 15

At this juncture, the present air quality analysis is deficient with respect to the evaluation of sensitive receptors. The final EIR needs to quantify and model all potential ozone and PM_{10} impacts from Project construction and operations on the sensitive populations of the Village of Joshua Tree and JTNP. Furthermore, the analysis must assess the impacts of increased NOx emissions on a Class I area coupled with establishing mitigation measures to avoid any potential visibility degradation. An adequate examination of potentially significant impacts would be to conduct a Class I area analysis on the JTNP using the EPA- recommended long range transport model CALPUFF. Contingent upon this data, the Project cannot accurately assess the present and future air quality of adjacent sensitive receptors.

AQ-3 – The Air Quality Impact analysis must discuss the inconsistencies between Project activities and the MDAQMD's Ozone and PM_{10} Federally-adopted Attainment Plans. The DEIR omitted air quality impact analysis with regards to the Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area), adopted June 9, 2008. 16

Pursuant to § 15125(d) of the CEQA Guidelines:

> *The EIR shall discuss any inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans. Such regional plans include, but are not limited to, the applicable air quality attainment or maintenance plan or State Implementation Plan... [and] plans for the reduction of greenhouse gas emissions...*

Further, subsection (e) states:

> *Where a proposed project is compared with an adopted plan, the analysis shall examine the existing physical conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced as well as the potential future conditions discussed in the plan.*

The Mojave Desert Air Quality Management District (MDAQMD) currently holds a Severe-17 non-attainment classification for eight-hour ozone and non-attainment for PM_{10}. In accordance with the Federal Clean Air Act §§110, 172, 174, and 182; 42 USC §§ 7410, 7502, 7504, and 7511a, the MDAQMD adopted the following attainment plans:

- *Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-attainment Area)*, adopted June 9, 2008
- *MDAQMD 2004 Ozone Attainment Plan (State and Federal)*, adopted April 26, 2004
- *Final Mojave Desert Planning Area Federal Particulate Matter (PM10) Attainment Plan*, adopted July 31, 1995.

The DEIR erroneously states that the applicable MDAQMD ozone attainment plan to the Project area is the 2004 Ozone Attainment Plan, omitting the applicability of the 2008 Ozone Attainment Plan. Pursuant to CEQA Guidelines § 15125(d), the final EIR air quality impact analysis must disclose the inconsistencies between the Project's proposed increase in ozone and PM_{10} emissions within the confines of the MDAQMD's non-attainment control strategies, and based upon the most current information available as of the Notice of Preparation date. It is necessary that the final EIR reevaluate the Project location's non-attainment status' by including specific discussion of the following: (1) Is it acceptable for the Project violate USEPA standards set forth in the attainment plans, and (2) to what extent will the Project prolong the adopted ozone attainment date set for June 15, 2021? 16

After a thorough examination of the DEIR's Air Quality section, it is concluded that the consideration of feasible mitigation measures with regard to non-attainment areas is superficial. A proper evaluation of the MDAQMD's non-attainment constraints with regard to Project's excessive emissions impact, will highlight the importance of the Project's responsibility to present all potentially damaging future conditions to the Mojave Desert Air Basin and yield a more adequate evaluation of mitigation measures that achieve the "lowest achievable emission rate" (LAER). In order to legitimately achieve the LAER, it is our conclusion that the Project should obtain a non-attainment minor New Source Review (NSR) permit from MDAQMD for PM_{10} and ozone. The stipulations of the NSR permits will ensure that mitigation measures are developed per NSR and attainment plan regulations in order to reduce ozone and PM_{10} emissions to a less than significant impact.

AQ-4 – The EIR must discuss how anticipated South Orange County population growth and associated secondary air quality impacts will have a significant environmental effect on Joshua Tree National Park as a Class I Designation. 17

The Project DEIR asserts that increased water supply to the Santa Margarita Water District could have a potential indirect impact to expanded growth in South Orange County, California. This population growth increases the potential for further air quality degradation in the South Coast Air Basin (SCAB). Consequently, transported air pollution from the SCAB has a significant

impact on increased NOx and PM_{10} emissions to the Mojave Desert Air Basin (MDAB). Additionally, a location of greater sensitivity to increased air pollution is Joshua Tree National Park (JTNP), which lies within the MDAB and approximately 50 km east of the most heavily populated region of the SCAB[30]. As of August 7, 1977, the Federal Clean Air Act designated JTNP as a Class I national park in order to prevent further air quality deterioration from damaging the Park's precious and sensitive ecosystems. According to the National Park Service, JTNP receives approximately 440 and 180 tons/year of respective NOx and PM_{10} emissions transported from the SCAB[31]. As a result from these existing physical constraints, the MDAB's ability to minimize and attain federal and state air quality standards is continuously stifled.

As the DEIR posits, the Project could potentially have indirect effect on growth in South Orange County resulting from Project operations that will increase available water supply. However, the Project's position deflects direct responsibility to population growth impacts by stating that the surrounding Southern California cities and counties presently anticipate future growth, and in doing so, have adopted independent growth-inducing elements into their respective general plans in order to address subsequent environmental impacts. Regardless of the Project's intent to contribute to South Orange County population growth, any increase of transported air pollutants from the SCAB to the MDAB generated as a result of population growth, should be evaluated as a significant environmental impact. Pursuant to CEQA Guidelines §15126.2 (d) the final EIR shall:

> *Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas)...Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

It is our conclusion that Project's proposed 50-year service activities will certainly have an indirect impact on increased growth in South Orange County. In order to be compliant with CEQA, the Project's final EIR must quantitatively demonstrate how these secondary growth impacts will result in increased transported air pollution from the SCAB to the MDAB, and more importantly to JTNP without compromising the protective restrictions associated with a Class I designation. Lastly, this correlated analysis needs to evaluate how indirect population growth induced by the Project could potentially alter the regional environmental landscape by causing

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[30] National Parks Service – Air Resources Division, *Assessment of Air Quality And Air Pollutant Impact in Class I National Parks of California*, April 2001.
[31] National Parks Service – Air Resources Division, *Assessment of Air Quality And Air Pollutant Impact in Class I National Parks of California*, April 2001.

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irreversible damage to sensitive ecosystems within JTNP. Discuss how these impacts will also potentially commit future generations to an altered environment within the MDAB that is potentially hazardous to human health.

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BIOLOGICAL RESOURCES IMPACT ANALYSIS COMMENTS

The DEIR's evaluation of Biological Impacts was reviewed by Kathy Kinsland from Shaw.

The Biological Resources methods indicate that "the list of special status species with the potential to occur within the project study area or to be affected by Project implementation" were identified, in part, through a database search of 9-7.5 minute quadrangles. These quadrangles include the proposed wellfield and spreading basin and along the proposed pipeline. The result is long, linear area of study primarily focused on the proposed construction corridor. Experienced CEQA practitioners are aware that under CEQA guidelines, the selection of the database-search is critical to proper identification of the potential species of concern and, although it is standard to conduct a 9-quad search as part of an Initial Study, there is no limitation to the number of quads that can be included in the project analysis. For standard linear project, such as a gas pipeline or electric transmission project, a quad search along the linear feature is more than appropriate. However, for a project such as the proposed Cadiz project, the selection of the quadrangles included in the biological evacuation must include the entire project study area, not just the linear elements of the project. A comparison of the hydrology-study area against the biological resources study area reveals a significant disparity between the two resource study areas. Given the undisputable correlation between water (surface and groundwater) and biological components (habitats, animals, migratory and movement corridors), the DEIR fails to provide an adequate rational for limiting the scope of the biological study area to only those area affected by construction. Specifically, the quadrangles that would at a minimum be key to the biological evaluation, but which are conspicuously not included are as follows:

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- Cadiz
- Calumet Mine
- Cadiz Lake
- Skeleton Pass
- Sheep Camp Spring
- Cadiz Valley Northwest and Northeast
- Iron Mountain

Further, review of the hydrology and biology sections of the DEIR reveal a general lack of effective attempts to evaluate the operational impacts to biological resources within the watershed included in the hydrology analysis. The DEIR Recreation section acknowledged that

the Cadiz Dunes Wilderness is located within 250 feet of a 5-mile segment of the proposed project. The Biological Resources section indicates that the *Astragalus lentiginosus* var. *borreganus* (Borrego milk-vetch) is known to be present within the Cadiz Dunes Wilderness area and has a medium to high potential for occurrence within the biological study area. While no plants were found during the biological surveys along the pipeline corridor and other project construction areas, the Cadiz Dunes are not included in the Hydrologic Analysis.

We find that the impact analysis of the potential operational impacts on plant species is overly simplistic and potentially flawed. There is also no attempt to evaluate any potential impacts of the operation of the project on the Cadiz Dunes which are identified by the Bureau of Land Management as a Class L (i.e. limited use) Sensitive area[32], or the CNPS listed plant species associated with the dunes (or other California sensitive habitats outside the limited biological scope of the project). Case law requires that with respect to endangered species, EIRs must not too narrowly define the biological study area as to "effectively restrict analysis of effects on endangered species when a broader analysis" is required (*Endangered Habitats League v. County of Orange* (2005) 131 Cal.App.4th 777). 18

CUMULATIVE IMPACT ANALYSIS COMMENTS

The DEIR's evaluation of Cumulative Impacts was reviewed by Kathy Kinsland from Shaw. Ms. Kinsland found that the DEIR did not adequately assess impacts to San Bernardino County which would be expected if County groundwater resources are allocated to South Orange County. In short, Ms. Kinsland found that County projects would suffer from a lack of available water supply. Additionally, Ms. Kinsland asserts that growth inducing cumulative impacts in South Orange County must be considered in the DEIR. 19 20

Hydrology/Water Supply

Cumulative Impacts

Figure 1-4 in Section 1 of the DEIR clearly defines the "Regional Cumulative Assessment" for the CEQA review. The area included within the "Area of Use Assessment" does not overlap with the local or regional assessment areas. Through a not so subtle "slight of hand", the DEIR (page 2-3) re-characterizes the geographic definition of "local source of water" to include export of water from the Cadiz basin, across the Bullion Mountains and the San Bernardino Mountain range, to the "Use Area" (i.e., Metropolitan service area and other metropolitan service area) local over 200 miles west of Cadiz along the coastal Southern California plain. Throughout the DEIR the project is referred to as using a "local water supply" to provide system reliability and supplement and/or replace existing water supplies. 21

[32] Bureau of Land Management, 1980. *California Desert Conservation Area Plan* 1980 (Amended)

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However, this analysis seems to ignore, or significantly downplay, the projected water demand required within what the DEIR correctly characterized as the "local" and "regional" areas, far removed from the water-hungry communities within the "use area". Of specific note, the cumulative analysis glosses over the project water demand for the numerous renewable energy projects, primarily solar projects, that are described in cumulative section and shown in Figure 5-1 that are all located within the local and regional cumulative assessment area. There is no discussion of where these projects, especially the ones located in proximity to the project area, would obtain their water needs which can be significant depending on the solar technology used. If the Cadiz water is being shipped to densely urban area to the west, this source of groundwater is then not available within the geographic region evaluated in the DEIR.

The estimates provided for solar project water use in the cumulative analysis include a total of 67 solar projects. Water demand is only given for one project: the Rice Solar project which would include 150 MW of power with a water demand of 780 AFY for a 30-month construction schedule + 180 AFY of operational demand (assuming an operating capacity of only 37%). Based on the stated water demand I calculate the following total water demand for operational water needs/year at full buildout of the cumulative scenario.

Name	Details	Stated Water Demand	Estimated Operational Water Demand/Year (assume 1.2 AFY/MW)*
RETI/CREZs	4,800 MW Solar (RETI) 1,805 MW solar (Twentynine Palms)	Not provided	7,926 AFY
REAT	6 solar projects (no MW provided)	Not provided	
SEPV2	2MW	Not provided	2.4 AFY
29 Palms PV	213 KV	Not provided	0.5 AFY
SECP	100 MW	Not provided	120 AFY
Rice Solar	150 MW	780 AFY for Construction 180 AFY for operation (@37% operational capacity)	780 AFY for Construction 180 AFY for operation (@37% operational capacity)
Calico Solar Project	Identified in the Marine Corps Twentynine Palms cumulative 663.5 MS	Not included in Cadiz DEIR	796 FY
TOTAL	**6,857 mw**		**9.027 AFY**

Note: The Estimated Operational Water Demand/Year is based a calculation of demand for the Rice Solar project of 1.2 AFY of water required for 1MW of power produced by solar. The Operational Demand/Year of Water equals the total MW proposed multiplied by 1.2 AFY.

In addition to the operational demand, all these projects, combined with all projects identified in the cumulative land use section, PLUS, the projects/water demand that is needed for all the 21

military/federal projects that are not included in cumulative analysis for land use, would add additional water demands on the region. Section 5.3.13 (Public Utilities) states:

> *All of the required public service providers have indicated that they have the capacity to serve the proposed Project. Because the proposed Project does not include residential development and would not add a substantial number of new, full-time employees to the Project area, it would not result in a cumulative contribution to impacts on public services.*

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The cumulative analysis cannot simply look at residential demand and should include the total projected demand for water all water users (industrial, commercial, energy, housing, military, etc.) in the region. The above statement may not be accurate if public service providers were asked to evaluate their capability to respond to demands from all anticipated development associated with the cumulative scenario and not just on future housing. While there does not appear to be substantial future housing proposed in the region, the region is clearly in high demand for renewable energy projects which would likely suffer from a lack of regional water supply.

Growth Inducement

The DEIR, Section 6 Growth Inducement, emphasizes that water service providers are in critical need, and are mandated to provide, redundancy in supplies and that this "reliability is needed with or without planned growth." Section 6 also states that "SMWD has identified opportunities for improving water supply reliability to meet projected demands through 2035." The proposed project would supply 32% of the projected future demand within SMWDs service area through 2035. Further, the DEIR also indicates that "Although Project water would be used primarily to improve the reliability of SMWD's existing water supplies, by contributing to the District's overall water supply portfolio it is possible that some of the Project water could be used to support some of the remaining incremental growth planned within SMWD's southern Orange County service area." Therefore, the Proposed Project will provide both system reliability and future demand within the use area. They further acknowledge that SMWD could make some of the project water available to MWDOC or other service providers on a short-term basis to support growth within other service areas. They indicate that since this does not represent a "firm permanent supply" it would not induce growth beyond SMWDs service area. These statements are not supported by fact. By virtue of the fact that this "new" source of water would be made available within a rapidly developing area to meet future demand, in and of itself can be consider growth inducing. If there is any service area within the use area that is currently under any constraints for approval until such time additional, or a more reliable source of water is secured or if any planning area or specific plan area has a moratorium on issuance of building permits or approvals because of water supply or system reliability issues, then there is a strong nexus between the Proposed Project and growth inducing impacts.

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Attachment 1

Shaw Staff Credentials

Shaw Staff Credentials

Julian Isham, PG, PH, CHG

Mr. Isham has over 38 years of professional experience in providing sound engineering and environmental guidance to both private and public stakeholders and policy makers. He is responsible for maintaining client and regulatory liaison; providing operation guidance to industrial and public agency managers; and providing compliance with state and federal regulations. In addition, he provides expert witness testimony on water and waste management issues. Mr. Isham has been recognized within the State of California as an expert in the field of water quality assessment. He is one of the first professionals to be licensed as a hydrogeologist in California, and was selected as one of seven "mentors" of hydrogeology by the California Board of Registration for Geologists and Geophysicists to prepare the first hydrogeology exam for the State of California. Executive level appointments by two California Governors to the California State Mining and Geology Board and the Central Valley Regional Water Quality Control Board.

Dan Wynne, PG, PH, CHG

Mr. Wynne has over 25 years of experience in California, performing and managing hydrogeologic investigations and assessments and third-party review of hydrogeologic studies and remediations. His related experience in remediation, engineering geology, and litigation support compliment his well rounded background. He has experience with a wide range of hydrologic environments and chemicals including dissolved and separate-phase hydrocarbons and solvents, metals, pesticides, fertilizers and explosive residues. He is experienced in agency liaison, litigation support, insurance claim evaluation, risk-based corrective actions (RBCA), brownfield projects, PRP-led CERCLA, SARA and RCRA activities, RCRA waste classification and RFI, UST corrective actions and risk assessment.

Gary Gaillot, PG, CGWP

Mr. Gaillot is a Certified Groundwater Professional and Licensed Professional Geologist with over 35 years experience assessing the hydrologic, hydrogeologic, and hydrogeochemical environment, with particular emphasis on fate and transport evaluations and remediation. His areas of expertise includes investigative geology and geophysics, hydrology, hydrogeology, geochemistry, computer modeling, and groundwater and surface water remediation. Mr. Gaillot has planned, managed, and participated in numerous projects to investigate groundwater, surface water, and sediment contamination at both radiological and non-radiological contaminated sites, surface water and groundwater interaction, groundwater supply potential, wellhead protection, salinity control, canal leakage, water salvage, artificial recharge, subsidence, dam safety, surface and subsurface mining impacts, soil, groundwater, and vadose zone remediation, including DNAPL.

O_Tetra 1 - Attachment

Arjit Pakrasi

Dr. Pakrasi is the Air Program National Practice Leader for Shaw Environmental & Infrastructure, Inc., and has 18 years experience in air quality management, compliance, and permitting. His main focus is on multi-media compliance services with emphasis on air quality projects. Dr. Pakrasi has led and participated in multi-disciplinary project teams addressing multi-media issues in response to Clean Air Act Amendments (CAAA), Emergency Planning and Community Right-to-Know Act (EPCRA), and Indoor Air Quality (IAQ) standards. Dr. Pakrasi has extensive experience in air quality projects such as pre- and post-construction air permitting including Prevention of Significant Deterioration (PSD), air pollution control system design, industrial ventilation systems design, regulatory compliance strategy planning, air emission inventory, and risk assessment. Other areas of experience include National Pollutant Discharge Elimination System (NPDES) permits, building ventilation studies, and multi-media transport modeling.

Marissa Spata

Ms. Spata provides environmental compliance, remediation, and reporting services. She provides support on issues related to groundwater monitoring, wastewater discharge, soil contamination and the storage of hazardous materials. She regularly researches current environmental regulations and statutes for reference and reporting support. Ms. Spata communicates with numerous regulatory agencies and subcontractors to provide these services.

Kathy Kinsland

Ms. Kinsland is a California Registered Environmental Assessor and Certified Inspector of Sediment and Erosion Control (CISEC) with over 25 years of experience in storm water management, regulatory permitting, project management, construction monitoring, biological surveys, and technical assessment. Her experience ranges from California Energy Commission licensing; local land use entitlements, NEPA and CEQA document preparation and management, public involvement, regulatory compliance, construction inspections and training, emergency response, hazardous materials management, storm water management, wetland delineation and permitting. Ms. Kinsland has extensive experience with all phases of linear infrastructure construction (gas transmission, transmission, roadways and bridge, sewer and water transmission, etc.) including routing studies/site selection, environmental review, permitting, and construction management. She often works with local, state, and federal agencies during the planning and review phases of a project and works with construction managers, contractors, and municipal staff during the construction phase.

Alex Naughton

Mr. Naughton is a Client Program Manager II with Shaw Environmental, Inc.'s Concord, California office. In this capacity he is involved in managing and implementing a variety of project types on industrial / commercial sites and federal facilities including hydrological investigations, due diligence assessments, CEQA evaluations/permitting, storm water

management / compliance, site investigations, and remedial actions. Mr. Naughton has successfully managed litigation support projects, and consulted for clients regarding land development risks, due diligence, and compliance/permitting.

O_Tetra 1 - Attachment

Attachment 2

GSi/water Site Map Showing
Bristol Playa Monitoring Facilities

Attachment 3

Table 1 and Figure 1, Summary and Locations of Testhole Results

GSi, 1980

O_Tetra 1 - Attachment

from: *Review of Brine Pit Extraction Practices and Exploration for Calcium Chloride Brine at Bristol Dry Lake*, GSiWater, November 24, 1999.

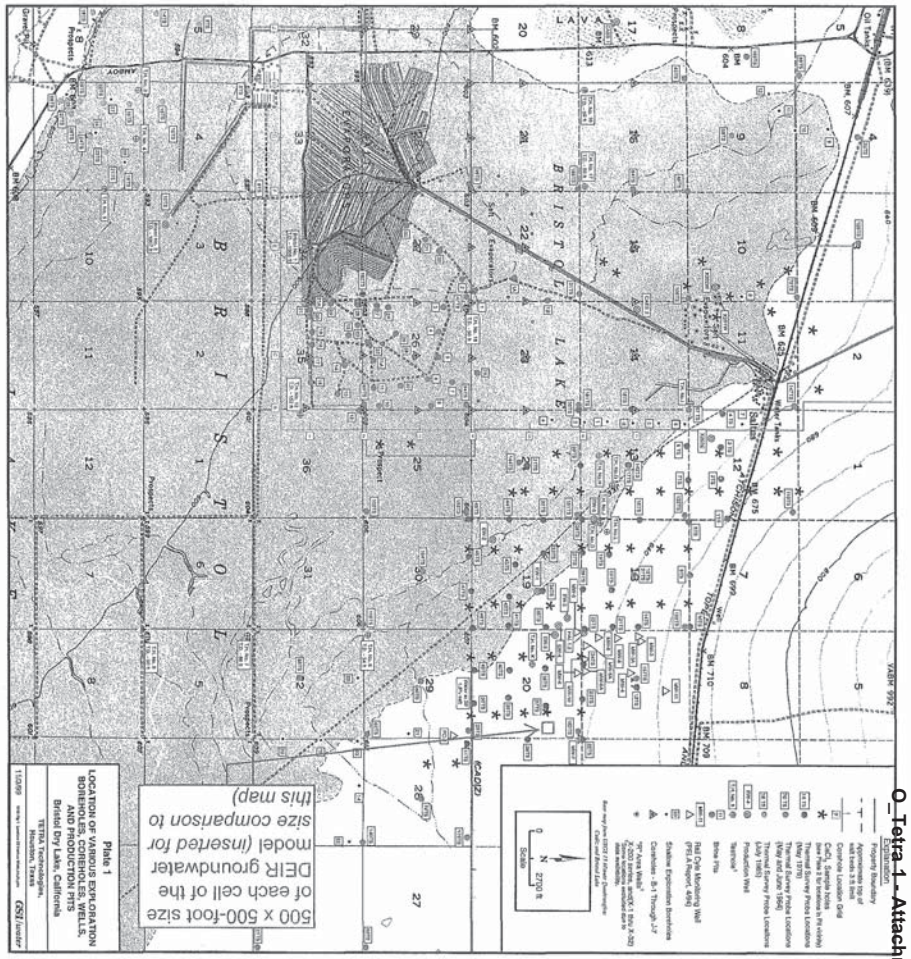


TABLE 1

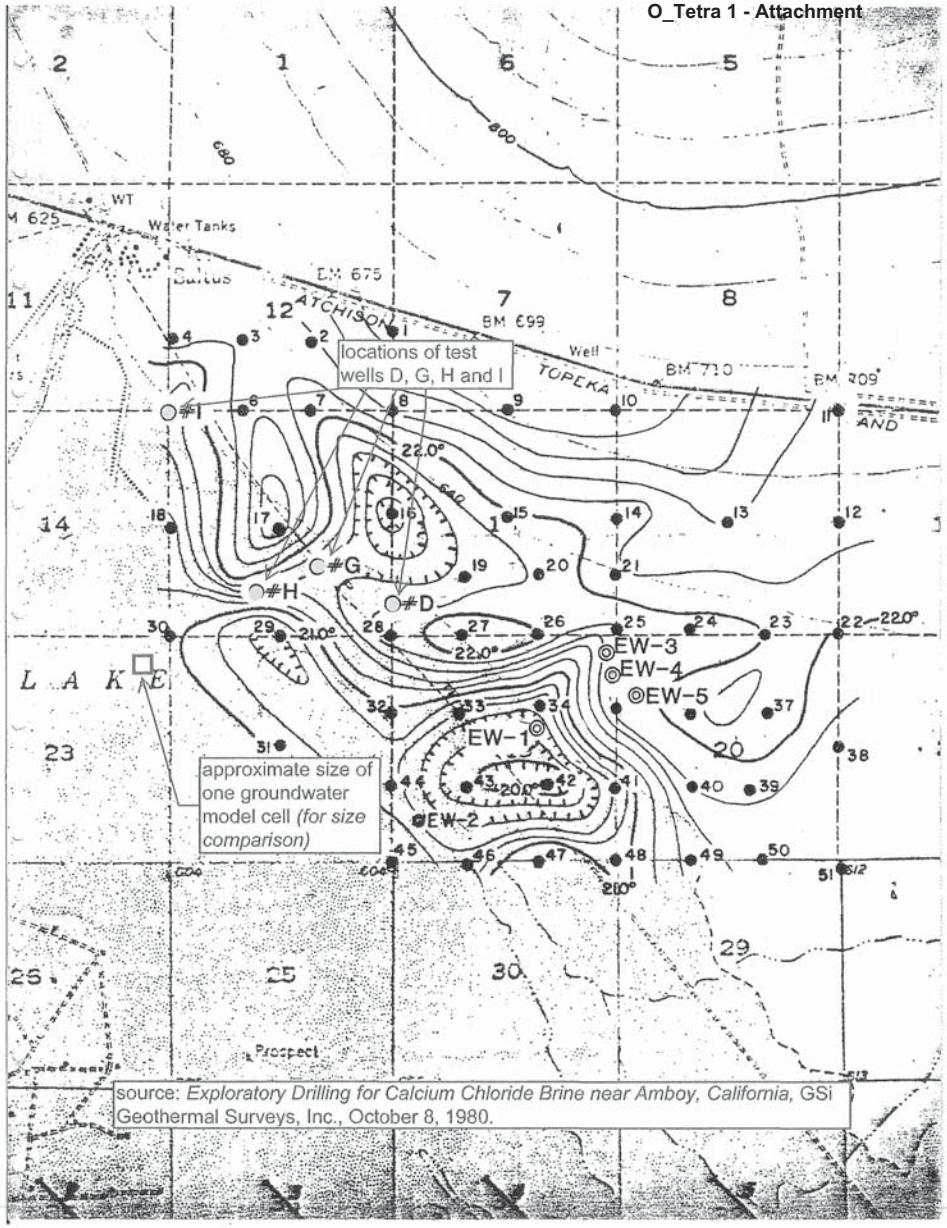
SUMMARY - TESTHOLE RESULTS

	Testhole #D	Testhole #H	Testhole #G	Testhole #I
LITHOLOGIC COMPOSITION				
sand and gravel and gypsum	7%	-	2%	17%
clay, sand and gravel and gypsum	42%	-	14%	40%
gypsum	3%	3%	-	-
clay	48%	97%	84%	43%
PRODUCTION				
total gallons per minute	293gpm	8gpm	51gpm	263gpm
SALINITY				
calcium chloride	3.071%	6.329%	4.930%	2.130%

each of the 'boxed' parameters above directly affects values selected in the modeling in Appendix H of the DEIR.

source: *Exploratory Drilling for Calcium Chloride Brine near Amboy, California*, GSi Geothermal Surveys, Inc., October 8, 1980.

O_Tetra 1 - Attachment



source: *Exploratory Drilling for Calcium Chloride Brine near Amboy, California*, GSi Geothermal Surveys, Inc., October 8, 1980.

O_Tetra 2

RUTAN
RUTAN & TUCKER, LLP

Robert S. Bower
Direct Dial: (714) 641-3440
E-mail: rbower@rutan.com

March 16, 2012

VIA E-MAIL AND FIRST CLASS MAIL

Santa Margarita Water District Attention:
Clerk of the Board
Administration Office
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

Re: Request for Documents -- Cadiz, Inc. Wells and Annual Groundwater Monitoring Reports

Dear Clerk of the Board:

The Draft Environmental Impact Report ("DEIR") for the Cadiz Valley Water Conservation, Recovery and Storage Project references several reports and other documents that were reviewed in connection with its preparation. In connection with the Project, I request that you provide me with an electronic copy of the *13th Annual* report: Cadiz, Inc., *13th Annual Groundwater Monitoring Report, January-December 2010, Cadiz Valley Agricultural Development*, June 2011;

The DEIR also references Cadiz Inc. wells that were used in modeling which are not readily available to the public. For the combined list of all wells listed at the bottom of this letter (developed from DEIR Appendix H *Figures 20* and *24*) and any other wells listed in the *Annual Groundwater Monitoring r*eport and/or the DEIR Groundwater Modeling Report, I request the following:

- The tabulation of static (not pumping) water levels (*i.e.*, depth to water from ground surface) including date measured;
- Drilling and construction logs (by drillers, geologists or geophysical survey) of each of the wells relating to:
  - Total depth of each well. Where total depth is not known, whatever information is known about total depth.
  - Well construction or completion diagrams – specifically regarding the depths of perforations or slotting of well casing, or bottom of casing if applicable.

1

O_Tetra 2

RUTAN
RUTAN & TUCKER, LLP

Because the 13th Annual Groundwater Monitoring Report is not available to me at this time, I do not know what wells are included in that Report, and thus cannot list them by name. The wells in Figures 20 and 24 that I am requesting information about are wells:

- 22 and 21N
- 5N/14E-13, 6N/15E-29
- Bristol 2, Burris 3L1, Haines and Tull
- CI-1, CI2 and CI-3
- MW-1, MW-2, MW-3, MW-5, MW-6 and MW-7, MW-7A
- TH-7, TH-7a, TH-8, TH-9, TH-17, TH-18
- TW-1, TW-2 and TW-3.

1

Thank you for your anticipated cooperation in this regard.

Very Truly Yours,

RUTAN & TUCKER, LLP

Robert S. Bower

RSB:rsb
cc: Tom Barnes, ESA
Alicia Boston
Alex Naughton
John Ramirez

102/029485-0001
3137497.1 a03/16/12

RUTAN
RUTAN & TUCKER, LLP

Robert S. Bower
Direct Dial: (714) 641-3440
E-mail: rbower@rutan.com

March 16, 2012

VIA E-MAIL AND FIRST CLASS MAIL

Santa Margarita Water District Attention:
Clerk of the Board
Administration Office
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

Re: Request for Documents -- Cadiz, Inc. Wells and Annual Groundwater Monitoring Reports

Dear Clerk of the Board:

In addition to the information requested in my letter earlier today, I would also like to request any and all reports or summaries of pumping test(s) performed in support of the Project. 1

Thank you for your anticipated cooperation in this regard.

Very Truly Yours,

RUTAN & TUCKER, LLP

Robert S. Bower

RSB:rsb
cc: Tom Barnes, ESA
Alicia Boston
Alex Naughton
John Ramirez

O_Tetra 4

RUTAN
RUTAN & TUCKER, LLP

Robert S. Bower
Direct Dial: (714) 641-3440
E-mail: rbower@rutan.com

March 27, 2012

VIA E-MAIL AND FIRST CLASS MAIL

Santa Margarita Water District Attention:
Clerk of the Board
Administration Office
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

Re: Request for Documents -- Cadiz, Inc. Wells and Annual Groundwater Monitoring Reports

Dear Clerk of the Board:

In addition to the documents requested in my Public Record Act requests on March 16, 2012, I would also request that you provide me with all written comments the District has received on the Draft Environmental Impact Report for the Cadiz Valley Water Conservation, Recovery and Storage Project. 1

Thank you for your anticipated cooperation in this regard.

Very Truly Yours,

RUTAN & TUCKER, LLP

Robert S. Bower

RSB:rsb
cc: Tom Barnes, ESA
Alicia Boston
Alex Naughton
John Ramirez

O_Tetra 5

From: Nakata, Dennis [dnakata@rutan.com]
Sent: Friday, February 24, 2012 4:55 PM
To: Cadiz Project
Subject: Request for Documents

Follow Up Flag: Follow up
Flag Status: Completed

Tom … Per our conversation, I'd like to request for the following documents referenced in the Cadiz Valley Water Conservation, Recovery and Storage Project. All of these documents are listed in the reference section of the EIR (section 11).

1. CH2M Hill, *Cadiz Groundwater Conservation and Storage Project*, July 2010.
2. CH2M Hill, *Groundwater Management, Monitoring, and Mitigation Plan,* November 2011
3. GEOSCIENCE Support Services, Inc., *Cadiz Groundwater Conservation and Storage Project Phase 1 – Conservation Scenarios,* August 2011.
4. GEOSCIENCE Support Services, Inc., *Cadiz Groundwater Modeling and Impact Analysis*, September 2011
1. GEOSCIENCE Support Services, Inc., *Addendum to September 1, 2011 Cadiz Groundwater Modeling and Impact Analysis*, November 2011

1

Please advise on any copy charges. Please contact me with any questions or concerns. I appreciate your help in this matter.

Thanks
Dennis Nakata
Paralegal
Rutan & Tucker, LLP
611 Anton Boulevard, 14th Floor
Costa Mesa, CA 92626
714-662-4656 Direct
714-546-9035 Fax
dnakata@rutan.com
www.rutan.com

RUTAN
RUTAN & TUCKER, LLP

O_Tetra 6

Robert S. Bower
Direct Dial: (714) 641-3413
E-mail: rbower@rutan.com

April 3, 2012

VIA E-MAIL AND
FIRST CLASS MAIL

Santa Margarita Water District Attention:
Clerk of the Board
Administration Office
26111 Antonio Parkway
Rancho Santa Margarita, CA 92688

Re: Public Records Act Request Relating to Rancho Santa Margarita Water District and the Cadiz Valley Water Conservation, Recovery and Storage Project

Dear Clerk of the Board:

I represent Tetra Technologies, Inc, which wishes to review and have the opportunity to copy certain public records in the possession of the Santa Margarita Water District ("District"). Pursuant to the California Public Records Act (Gov. Code §§ 6250 *et seq.*), I hereby request that the following documents be made available to this office:

1) Any "writing" as that term is defined by Government Code section 6252(g), including, but not limited to, **all internal e-mails** transmitted or received, letters, memoranda, reports, notes, or phone records relating to or evidencing communications between or among the employees, officers, officials, or consultants of the Santa Margarita Water District regarding the Cadiz Valley Water Conservation, Recovery and Storage Project ("Project"), but excluding communications protected by the attorney-client privilege.

2) Any "writing" as defined by Government Code section 6252(g), including, but not limited to, **all e-mails** or facsimile documents transmitted or received, letters, memoranda, reports, notes, phone records, and agreements of any kind (*e.g.*, draft versions of agreement(s)) relating to or evidencing communications between the employees, officers, officials, or consultants of the District regarding the Project, and any third party, including:

   (i) consultants regarding the Project and the preparation of the EIR; and

   (ii) state or local agencies.

1

This request specifically includes all documents relating to the District's compliance with the California Environmental Quality Act, Public Resources Code sections 21000 *et seq.*, for the Project.

As you may be aware, Government Code section 6253 requires that the District determine within 10 days after receipt of this request whether to comply with this request and to immediately notify this office "of the determination and the reasons therefor." Once the requested documents are assembled, please have a District staff member telephone me at (714) 641-3440, so that we may review the documents and arrange to have the pertinent ones copied.

If the District determines to withhold any public records within the scope of the above requests, I hereby request that the District identify each separate document (by date, author, addressee, title, subject, and other identifying description) and that the District "justify withholding any record by demonstrating that the record in question is exempt under express provisions of [the California Public Records Act] or that on the facts of the particular case the public interest served by not disclosing the record clearly outweighs the public interest served by disclosure of the record." (Gov. Code § 6255.)

1

Our office will agree to pay the standard copying charges for any writings that we determine to have copied by the District or we will provide our own copy service.

Your prompt attention to this matter is appreciated.

Thank you in advance for your assistance in this matter.

Very truly yours,

RUTAN & TUCKER, LLP

Robert S. Bower

RSB:dmo

cc: Michelle Ouellette
Tom Barnes, ESA
Alicia Boston
Alex Naughton
John Ramirez

O_29 Palms Chamber

Twentynine Palms Chamber of Commerce
73484 Twentynine Palms Hwy
Twentynine Palms, California 92277
(760) 367-3445 Fax (760) 367-3366
29chamber@29chamber.org

15 December 2011

Attn: Tom Barnes
ESA Southern CA Water Group
626 Wilshire Blvd Suite 1100
Los Angeles, CA 90017

RE: CADIZ VALLEY WATER CONSERVATION RECOVERY AND STORAGE PROJECT

The Twentynine Palms Chamber of Commerce is a not-for-profit organization dedicated to meeting the needs of its membership and the community by fostering economic opportunity and developing a favorable business climate while enhancing our quality of life. Our purposes are to protect and stimulate the natural advantages of the community; to foster and encourage commerce; to encourage residential possibilities; and to promote the economic, civic and social welfare of the residents of the Twentynine Palms area. We are made up of nine Board Members all in support of The Cadiz Valley Water Conservation Recovery and Storage Project

Cadiz Inc has been an active participant in the local community for decades. The Cadiz organic farm has hosted events, donated to local charities, and has been an all around good neighbor. We have no doubt that they will continue to be responsible and show care for the community and the environment while building and operating the project. The project would have major economic benefits in the High Desert area and especially in the community of Twentynine Palms. The job creation and economic benefits described in the report by John Husing are very exciting. 1

For these reasons we are very excited to support the project.

Sincerely,

Maggie Chaffer

Maggie Chaffer
President, 29 Palms Chamber of Commerce (2011-2012)

O_Wildlands

THE WILDLANDS CONSERVANCY

March 14, 2012

Tom Barnes
ESA
626 Wilshire Boulevard, Ste. 1100
Los Angeles, CA 90017
FAX: 213-599-4301
Email: cadizproject@esassoc.com

RE: Comments on the Cadiz Valley Water Conservation, Recovery, and Storage Project Draft Environmental Impact Report State Clearinghouse #2011031002

Dear Mr. Barnes,

The Wildlands Conservancy appreciates the opportunity to comment on the Cadiz Valley Conservation, Recovery, and Storage Project Draft Environmental Impact Statement.

The Wildlands Conservancy (TWC) is a non-profit organization whose dual mission is to preserve the beauty and biodiversity of the earth, and to fund programs so that children may know the wonder and joy of nature. The Wildlands Conservancy owns and operates California's largest nonprofit nature preserve system, and over the past ten years, TWC has been California's nonprofit leader in providing free outdoor education programs for school children.

Between 1999 and 2004, The Wildlands Conservancy negotiated the purchase of former railroad land from the Catellus Corporation. These lands were subsequently conveyed to the Department of the Interior, and were meant to be a gift to the American people, to be managed for conservation and recreational purposes. At more than 587,000 acres, The Wildlands Conservancy's Catellus acquisition is the largest nonprofit land acquisition in U.S. history. It included funding of more than 85,000 acres in the Mojave National Preserve, more than 20,000 acres in Joshua Tree National Park, and over 210,000 acres in 20 Bureau of Land Management wilderness areas, and hundreds of thousands of acres of important habitat. This acquisition represents the largest landscape connectivity and wildlife corridor project completed with nonprofit funds in North America.

1

Much of the area that could be affected by the impacts of the Cadiz Valley Conservation, Recovery, and Storage Project is comprised of lands included in our Catellus acquisition. We

O_Wildlands

are concerned that the DEIR fails to address many of the possible impacts associated with the removal of vast amounts of water from this desert aquifer, and that by its nature, the project is unsustainable.

We are also concerned that despite the best efforts to mitigate possible impacts from the project, that irreversible damage could be done to the natural desert environment and local human communities. Given the one way nature of water use proposed by the project, sufficient recharge of the aquifer would be impossible if the impacts of overdrafting became apparent.

1

For these reasons, we are voicing our support of, and agreement with, the comments submitted on this project by the Center for Biological Diversity, National Parks Conservation Association, the Desert Tortoise Council, et al. on March 13, 2012.

We appreciate the opportunity to submit these comments.

DATE: March 14, 2012

Signed,

Frazier Haney
The Wildlands Conservancy
39611 Oak Glen Road #12
Oak Glen, Ca. 92399

O_WillitsNewcomb

March 12, 2012

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

Dear Mr. Barnes,

I want to support the Cadiz Valley Water Conservation, Recovery and Storage Project because it is a good project for many reasons.

The Cadiz Ranch has been a customer of Willits and Newcomb for many years. We are a full service wholesaler nursery, grower and supplier of a full range of citrus products in California, Arizona and Nevada. Water supplies and price are always a concern of our farming customers in these states. Water reliability will continue to be a core priority in California for the next hundred years. That's why long range plans and sustainable water supplies are so important to the region and specifically to the agriculture industry.

It's hard for people to imagine how far water must go to get from the Sacramento Delta to South Orange County. It makes much more sense to use and conserve water that is found in Southern California whenever possible as an alternative to bringing water from the Delta. The water project at Cadiz would use water that is just going to evaporate and be wasted and instead pump it to meet this need for local water in Southern California. This is smart planning for the future. 1

The Cadiz Valley Water Conservation Recovery and Storage project is good for businesses, good for the environment instead of pumping water from hundreds of miles north, and a good way to save water that would otherwise be lost.

We have enjoyed getting to know the staff and the property over the years. They have always been responsible and good customers. I have complete confidence in the Cadiz company and staff and their ability to build this project that will help meet California's ongoing water needs.

Sincerely,

Jackie Maxwell
President

P.O. Box 428 Arvin, California 93203 www.wncitrus.com
Phone (661) 327.9345 (800) 889.5370 Fax (661) 366.6419

O_Zepeda

Zepeda Labor Contracting, Inc.
1457 6th Street
Coachella, CA 92236
(760) 398-2525

March 9, 2012

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

Dear Mr. Barnes,

I write in support of the Cadiz Valley Water Conservation, Recovery and Storage Project being reviewed by the Santa Margarita Water District.

Our company is very familiar with the Cadiz Inc. landholdings in San Bernardino County. We have provided farm labor for the organic ranch for many years. The Cadiz farm has always been a good business partner and it has been a pleasure working with the company representatives during planting and harvesting.

While using the clean, fresh, water for the organic farm, the company has taken great care to use drip irrigation and other sustainable farming techniques. The company has helped to maintain the quality of the water by not using chemical pesticides or fertilizers on their land. 1

During day to day operations at the farm, Cadiz Inc. technicians have been able to study the water under their property in great detail. For many years they have studied the water, how to best use it and how to use it without harming the land. All this study has been put together in the draft Environmental Impact Report and it shows great planning and research has been done by many people over many years.

This project has been a long time coming. The Environmental Report shows that there is a very good source of water that can be used safely. It is time to move forward and take advantage of the water resource that is available at Cadiz.

The Cadiz water project has my support.

Sincerely,

Elena Zepeda Cota
Zepeda Labor Contracting, Inc.
Corporate Secretary