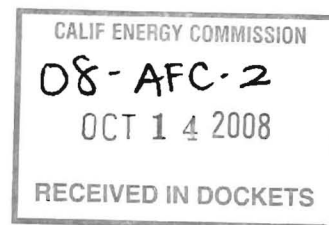


Sophia J. Rowlands  
srowlands@downeybrand.com

October 14, 2008



**BY HAND DELIVERY**

Shaelyn Strattan  
c/o April Albright  
California Energy Commission  
1516 Ninth Street, MS-15  
Sacramento, CA 95814

Re: Beacon Solar Energy Project, AFC No. 08-AFC-2

Dear Ms. Strattan:

Pursuant to our discussions, attached are the hard copies and CDs you requested of Beacon Solar, LLC ("Beacon")'s Supplemental Response to CEC Data Request 14 and Responses to CEC Data Requests 71 through 127. In addition, one hard copy and two CDs were filed with the Dockets Clerk, and copies will be served on all parties on the proof of service list today.

In reviewing these responses, please note that Beacon has provided additional discussion of the mitigation lands criteria requested in Data Request 18 in our response to Data Request 78.

If you need anything additional, please don't hesitate to contact me.

Very truly yours,

DOWNEY BRAND LLP

A handwritten signature in blue ink that reads "Sophia Rowlands".

Sophia J. Rowlands

SJR

Attachments

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

**APPLICATION FOR CERTIFICATION FOR  
THE BEACON SOLAR ENERGY PROJECT**

DOCKET NO. 08-AFC-2

**PROOF OF SERVICE**  
(Revised 8/18/08)

**INSTRUCTIONS:** All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

**CALIFORNIA ENERGY COMMISSION**

Attn: Docket No. 08-AFC-2  
1516 Ninth Street, MS-14  
Sacramento, CA 95814-5512  
[docket@energy.state.ca.us](mailto:docket@energy.state.ca.us)

Steve Schauer, Executive Director Solar Business Development 700 Universe Blvd. Juno Beach, FL 33408 <a href="mailto:Steve.schauer@fpl.com">Steve.schauer@fpl.com</a>  Mike Argentine FPL Energy, LLC 1465 Oak Hill Way Roseville, CA 95661 <a href="mailto:Michael.argentine@fpl.com">Michael.argentine@fpl.com</a>	Kenneth Stein, J.D. Duane McCloud Bill Narvaez Meg Russell FPL Energy, LLC 700 Universe Blvd., MS JES/JB Juno Beach, FL 33408 <a href="mailto:Kenneth.stein@fpl.com">Kenneth.stein@fpl.com</a> <a href="mailto:Guillermo.narvaez@fpl.com">Guillermo.narvaez@fpl.com</a> <a href="mailto:Duane.mccloud@fpl.com">Duane.mccloud@fpl.com</a> <a href="mailto:Meg.russell@fpl.com">Meg.russell@fpl.com</a>
Jane Luckhardt, Esq. Downey Brand, LLP 555 Capitol Mall, 10th Floor Sacramento, CA 95814 <a href="mailto:jluckhardt@downeybrand.com">jluckhardt@downeybrand.com</a>	Sara Head, Vice President ENSR Corporation 1220 Avenida Acaso Camarillo, CA 93012 <a href="mailto:shead@ensr.aecom.com">shead@ensr.aecom.com</a>
Geoffrey R. Baxter, P.E. – Project Manager Worley Parsons 2330 E. Bidwell Street, Suite 150 Folsom, CA 95630 <a href="mailto:Geoffrey.baxter@worleyparsons.com">Geoffrey.baxter@worleyparsons.com</a>	CA Independent System Operator P.O. Box 639014 Folsom, CA 95763-9014 <a href="mailto:e-recipient@caiso.com">e-recipient@caiso.com</a>

Tanya A. Gulesserian Marc D. Joseph Adams, Broadwell, Joseph & Cardozo 601 Gateway Blvd., Suite 1000 So. San Francisco, CA 94080 <a href="mailto:tgulesserian@adamsbroadwell.com">tgulesserian@adamsbroadwell.com</a>	
Karen Douglas Commissioner & Presiding Member <a href="mailto:kldougl@energy.state.ca.us">kldougl@energy.state.ca.us</a>	Jeffrey D. Byron, Associate Member <a href="mailto:jbyron@energy.state.ca.us">jbyron@energy.state.ca.us</a>
Kenneth Celli, Hearing Officer <a href="mailto:kcelli@energy.state.ca.us">kcelli@energy.state.ca.us</a>	Jared Babula, Staff Counsel <a href="mailto:jbabula@energy.state.ca.us">jbabula@energy.state.ca.us</a>
Shaelyn Strattan, Project Manager <a href="mailto:mstratta@energy.state.ca.us">mstratta@energy.state.ca.us</a>	Public Adviser <a href="mailto:pao@energy.state.ca.us">pao@energy.state.ca.us</a>

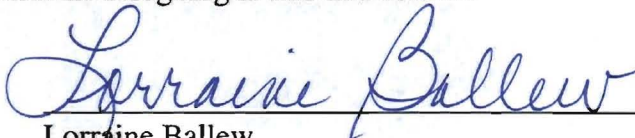
### DECLARATION OF SERVICE

I, Lorraine Ballew, declare that on October 14, 2008, I deposited copies of the attached **Supplemental Response to CEC Data Request 14 and Responses to CEC Data Requests 71 Through 127** in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

**OR**

Transmission via electronic mail was consistent with the requirements of the California Code of Regulations, title 20, sections 1209, 1209.5 and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

  
 Lorraine Ballew

# BEACON SOLAR ENERGY PROJECT

Supplemental Response to CEC Data Request 14 and  
Responses to CEC Data Requests 71 through 127  
Docket No. 08-AFC-2



Submitted by:

***Beacon Solar, LLC***

Submitted to:

**California Energy Commission**

**October 13, 2008**

Prepared by:

**ENSR** | AECOM



# **BEACON SOLAR ENERGY PROJECT**

**Supplemental Response to CEC Data Request 14 and  
Responses to CEC Data Requests 71 through 127  
Docket No. 08-AFC-2**

**by:  
*Beacon Solar, LLC***

**Submitted to:  
California Energy Commission**

**Prepared by:  
ENSR**

**October 13, 2008**

<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 71-78</b>	
<b>Technical Area: Biological Resources</b>	<b>Response Date: October 13, 2008</b>

**Data Request 71:**

Please provide a detailed discussion of the design of the rerouted desert wash and clarify any discrepancies and inconsistencies between information in the AFC and the July 16, 2008 Data Response #17.

**Response:**

Information in response to this comment was included in Applicant's Supplemental Data Responses to CEC Staff Data Request Set 1, submitted on August 18, 2008; please see Page BR-1 and BR-2. As indicated in these Supplemental Data Responses on pages BR-1 and BR-2, the conceptual design of the rerouted wash has been revised to provide unlined sections. Please see sheets C1 through C7 included in Attachment DR-45 of the Supplemental Data Request Responses, submitted to the California Energy Commission (CEC) on August 18, 2008 that show the revised design of the re-routed wash.

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**Data Request 72:**

Please provide a revised Drainage Study and channel design that would create the appropriate conditions in the proposed rerouted desert wash to promote natural hydrological/geomorphological processes and establish native vegetation.

**Response:**

Information in response to this comment was included in Applicant's Supplemental Data Responses to CEC Staff Data Request Set 1, submitted on August 18, 2008; please see Page BR-1 and BR-2. As indicated in these Supplemental Data Responses on pages BR-1 and BR-2, the conceptual design of the rerouted wash has been revised to provide unlined sections. Please see sheets C1 through C7 included in Attachment DR-45 of the Supplemental Data Request Responses, submitted to the CEC on August 18, 2008 that show the revised design of the rerouted wash.

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**Data Request 73:**

With respect to the reference on page BR-7, please discuss the frequency and duration of biological monitoring (via cameras, human observers, etc.) that has occurred at Harper Lake SEGs.

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<b>Technical Area: Biological Resources</b>	<b>Response Date: October 13, 2008</b>

**Response:**

As described in the Harper Lake SEGS Biological Resource Mitigation Implementation Plan (BRMIP) Compliance Reports (2<sup>nd</sup> Quarter 2002 to 2<sup>nd</sup> Quarter 2008), the following monitoring activities were conducted at Harper Lake SEGS areas VIII and IX.

Weekly Monitoring

Weekly monitoring began in 1989/1990 at the beginning of facility operations; however, the following discussion is based on the monitoring events conducted from April 6, 2002, to June 28, 2008. Quarterly reports summarizing both the weekly and monthly monitoring events were obtained from Glen King, Environmental Compliance Manager at Harper Lake SEGS. Weekly evaporation pond bird monitoring was performed as required by the BRMIP for Harper Lake SEGS.

Visual monitoring was the primary method of observation and was conducted by vehicle or on foot. Surveys were conducted by one to two environmental compliance monitors and occurred for a duration of 15 minutes to one hour, although the average survey length was 30 minutes. The weekly surveys were conducted sometime between 0700 and 1300 hours. Most of the surveys were completed before 1100 hours.

Each survey documented the quantity of birds observed for four bird type categories: waterfowl (e.g., ducks and geese), water birds (e.g., herons and gulls), small shorebirds (e.g., sandpipers and killdeer), and large shorebirds (e.g., avocets and stilts). Birds were not identified by genus or species. The quantity of birds in each category was documented for each of the three ponds. If sick, injured, or nesting birds were identified, then the bird species, the location relative to the evaporation ponds, and any other pertinent information were documented.

The date and survey start and stop time were recorded in addition to general site conditions, including air temperature, cloud cover, precipitation, and wind. The surveyor(s) also recorded the water level for each evaporation pond as well as any notable damage to the dikes, liners, or fences surrounding the evaporation ponds. The results of the weekly monitoring events were summarized in the quarterly BRMIP Compliance Reports.

Quarterly Monitoring

Quarterly evaporation pond bird surveys were conducted for Harper Lake SEGS by contract biologists beginning in 1989/1990 at the start of facility operations and continuing today. Reports for quarterly monitoring were reviewed from 2<sup>nd</sup> Quarter 2002 through 2<sup>nd</sup> Quarter 2008. The results were summarized and submitted in a "Memorandum for the Record," and were further summarized in the quarterly BRMIP Compliance Reports.

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Each quarterly survey event included four consecutive sessions (two morning and two evening sessions) over the course of two days. Morning surveys began no later than one hour after sunrise and evening surveys ended approximately one hour before sunset. Surveyors (usually one) drove or walked the perimeter of each pond and recorded observations. Both binoculars and a spotting scope were used to assist in the detection and identification of bird species. Each pond was surveyed independently with the survey time ranging anywhere from five minutes to 60 minutes depending on the size of the pond, weather conditions, and the quantity of bird species and individuals observed.

Unlike the weekly surveys, bird species was recorded for all observations (not just bird type) in addition to the quantity observed. As with the weekly surveys, sick, injured, or nesting birds were identified along with the location relative to the evaporation ponds and any other pertinent information. In addition, the date and survey start and stop time were recorded as well as general site conditions including air temperature, cloud cover, precipitation, and wind. The surveyor(s) also recorded the water level for each evaporation pond as well as any notable damage to the dikes, liners, or fences surrounding the evaporation ponds.

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**Data Request 74:**

Please explain the method and frequency for equalizing water in all evaporation ponds.

**Response:**

It is undesirable to maintain low quantities of water in the Beacon Solar Energy Project (BSEP) ponds because shallow water could result in an increase in pond salinity and could potentially attract wading birds. Therefore, the wastewater discharge to the ponds will be managed to maintain a minimum water level of one foot in all active evaporation ponds (i.e., during periods when ponds are not dry).

The BSEP pond system was designed based on a calculated monthly water balance between plant wastewater discharge and evaporation. In designing the ponds, the average monthly wastewater discharge and average monthly evaporation, based on local meteorological data, were used to calculate a design pond surface area that would result in the ponds theoretically drying out at least once each year. (It is important to note that while these calculations form the design basis for a properly functioning evaporation pond, they are an approximation and the actual volume of water in the ponds at any given time will vary with actual climatic conditions.) The analysis on which the pond design was based indicates that during the months of October through February, less water is generally needed for the cooling towers, and the predicted evaporation, if all three ponds are used, exceeds the volume of water discharged to the ponds by approximately one to two million gallons per month. During the remainder of the year, the volume of water discharged and the evaporation rates (using all three ponds) are in closer equilibrium.



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As a result, the ponds will contain varying quantities of water throughout the year and may be dry some of the time.

Based on the above evaluation, wastewater will be actively discharged to all three ponds at an equal rate during much of the year, but, as described below, the discharge will be managed during other times of the year to dilute and maintain higher water levels in some ponds while the other, inactive, ponds are allowed to go dry. As part of the evaporation pond water quality monitoring plan, each actively used evaporation pond will be outfitted with a level gauge for daily water level measurements, a hydrometer for daily salinity measurements, and a direct reading thermometer with the temperature data recorded at least diurnally. During periods when evaporation significantly exceeds discharge and pond water levels drop below an initial threshold of one foot in depth,<sup>1</sup> the Environmental Compliance Monitor (ECM) will route the wastewater discharge to only one or two of the ponds as needed to maintain the water levels above a depth of one foot in those ponds. The water in the inactive pond(s) will be pumped into the active pond(s) to allow the inactive pond to quickly dry up. In addition, if the average overnight water temperature in the active evaporation ponds is at or below 4 degrees Celsius (Woebser and Howard, 1987; Gordus et al., 2002), the ECM will conduct a visual survey of the ponds immediately the following morning. If the ECM observes evidence of recent increases in salt crystallization anywhere within the pond(s) (e.g., at or near the waterline), the ECM will route all of the wastewater into one or two ponds and pump the remaining pond(s) dry as noted above.

Calculations were performed for several pond management scenarios and indicate the ponds can be managed to maintain the water levels at depths equal to or greater than one foot but below the minimum pond freeboard requirement of two feet by initially filling the ponds one at a time and then periodically rotating the ponds to which the discharge is routed during the periods of managed discharge. In the event that climatic conditions are such that evaporation must be increased to maintain pond levels below the freeboard limits, evaporative disposal nozzles (see for example <http://www.bete.com/applications/disposal.html>) will be used to increase wastewater evaporation rates. Data from the evaporation pond water quality monitoring program, once the facility is in operation, will be used to adapt the pond discharge management approach to best meet the objective of avian protection and may suggest additional pond management practices.

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<sup>1</sup> One foot was selected as the starting threshold for implementation of flow management based on best professional judgment to minimize the potential for pond use by wading birds and balance dilution of salinity with the need to maintain adequate evaporation rates for water disposal. It should be noted that a particular salinity threshold has not been established at this time, and the salinity that corresponds with a one-foot pond depth has not been established. Pond depth, temperature, and water quality data gathered during implementation of the evaporation pond monitoring program will be used to better define and adjust pond operating thresholds, as warranted.

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**Technical Area: Biological Resources**

**Response Date: October 13, 2008**

**Data Request 75:**

Please provide a chronology of the summer 2007 waterfowl deaths and the factors leading to the conclusion that equalizing water levels in each evaporation pond would prevent recurrences of salt toxicosis.

**Response:**

The following table summarizes the chronology of waterfowl deaths recorded in the summer of 2007 at Harper Lake SEGS, based on the quarterly Harper Lake SEGS BRMIP Compliance Reports. This information was collected from the 3<sup>rd</sup> quarter monitoring report and includes the months of July through September 2007. No sick or dead birds were observed during the 1<sup>st</sup> or 2<sup>nd</sup> quarter of 2007.

<b>Scientific Name</b>	<b>Common Name</b>	<b>Date Observed</b>	<b>Quantity</b>	<b>Pond Location</b>
<i>Anas acuta</i>	Northern pintail	August 22, 2007	1	VIII West Pond (Pond A)
<i>Anas acuta</i>	Northern pintail	August 24, 2007	1	VIII West Pond (Pond A)
<i>Anas clypeata</i>	Northern shoveler	August 24, 2007	10	VIII West Pond (Pond A)
<i>Unidentified</i>	unknown	August 24, 2007	3	VIII West Pond (Pond A)
<i>Anas clypeata</i>	Northern shoveler	August 31, 2007	2	VIII West Pond (Pond A or B)*
<i>Oxyura jamaicensis</i>	Ruddy duck	August 31, 2007	1	VIII West Pond (Pond A or B)*
<i>Aythya americana</i>	Redhead duck	September 7, 2007	1	VIII West Pond (Pond A)

\* Three dead ducks were reported on August 31, 2007 (two northern shovellers and one ruddy duck); however, the exact pond location was not described, only that two ducks were collected from Pond A and one duck was collected from Pond B.

Harper Lake SEGS personnel contacted the Designated Biologist immediately after the discovery of bird remains at the evaporation ponds. The Project Biologist verified the species and determined if there were any additional reporting requirements (e.g., a state-listed species). A total of 19 salt-encrusted waterfowl (3 unverified) were found dead at the evaporation ponds in the late summer of 2007. All but one bird was collected from the VIII West Pond A. One bird was collected from VIII West Pond B; however, the report does not distinguish which species (northern shoveler or ruddy duck). On August 27, 2007, the Project Biologist (Richard Erickson, LSA Associates) collected 11 carcasses from the Harper Lake SEGS facility and delivered them to the San Bernardino Branch of the California Animal Health and Food Safety Laboratory for

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analysis. A final report submitted on September 17, 2007 by Dr. Francisco A. Uzal (Attachment 4 to the 2007, 3<sup>rd</sup> Quarter BRMIP Compliance Report) verified that the birds had died of salt toxicity. He stated that "the high level of sodium detected in the brains of five ducks tested confirmed a diagnosis of salt toxicity."

It had been noted that the water level in the VIII West Pond had been reduced to an unusually low level from late August and into early September, which most likely resulted in higher than normal salinity levels. In reviewing data from Regional Water Quality Control Board waste discharge reports, the TDS concentration in composite samples from the ponds during this period was approximately 250,000 mg/L, based on May and December semiannual monitoring events. It is therefore suspected that TDS concentrations in the SEGS VIII West pond would be higher than 250,000 mg/L. As stated by the Project Biologist (cover letter and Attachment 4 to the 2007 3<sup>rd</sup> Quarter BRMIP Compliance Report), lowering of water levels is thought to have contributed to the entrapment and subsequent death of these birds.

In late October 2007, six more bird mortalities were discovered at the evaporation ponds (see table below). No evidence is available to suggest that these deaths are related to salt toxicosis; however, no autopsies or other analyses were reported that identified the cause of death in the quarterly report.

Scientific Name	Common Name	Date Observed	Quantity	Pond Location
<i>Oxyura jamaicensis</i>	Ruddy duck	October 22, 2007	4	VIII East Pond B
<i>Aythya collaris</i>	Ring-necked Duck	October 23, 2007	1	VIII East Pond B
<i>Aythya affinis</i>	Lesser Scaup	October 24, 2007	1	VIII East Pond B

Following the fall bird mortality event, the water levels in the Harper Lake SEGS ponds were increased using blow-down water from the cooling system. No additional bird mortalities occurred following the increase in water volume. Harper Lake SEGS has continued to manage pond water levels to prevent low levels that could result in unusually high TDS concentrations. No additional bird mortalities have been documented.

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**Data Request 76:**

Please provide data on migratory bird activity at Harper Lake SEGS in the months subsequent to the summer 2007 events.

**Response:**

The following is a summary of migratory bird activity recorded during the Harper Lake SEGS quarterly monitoring events in the months subsequent to the summer 2007 bird mortalities,

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including the 4<sup>th</sup> Quarter of 2007 (October – December 2007) and the 1<sup>st</sup> and 2<sup>nd</sup> Quarter of 2008 (January – June 2008). Data have been presented for the weekly reports but are not discussed in detail as the sighted birds are grouped into bird type categories (waterfowl, water birds, small shorebirds, and large shorebirds) with no genus or species-specific identification recorded (unless bird mortality occurs).

The following table summarizes the migratory bird activity documented during the Harper Lake SEGS 4<sup>th</sup> Quarter 2007 (November) quarterly monitoring event.

Scientific Name	Common Name	Count*	Comments
<b>4<sup>th</sup> Quarter 2007 (November 28-29, 2007)</b>			
<i>Anas clypeata</i>	Northern shoveler	33	-
<i>Branta canadensis</i>	Canada goose	6	-
<i>Podiceps nigricollis</i>	Eared grebe	2	-
<i>Calidris minutilla</i>	Least sandpiper	2	-
<i>Larus delawarensis</i>	Ring-billed gull	1	-
<i>Gavia pacifica</i>	Pacific loon	1	More likely a common loon, <i>Gavia immer</i> , based on Project Biologist
Total Number Based on Highest Count		45	

\* In an effort to avoid double counting birds moving between ponds, the count represents the greatest number of individuals counted during any single monitoring session.

The following table summarizes the migratory bird activity documented during the Harper Lake SEGS 1<sup>st</sup> Quarter 2008 (March) quarterly monitoring event.

Scientific Name	Common Name	Count*	Comments
<b>1<sup>st</sup> Quarter 2008 (March 12-13, 2008)</b>			
<i>Larus californicus</i>	California gull	67	-
<i>Larus delawarensis</i>	Ring-billed gull	27	-
<i>Recurvirostra americana</i>	American avocet	3	-
<i>Stelgidopteryx serripennis</i>	Northern rough-winged swallow	3	-
<i>Charadrius vociferus</i>	Killdeer	2	-
<i>Anas cyanoptera</i>	Cinnamon teal	1	-
Total Number Based on Highest Count		103	

\* In an effort to avoid double counting birds moving between ponds, the count represents the greatest number of individuals counted during any single monitoring session.

Five of the six species observed during the 1<sup>st</sup> Quarter 2008 (March) monitoring event were not observed during the 4<sup>th</sup> Quarter 2007 (November) monitoring event. These are the California gull (*Larus californicus*), American avocet (*Recurvirostra americana*), rough-winged swallow



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(*Stelgidopteryx serripennis*), killdeer (*Charadrius vociferous*), and cinnamon teal. Conversely, five species that were recorded in the 4<sup>th</sup> Quarter 2007 (November) monitoring event were not observed in the 1<sup>st</sup> Quarter 2008 (March) monitoring event: northern shoveler (*Anas clypeata*), Pacific loon, eared grebe, least sandpiper, and Canada goose. For comparison, in the 2007, 1<sup>st</sup> Quarter monitoring event 18 species of birds were observed compared to six species in 2008.

The following table summarizes the migratory bird activity documented during the Harper Lake SEGS 2nd Quarter 2008 (June) quarterly monitoring event.

Scientific Name	Common Name	Count*	Comments
<b>2<sup>nd</sup> Quarter 2008 (June 18-19, 2008)</b>			
<i>Larus californicus</i>	California gull	27	-
<i>Phalaropus tricolor</i>	Wilson's phalarope	26	-
<i>Recurvirostra americana</i>	American avocet	5	-
<i>Himantopus mexicanus</i>	Black-necked stilt	5	-
<i>Anas discors</i>	Blue-winged teal	2	-
<i>Anas cyanoptera</i>	Cinnamon teal	2	-
Total Number Based on Highest Count		67	

\* In an effort to avoid double counting birds moving between ponds, the count represents the greatest number of individuals counted during any single monitoring session.

Three of the six species observed during the 2nd Quarter 2008 (June) monitoring event were not observed during the 1<sup>st</sup> Quarter 2008 (March) monitoring event. These are the Wilson's phalarope, black-necked stilt (*Himantopus mexicanus*), and blue-winged teal (*Anas discors*). Conversely, three species that were recorded in the 1<sup>st</sup> Quarter 2008 (March) monitoring event were not observed in the 2nd Quarter 2008 (June) monitoring event: ring-billed gull, killdeer, and rough-winged swallow. For comparison, in the 2007, 2<sup>nd</sup> Quarter monitoring event nine species of birds were observed compared to six in 2008.

The following table summarizes the weekly bird activity documented from the 4<sup>th</sup> Quarter 2007 to the 2<sup>nd</sup> Quarter 2008 (October 2007 – June 2008). As mentioned above, no species-specific data are recorded during the weekly surveys. The total number of birds recorded for each bird type category and the total number of birds observed for each sampling date are presented below.

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Date	Survey Start Time	Bird Type Categories (No. Observed)				Total
		Water Fowl ( e.g., ducks and geese)	Water Birds (e.g., herons and stilts)	Small Shorebirds (e.g., sandpipers and killdeer)	Large Shorebirds (e.g., avocets and stilts)	
4 <sup>th</sup> Quarter 2007, Weekly Survey Results						
October 6, 2007	1400	12	7	0	0	19
October 13, 2007	0734	13	0	0	0	13
October 20, 2007	0908	0	0	0	0	0
October 27, 2007	1041	8	0	0	0	8
November 3, 2007	0736	0	0	0	0	0
November 10, 2007	0645	0	0	0	0	0
November 17, 2007	0630	1	0	0	0	1
November 24, 2007	0700	9	1	0	0	10
December 1, 2008	0800	0	0	0	0	0
December 8, 2007	0930	0	0	0	0	0
December 15, 2007	0835	2	0	6	2	10
December 21, 2008	0750	0	0	6	7	13
December 29, 2008	0810	0	0	0	0	0
4 <sup>th</sup> Quarter 2007 Total		45	8	12	9	74
1 <sup>st</sup> Quarter 2008, Weekly Survey Results						
January 5, 2008	0840	0	0	10	0	10
January 12, 2008	0650	0	0	25	1	26
January 19, 2008	0850	7	0	14	1	22
January 26, 2008	0800	0	0	18	0	18
February 2, 2008	0810	0	3	34	0	37
February 9, 2008	0708	14	0	0	0	14
February 16, 2008	0848	11	0	0	0	11
February 23, 2008	0640	0	0	0	0	0
March 1, 2008	0730	0	0	0	0	0
March 8, 2008	0905	0	3	0	8	11
March 15, 2008	0905	0	0	3	2	5
March 22, 2008	0702	24	0	0	1	25
March 29, 2008	0920	1	0	0	0	1
1 <sup>st</sup> Quarter 2008 Total		57	6	104	13	180

**BEACON SOLAR ENERGY PROJECT (08-AFC-02)**  
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Date	Survey Start Time	Bird Type Categories (No. Observed)				Total
		Water Fowl ( e.g., ducks and geese)	Water Birds (e.g., herons and stilts)	Small Shorebirds (e.g., sandpipers and killdeer)	Large Shorebirds (e.g., avocets and stilts)	
2 <sup>nd</sup> Quarter 2008, Weekly Survey Results						
April 5, 2008	0745	2	3	0	0	5
April 12, 2008	0730	7	0	0	3	10
April 19, 2008	0730	7	4	0	0	11
April 26, 2008	0630	0	0	25	21	46
May 3, 2008	0921	1	0	15	3	19
May 10, 2008	0632	2	1	23	4	30
May 17, 2008	0620	16	0	28	6	50
May 24, 2008	0855	11	24	9	0	44
May 31, 2008	0653	2	44	0	0	46
June 7, 2008	0648	21	4	2	0	27
June 14, 2008	0720	0	26	0	0	26
June 21, 2008	1048	0	21	0	1	22
June 26, 2008	0835	0	19	17	0	36
2 <sup>nd</sup> Quarter 2008 Total		69	146	119	38	372

In reviewing migratory bird activity at Harper Lake SEGS, it is important to note that the Harper Lake SEGS site is located near an existing marsh that would be expected to attract greater numbers of birds than BSEP throughout the life of the project due to the proximity to this resource.

**Data Request 77:**

Please provide electronic copies of the references that support the proposed compensation ratios for the Mohave ground squirrel and desert tortoise.

**Response:**

Electronic copies of the reference documents that pertain to the Mohave ground squirrel density estimate (described on page BR-17), and the desert tortoise density estimate, were provided electronically by Jennifer Guigliano, EDAW, to the CEC by email to Shaelyn Stratton and Susan Sanders on September 29, 2008. References provided include:

1. Berry, K.H., 1997. Demographic Consequences of Disease in Two Desert Tortoise Populations in California, USA. Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles—An International Conference, pp. 91–99.

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2. Harris, J.H. and P. Leitner, 2004. Home-range Size and Use of Space by Adult Mohave Ground Squirrels, *Spermophilus mohavensis*. Journal of Mammalogy, 85(3):517-523.
3. Harris, J.H. and P. Leitner, 2005. Long-distance Movement of Juvenile Mohave Ground Squirrels, *Spermophilus mohavensis*. The Southwestern Naturalist, 50(2):188–196.

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**Data Request 78:**

Please provide additional detailed, site-specific information as to how and where owls would be relocated off-site and how lands would be managed in the vicinity of the site for long-term preservation of this species. This relocation/preservation plan should reflect close coordination with the California Department of Fish and Game and the U.S. Fish and Wildlife Service and should include the following elements:

- a. A figure depicting the location of the off-site relocation area at a scale no less than 1 inch = 1000 feet;
- b. A description of the ownership of the relocation area, an assessment of habitat suitability of the area for burrowing owls, and a discussion of proposed management of habitat within the relocation site;
- c. A description of how lands would be managed near the Plant to promote long-term maintenance of a viable burrowing owl population; and
- d. A figure, at a scale of no less than 1 inch = 1000 feet, depicting the areas that would be subject to burrowing owl management.

**Response:**

Management of burrowing owls will consist of two activities: (1) passive relocation of owls from the construction area, and (2) acquisition of offsite lands suitable for burrowing owl. The purpose of the passive relocation is to avoid direct impacts to any onsite burrowing owls from the proposed Project. Mitigation for the loss of burrowing owl habitat on the Project site will be offset by the acquisition of suitable burrowing owl habitat offsite.

The Project proposes the passive relocation of onsite burrowing owls to artificial burrows located off site. The artificial burrows will be located within a 14.39-acre parcel under the control of Beacon Solar, LLC. (Beacon) (Assessors Parcel Number [APN] 469-14-011), located just outside of the Plant Site boundary, east of State Route 14 (SR-14) and north of the facility access road (Figure BR78-1). The proposed relocation area is characterized by Mojave creosote scrub (*Chrysothamnus nauseosus*, dominant). Two potential burrowing owl burrows were identified in



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the area during the spring 2007 and 2008 biological resource surveys, although neither was active and there was no burrowing owl sign associated with the burrows. One burrowing owl was observed immediately south of this area, inside the Project boundary. Figure BR78-1 shows a portion of the 14.39-acre parcel controlled by Beacon, proposed for artificial burrows construction in support of passive relocation. A thorough discussion of the proposed passive relocation effort was included with the Supplemental Response to CEC Staff Data Request No. 20 submitted on August 18, 2008.

To support protection and conservation of the burrowing owl within the relocation area, Beacon has agreed to establish a conservation easement over approximately six (6) acres of the parcel located north of the access road and east of SR-14 to protect the lands in perpetuity (Figure BR78-1). A total of four (4) artificial burrows will be constructed in this area to facilitate passive relocation of two pairs of burrowing owls identified previously on the Plant Site. The artificial burrows will be constructed as close to the northern border of the parcel as feasible to maximize distance between construction areas and the access road in an effort to decrease indirect disturbance and increase the potential for occupancy by burrowing owls.

The area will be surveyed for burrowing owls prior to construction of the artificial burrows to evaluate the baseline conditions and burrowing owl presence/absence. Following relocation efforts, the conservation area will be surveyed for one year, during spring and winter seasons, to evaluate use of burrows. Surveys will follow the protocol survey methodology for surveys (to include Phase II and III) identified in the Burrowing Owl Consortium Guidelines.

In addition, Beacon will conduct ongoing maintenance and monitoring of the conservation area for exotic weed control for a 5-year period following construction of the burrows.

In addition to the passive relocation to avoid direct impacts, Beacon will mitigate for the loss of burrowing owl habitat by the acquisition and preservation of land offsite. The offsite mitigation lands will include the six acres adjacent to the Project area that will be placed into a conservation easement to protect the relocation area and artificial burrows; however, additional acreage will be acquired at a second location, to be determined, to ensure that a minimum of a total of 20 acres will be purchased and managed to mitigate for the loss of two pairs of burrowing owls on site. A thorough discussion of proposed compensatory mitigation lands and proposed management of offsite mitigation areas can be found in the Supplemental Response to CEC Staff Data Request No. 18 (August 18, 2008). Additional information on criteria for offsite mitigation lands is provided below.

**Location and characteristics of lands proposed for compensatory mitigation.**

The following qualitative criteria for compensation lands will facilitate optimum compensation for the loss of occupied habitat at BSEP. This information would be applicable to the burrowing owl in addition to the desert tortoise (DT) and Mohave ground squirrel (MGS).

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1. Compensation lands should be part of a larger block of lands that are either already protected or planned for protection (e.g., the Desert Tortoise Research Natural Area [DTNA] and its proposed expansion area), or feasibly could be protected by a public resource agency (e.g., California Department of Fish and Game [CDFG]) or a private biological reserve organization (e.g., the Desert Tortoise Preserve Committee [DTPC]).
2. Parcels should have inherently moderate to good habitat that is likely to regenerate naturally when current disturbances are removed. Parcels should not be subject to such intensive recreational, grazing, or other uses that recovery is rendered unlikely or lengthy. Nor should those invasive species that are likely to jeopardize habitat recovery (e.g., Saharan mustard [*Brassica tournefortii*]) be present in uncontrollable numbers, either on or immediately adjacent to the parcels under consideration.
3. Parcels should provide habitat that is as good or better than the habitat being impacted by the Project. Preferably, the lands would comprise sufficiently good habitat that they are either currently occupied or will likely be occupied by the three species once they are protected from anthropogenic impacts and/or otherwise enhanced.
4. The parcels should be connected to known, occupied lands. Preferably, the existing population on these occupied lands would represent a population that is stable, recovering, or likely to recover.

To meet these objectives for acquiring compensation lands, the Project has initially focused on the region east of the Project area, in the vicinity west of the DTNA. This region was targeted for potential acquisition because (1) it achieves all of the goals identified above, (2) has the potential to support the same suite of high-profile special status species that are present on or adjacent to the BSEP, and (3) is within the same geographic area as the populations of special-status species at or near BSEP. Within this area are lands that adjoin the DTNA and are in the DTNA expansion area targeted by the DTPC. Acquisition of lands here would incorporate them into the protection and management program for the entire preserve. This consolidation of lands would increase the block of protected, high-quality habitat currently provided by the DTNA, an important conservation and recovery measure for all three special species in question. Furthermore, as land ownership would be ultimately transferred to CDFG or the DTPC, this action would be consistent with Objective No. 1 of the DTNA Management Plan's *Goals and Objectives*, which promotes protection, conservation, and enhancement of habitat in and around the DTNA. To the extent that land cannot be acquired in this particular area due to availability or cost, other areas as similar as possible to the area surrounding the DTNA will be pursued.

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While the BSEP team has begun identifying the location and characteristics of lands that could be used for compensatory mitigation, the acquisition of compensation lands is dependent upon all parties agreeing upon the number of acres that need to be acquired, since that can affect availability and cost. The ultimate goal is to acquire compensatory lands that would offset the loss of the biological values associated with construction and operation of the BSEP that cannot be completely addressed on site. Species specialists who are knowledgeable about the habitat requirements of DT, MGS, and burrowing owl would evaluate candidate properties. As potential compensatory lands are identified, the BSEP team, or third party approved by the agencies, would coordinate closely with the CEC, CDFG, and U.S. Fish and Wildlife Service to obtain consensus that the targeted lands are suitable. A Property Analysis Record (PAR), or a PAR-like analysis, would be conducted on compensation lands that are provisionally acceptable to both BSEP and the resource agencies or are similar to lands likely to be acquired. The PAR would model the anticipated costs associated with the acquisition of land, as well as management expenses (e.g., fencing, habitat enhancement, monitoring, etc.), while accounting for escalation in costs associated with inflation. The result of the PAR model would be an accurate estimate of the long-term endowment costs that would be required to fully implement all compensation measures. The funding associated with the PAR was addressed in the response to Data Request 25.

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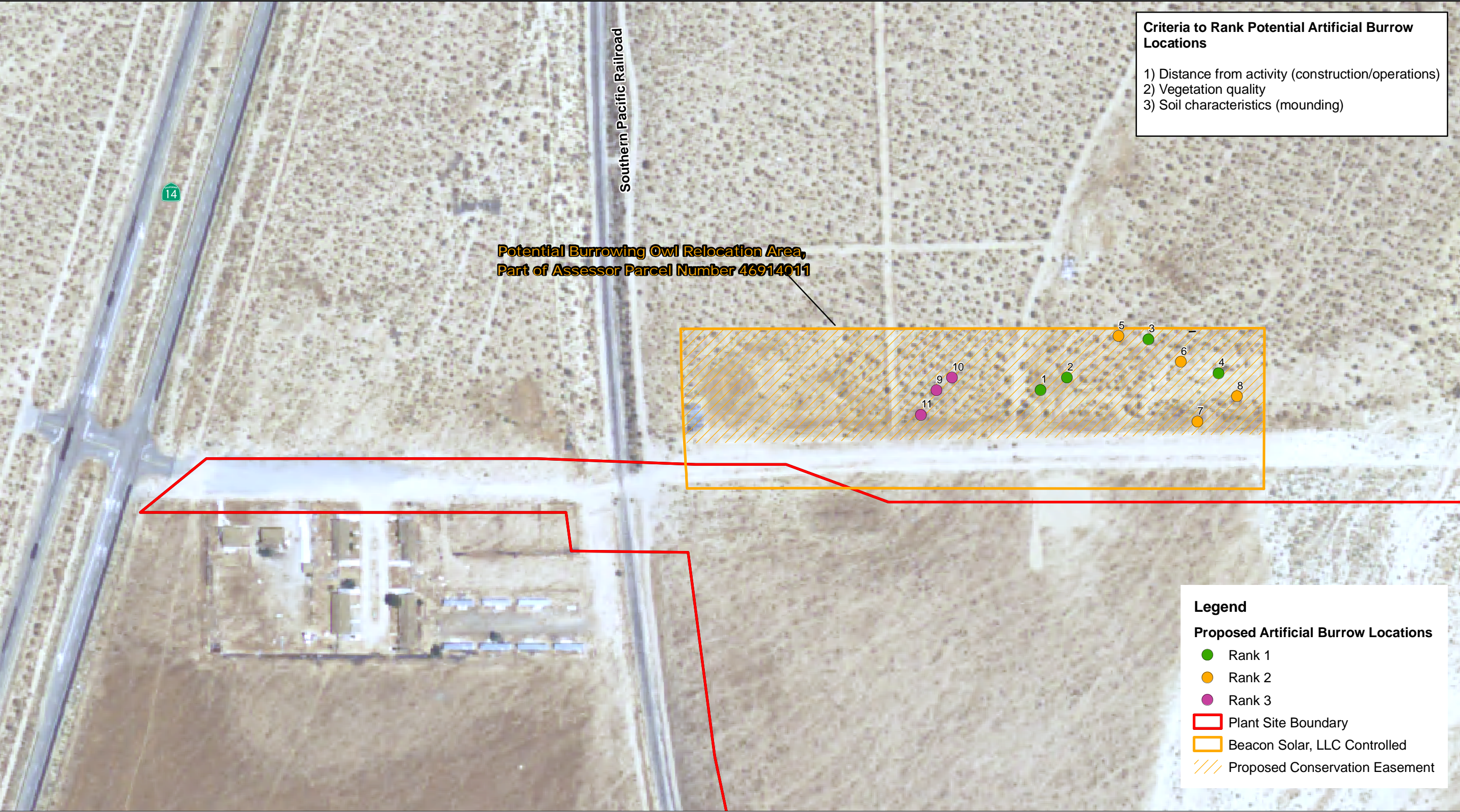
References:

GeoTrans, Inc., 2002-2008. Biological Resource Mitigation Implementation Plan (BRMIP) Compliance Reports (2<sup>nd</sup> Quarter 2002 to 2<sup>nd</sup> Quarter 2008) for the SEGS VIII & IX Project Area, Harper Lake, California.

Gordus, A.G., H.L. Shivaprasad, and P.K. Swift, 2002. Salt toxicosis in ruddy ducks that winter on an agricultural evaporation basin in California. *Journal of Wildlife Diseases* 38:124-131.

Woebser G. and J. Howard, 1987. Mortality of Waterfowl on a Hypersaline Wetland as a result of -Salt Encrustation. *Journal of Wildlife Diseases* 23:127-134.





Source: NAIP 2005, Kern County 2007

200 100 0 200 Feet

Scale: 1:2,400; 1 inch = 200 feet

**Figure BR78-1**  
**Burrowing Owl Map**



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**Beacon Solar Energy Project CEC Staff Data Request Set 1, Revised Response to Data Request 14.**

This revision to Applicant's Response to California Energy Commission (CEC) Staff Data Request No. 14, dated July 16, 2008, provides additional information regarding the proposed evaporation ponds and associated potential risks to wildlife. This revised response has been prepared, in part, to address questions raised by CEC staff at the public workshop held July 22, 2008, and replaces the original response in its entirety. The original response included information on the risks to wildlife, specifically avian species, design features to minimize risk, a monitoring program to evaluate potential impacts, and remedial actions should an impact be identified. This revised response covers those same issues but also provides supplemental information regarding potential impacts to wildlife issues from selenium and total dissolved solids (TDS) concentrations in the evaporation ponds at the Beacon Solar Energy Project (BSEP).

**Data Request 14:**

Please provide a more detailed and specific monitoring plan for the evaporation ponds, including:

- a. a discussion of the frequency and nature of the monitoring;
- b. the elements that will be monitored (e.g., sodium, selenium);
- c. resident and migratory species that could be at risk;
- d. remedial actions that could be taken if the ponds became a hazard for wildlife; and
- e. the events that might trigger implementation of those remedial actions.

**Revised Response:**

The primary constituents of the evaporation pond water that could have a potential adverse effect on wildlife are selenium and hyper-saline conditions resulting from high TDS concentrations. As noted in the Application for Certification, selenium and elevated levels of TDS have the potential to adversely affect avian species. This discussion includes an evaluation and discussion of both selenium and TDS concentrations in evaporation pond water and an evaluation of ecological risk to wildlife.

**Target Species**

It is anticipated that birds are the wildlife taxon with the greatest potential to be at risk from constituents in the evaporation ponds. The tortoise-proof perimeter fencing associated with the BSEP Plant Site will restrict most terrestrial wildlife from entering the Plant Site. Any that enter will be unlikely to travel to the evaporation ponds, which will be located approximately 0.25 mile inside the perimeter fence. This analysis, therefore, focuses on risks to avian

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species. Species at risk are those with the potential for nesting at the facility, residents of the area that would drink and forage from the ponds or on insects associated with the ponds, and migrants that would use the ponds for a stopover during migration.

To further reduce the potential for impacts from the ponds, a series of avian deterrence measures are being incorporated as Project Design Features (PDFs) into the design and operation of the evaporation ponds to minimize pond access by birds. The use of anti-perching devices around the perimeter of each pond will assist in excluding ravens and other birds from accessing the edge of the ponds to drink any of the water. Additionally, the operational design of the ponds is such that a minimum freeboard of 2 feet will be kept at all times, and the interior sides of the ponds will be at a 33 percent slope (3:1, horizontal:vertical). These PDFs will make it difficult for perching birds and/or shorebirds to access the water and are anticipated to minimize risks to wildlife by minimizing availability of water as a new subsidy.

Because the ponds will remain uncovered to maximize evaporation and to avoid trapping birds under netting or monofilament arrays, it is anticipated that primarily waterfowl, such as ducks and geese, will be able to access the evaporation ponds by landing on the water. Although waterfowl are anticipated to be the highest risk category, other bird groups, such as shorebirds, may be present even though the ponds have been designed to minimize access. Therefore, the response below focuses on both waterfowl and shorebirds.

### **Water Quality Analysis**

To facilitate an understanding of the anticipated water quality within the BSEP ponds and the potential risk to birds, water quality in a similar system at the Harper Lake Solar Electric Generating System (SEGS) site (Harper Lake SEGS) was evaluated. In general, both the BSEP and the Harper Lake SEGS sites use and treat water in a similar manner. Raw water is obtained from groundwater wells primarily for cooling purposes. All or a portion of the water is treated prior to being used in the cooling towers by cold lime water softening (at Harper Lake SEGS) or ion exchange (at BSEP), and treatment chemicals are added for pH control, as biocides, and for scale and corrosion control. Due to the difference in source water concentrations, cooling water is blown down to the ponds after 8 cycles of concentration at Harper Lake SEGS and will be blown down after 15 cycles of concentration at BSEP. However, all of the treated water and wastewater streams from these treatment processes and from cooling water blowdown at both sites, and most of the dissolved selenium and TDS, eventually enter the evaporation ponds. The water quality data and pond management approach at Harper Lake SEGS are therefore useful for understanding the water chemistry and appropriate management approach at BSEP.

The risk to wildlife, specifically avian species, is related to dissolved constituent concentrations in the pond water and not the source water or wastewater discharge into the ponds; therefore,

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analysis of wildlife risks focuses on pond water quality. The pond water contains a great number of different dissolved constituents, which are separated into positively and negatively charged ions (cations and anions, respectively). As evaporation takes place, the concentrations of these ions increases until they eventually reach a saturation point and some of the positive and negative ions combine and begin to drop out of solution and crystallize as solid salts. Which ions stay dissolved in the pond water and which ones precipitate at any given time is determined by a complex series of chemical and physical processes that all interact concurrently. These processes include the rate at which new wastewater is added, the evaporation rate, the concentrations of the various dissolved salt ions that make up the TDS and compete with each other to combine into solids, the pond temperature, the amount and chemistry of the already crystallized salt in the ponds, and other factors. Therefore, focusing on the constituent concentrations of source water and wastewater discharge into the ponds does not, in and of itself, provide a mechanism for determining the concentrations in the pond over time. The preferred, and most reliable, method of determining the "equilibrium" concentrations of dissolved ions in an evaporation pond would be to undertake actual laboratory studies where samples of the water are evaporated and analyzed. Since this is not possible, data regarding the performance of an existing pond under similar conditions, in this case Harper Lake SEGS, are used as a reasonable analogy for anticipating evaporation pond water quality at the BSEP, evaluating risk to avian life, and identifying a management strategy.

#### Source Water (Groundwater) Quality

Both the Harper Lake SEGS and the BSEP use groundwater as the source water for the cooling process. Risk to avian species is related to the concentration of constituents in evaporation pond water and not the source water, but since the constituents in the pond water are derived from the source water, information on the source water quality is discussed below.

#### *Total Dissolved Solids*

A comparison of the well water chemistry for the BSEP and Harper Lake SEGS sites is provided in Table BR-14a. Table BR-14a shows that groundwater at Harper Lake SEGS contains a higher concentration of TDS and is of generally poorer quality than water at the BSEP. Harper Lake SEGS well water has a TDS concentration of 2,475 milligrams per liter (mg/L), an amount that is about five times higher than well water at the BSEP, which has a TDS concentration of 550 mg/L. The water at each site is composed of a complex mixture of salt cations and anions that determines which salt species precipitate out at what times and which ones remain in solution as the water evaporates in an evaporation pond. TDS solubility limits (or saltiness of the water before the solids are precipitated out) are therefore dependant on a complex series of interactions between competing solutes that is beyond the scope of this evaluation. In general, however, relative TDS solubility limits can be compared based on the major ion chemistry at each site. The dominant ions at Harper Lake SEGS are sodium



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**Table BR-14a**

Comparison of Well Water from Harper Lake Site to Beacon Site  
Beacon Solar, LLC.

Constituent	Concentration in Beacon Well Water (3 Samples)			Concentration in Harper Lake Well Water (7 Samples)			Units
	Mean	Minimum	Maximum	Mean	Minimum	Maximum	
Arsenic (total)	0.0035	0.0030	0.0041	0.0089	0.005	0.011	(mg/L As)
Calcium (total)	47	45	50	170	120	220	(mg/L Ca)
Chloride	15.5	14	18	1052.5	760	1300	(mg/L Cl)
HCO <sub>3</sub> (bicarbonate alkalinity)	257	200	360	115	110	120	(mg/L HCO <sub>3</sub> )
Magnesium (total)	11	10	12	29	15	36	(mg/L Mg)
pH	8.00			7.40	7.10	7.60	pH
Selenium (total)	0.00039	0.00031	0.00048	0.00162	0.0013	0.002	(mg/L Se)
Sodium (total)	78	74	84	500	360	610	(mg/L Na)
Sulfate	118	110	124	232.5	180	280	(mg/L SO <sub>4</sub> )
Total Dissolved Solids	550	470	550	2,475	1,600	3,100	(ppm)

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and chloride (the basic constituents of table salt), whereas the dominant ions at BSEP are sodium and bicarbonate (the basic constituents of bicarbonate of soda). This is relevant because table salt is more than three times as soluble as bicarbonate of soda, which indicates the water in the evaporation ponds at BSEP is expected to have lower TDS concentrations during operation than have been observed at Harper Lake SEGS (Table BR-14a).

*Selenium*

The selenium concentration in mean well water at Harper Lake SEGS is 0.00162 mg/L, which is approximately four times higher than the selenium concentration at BSEP of 0.00037 mg/L. Nevertheless, selenium concentrations as a fraction of the TDS concentrations are similar at both sites, which indicates that selenium concentrations in the evaporation ponds may be expected to be similar at both sites at equilibrium.

Evaporation Pond Water Quality

The risk to wildlife, specifically avian species, is related to the concentration of constituents in the evaporation pond water and not the source water or wastewater discharge into the ponds; therefore, analysis of wildlife risks focuses on pond water quality. The anticipated concentrations of TDS and selenium in the wastewater discharge to the evaporation ponds at BSEP have been calculated based on the source water chemistry and the use and treatment of the water at the facility. However, as explained above, information regarding anticipated concentrations of dissolved constituents in the BSEP evaporation ponds is based on Harper Lake SEGS data.

*Total Dissolved Solids*

The concentration of TDS in the wastewater discharge to the BSEP evaporation ponds is calculated to be 5,579 mg/L. As evaporation occurs, the concentration of TDS increases due to the loss of water and corresponding concentration of salts. Based on the source water chemistry at BSEP and Harper Lake SEGS, it is reasonable to assume that, without water level management, TDS concentrations in the evaporation ponds at BSEP will intrinsically be lower than the TDS concentrations observed at Harper Lake SEGS. Samples of evaporation pond water from the Harper Lake SEGS site have been collected and analyzed semiannually for various dissolved constituents since 1998. TDS concentrations associated with these samples range from approximately 94,000 to 270,000 mg/L, with a mean of approximately 164,000 mg/L (Table BR-14b). Average TDS concentrations (or the concentrations in composite samples) detected over time are plotted in Figure BR14-1. No seasonal trend in TDS concentrations is apparent; however, TDS concentrations appear to increase over time.



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**Table BR-14b**

Harper Lake Evaporation Pond Selenium and Total Dissolved Solids Concentrations  
Beacon Solar, LLC.

Date	Evaporation Pond Water Chemistry	
	Selenium (mg/L)	TDS (mg/L)
16-Mar-98	0.0383	94,333
25-Jun-98	0.0383	130,667
11-Sep-98	0.0320	103,667
10-Dec-98	0.0550	113,333
10-Jun-99	0.0523	134,667
1-Dec-99	0.0540	126,667
7-Jun-00	0.0220	130,000
30-Nov-00	0.0400	107,333
28-Nov-01	0.0380	124,333
5-Jun-02	0.0700	170,000
4-Dec-02	0.0387	119,667
12-Jun-03	0.0550	230,000
9-Dec-03	0.0660	180,000
8-Jun-04	<0.015	99,000
14-Dec-04	0.0150	180,000
30-May-05	0.0400	140,000
27-Dec-05	0.0150	230,000
9-Jun-06	<0.50	200,000
19-Dec-06	<0.050	230,000
23-May-07	0.0250	250,000
19-Dec-07	<0.01	250,000
14-Jun-08	<0.050	270,000
Mean Concentration <sup>1</sup>	0.0409	164,258

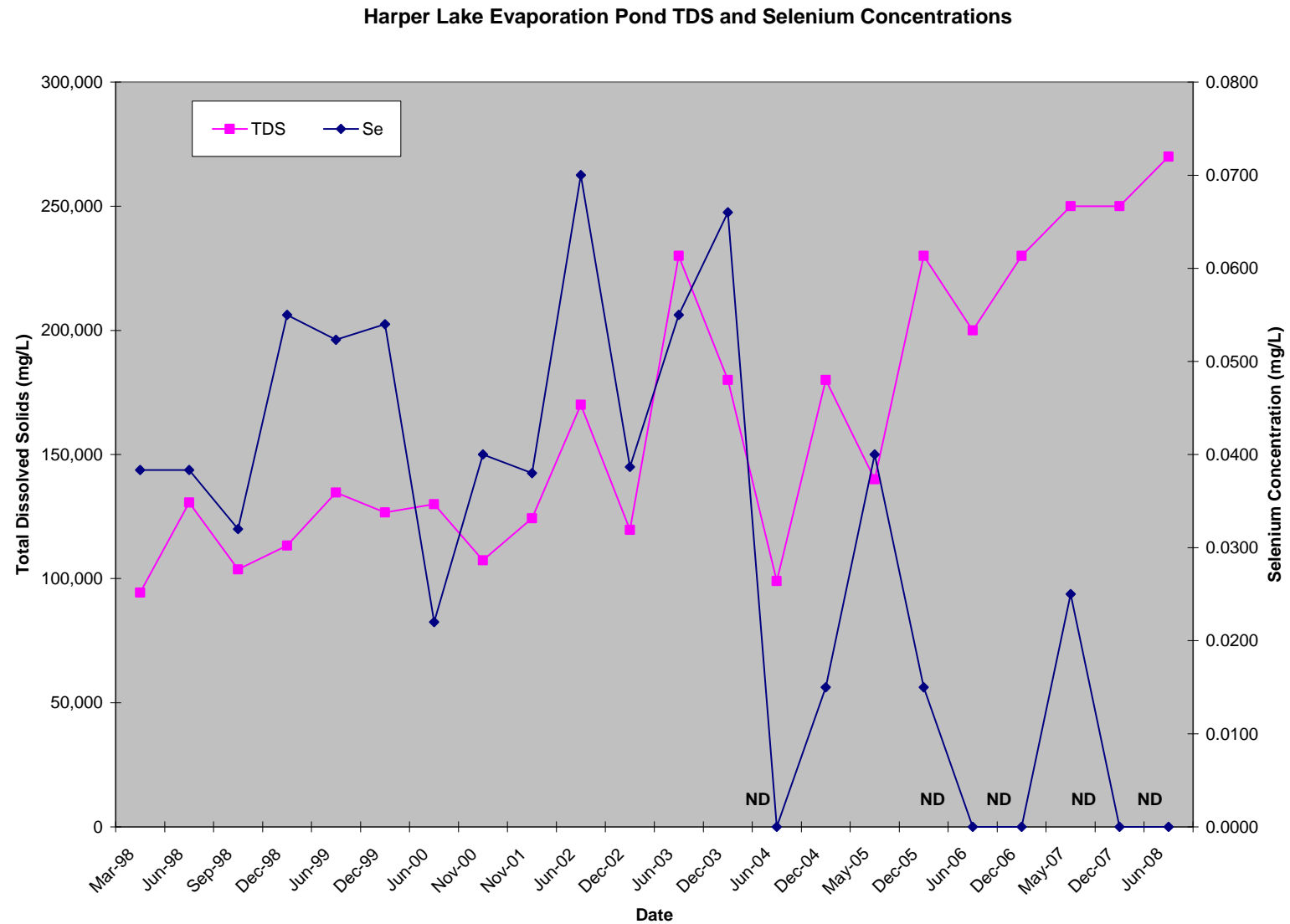
mg/L = milligrams per liter

TDS = Total Dissolved Solids

<sup>1</sup>Only results for samples in which selenium was detected are used in calculation of mean.



Figure BR14-1



ND = Not Detected





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### *Selenium*

The selenium concentration in the wastewater discharge to the BSEP evaporation ponds has been calculated to be 0.0028 mg/L. As evaporation occurs, the concentration of selenium increases due to the loss of water and corresponding concentration of metals. Samples of evaporation pond water at the Harper Lake SEGS site have been collected and analyzed semiannually for selenium since 1998. The detected selenium concentrations ranged from 0.0150 to 0.0700 mg/L, and the mean detected concentration was 0.0409 mg/L during the period of record (Table BR-14b). The concentrations detected during the first three quarterly sampling events were very similar, suggesting that dissolved selenium concentrations reached equilibrium concentrations relatively quickly. This indicates that selenium was being removed from solution by precipitation and/or sorption at equilibrium rates and that variations in selenium concentrations over time are likely related to changes in conditions that affect the precipitation and sorption equilibrium. Selenium solubility at neutral to alkaline pH tends to be dominated by sorption. No seasonal trend in selenium concentrations is apparent, and selenium and TDS concentrations overall do not appear to be consistently correlated (Figure BR14-1); however, increases in TDS concentrations since 2004 may be correlated with decreasing selenium concentrations during that time period. The data indicate that selenium under the Harper Lake SEGS pond operating conditions has remained consistently at or below 0.07 mg/L. BSEP evaporation ponds are assumed to have similar concentrations assuming equilibrium concentrations as discussed above.

### **Ecological Risk**

Potential ecological risk to avian species from the BSEP evaporation ponds may result from selenium through bioaccumulation of the metal through the food chain (ingestion exposure route) or from sodium by salt encrustation and/or ingestion resulting in salt toxicosis. Based on review of water quality data and Biological Resources Mitigation Implementation Plan (BRMIP) quarterly compliance reports from 2002–2008 for the Harper Lake SEGS site, bird mortalities have not been a routine occurrence and have been minimized by adapting pond management (i.e., raising water levels). Bird risks and issues identified at Harper Lake SEGS were considered in developing PDFs for the BSEP to minimize the potential for evaporation ponds to become a new subsidy for birds. In addition, the BSEP includes a pond management program that uses lessons learned from the Harper Lake SEGS experiences to further minimize the risk of impact to birds. Because the BSEP evaporation ponds will be operated in a manner similar to the Harper Lake SEGS site, and will have reasonably similar water quality to the Harper Lake SEGS ponds that assumes equilibrium concentrations (and likely lower concentrations over a longer time until equilibrium is reached due to lower source water concentrations) it is anticipated that impacts to avian species will be avoided. However, if potential impacts do occur, a monitoring program that uses adaptive management techniques will identify and avoid, minimize, and mitigate those impacts.

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Information on potential ecological risks from sodium (a major component of TDS) and selenium is presented below.

Total Dissolved Solids

Published ecological risk assessment studies have not focused on the biological toxicity associated with exposure to sodium or TDS, although it has been suggested that healthy birds or those that are acclimatized to hyper-saline conditions are able to adequately expel the excess salt via their salt glands (Woebser and Howard, 1987; USGS, 1999). A primary concern with increased avian hazards from exposure to hyper-saline conditions is associated with the formation and accumulation of salt crystals on the feathers of waterfowl, which impedes their ability to fly by weighing down the affected bird and potentially resulting in salt toxicosis (i.e., poisoning) (Woebser and Howard, 1987; Gordus et al., 2002). Evidence suggests that salinity levels are not the sole determining factor in the potential for salt encrustation on waterfowl. Studies have shown that the formation of salt crystals on hyper-saline ponds is often associated with water temperatures at or below 4 degrees Celsius (39 degrees Fahrenheit) (Woebser and Howard, 1987; Gordus et al., 2002). However, salt encrustation has also been observed in the deserts in August, when temperatures can be reasonable expected to be greater than 4 degrees Celsius.

Salt toxicosis via salt ingestion may also occur from overexposure to hyper-saline waters when alternative freshwater sources are unavailable or limited (i.e., during drought conditions) and birds become dependent on a hyper-saline water supply (Gordus et al., 2002). Based on the biological monitoring associated with the evaporation ponds at the Harper Lake SEGS, salt encrustation and salt toxicosis have been a rare occurrence there. BRMIP compliance reports identified an isolated event in August 2007 that was tied directly to high salinity levels in the evaporation pond, which fell to low water levels during that time. A second mortality incident was observed in October 2007; however, the cause was not determined. A recurrence has since been avoided with equalization of (i.e., increasing) the water levels in all evaporation ponds that are active at any given time.

The Harper Lake SEGS incident resulted in deaths to waterfowl by salt toxicosis and salt encrustation following very low water levels in one particular evaporation pond at SEGS VIII West during the 3<sup>rd</sup> quarter of 2007 (all bird mortalities resulting from salt toxicosis were found at the SEGS VIII West pond, with the exception of one bird found at the SEGS VIII East pond). In reviewing data from Regional Water Quality Control Board waste discharge reports for Harper Lake SEGS, the TDS concentration in composite samples collected from the evaporation ponds during this period was approximately 250,000 mg/L, based on the May and December 2007 semiannual sampling. It is therefore suspected that TDS concentrations in the SEGS VIII West pond would have been higher than 250,000 mg/L. The higher concentrations were thought to be caused by low water levels that resulted in a concentration of TDS to higher than normal levels (cover letter and Attachment 4 to the 2007 3<sup>rd</sup> Quarter

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BRMIP Compliance Report). The addition of water to the pond has appeared to correct the situation and no further bird deaths associated with the evaporation pond salinity levels occurred subsequent to the fall 2007 events.

Salinity or TDS numeric action levels have not been established by regulatory agencies for wildlife exposure, and conditions resulting in salt encrustation and toxicosis in birds appear to vary with different site characteristics. Defining specific TDS concentrations that result in bird mortalities or other impacts associated with salinity is therefore not feasible. Consequently, management programs should utilize PDFs to minimize the potential introduction or availability of new water subsidies and incorporate monitoring programs to evaluate site conditions and impacts, if any. The monitoring programs should consider site characteristics, including water levels, temperatures, and TDS concentrations, in addition to bird activity, when establishing management changes and triggers.

#### Selenium

A review of relevant literature, including selenium research at two similar solar energy project sites, Harper Lake SEGS and the Blythe Energy Project (BEP), indicates that there are two primary routes of exposure for selenium toxicity in avian species at evaporation ponds: through drinking water, and through aquatic invertebrate food sources. However, the primary indicator of toxicity in wildlife is through aquatic invertebrate food sources (Nagpal and Howell, 2001; FPL Energy Operating Services, Inc., 2000; U.S. Department of the Interior [DOI], 1998). In addition, literature reviewed has identified that ecological risk responses associated with selenium exposure in avian species are most typically defined by negative effects on egg viability and avian reproduction as opposed to direct mortality via ingestion of food sources with high selenium concentrations (Nagpal and Howell, 2001; FPL Energy Operating Services, Inc., 2000; DOI, 1998). It is also possible that impacts may include mortality (Lemly, 1977; DOI, 1998).

Although there is an acknowledged concern regarding selenium exposure and ecological risk, there are no current regulatory action levels for selenium exposure to wildlife that define ecological risk limits in the United States. Although water quality guidelines for selenium have been considered, water is not the primary exposure route for avian species and may not be the best representation of risk. According to the DOI report (1998), when water is the only exposure route, "[w]aterborne selenium, *per se*, is not very toxic to fish and wildlife" (DOI, 1998). It is therefore important to consider primary exposure routes (i.e., ingestion of food sources) when evaluating selenium toxicity.

It is also important to consider salinity concentrations when evaluating the effects of selenium on avian species. Salinity affects invertebrate populations and, therefore, is also an important consideration as it influences food source availability for foraging bird species and may affect

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selenium bioaccumulation in the food chain due to different accumulation rates in invertebrate food sources (FPL Energy Operating Services, Inc., 2000).

Due to such high variability associated with selenium concentrations and lack of observable adverse effects to waterfowl, a strict monitoring trigger based solely on water quality testing has been deemed inappropriate. Discussion of selenium toxicity therefore focuses on selenium in invertebrate food sources and this analysis focuses on studies conducted at similar solar energy facilities at Harper Lake SEGS and BEP that have involved monitoring and impact assessments.

*Harper Lake SEGS Study*

A study of avian feeding behavior and aquatic invertebrate populations was conducted from June 1998 to April 1999 to study the effects of selenium on shorebirds foraging at the evaporation ponds at Harper Lake SEGS (FPL Energy Operating Services, Inc., 2000). The study at Harper Lake SEGS evaluated potential adverse effects to avian species from selenium in food but did not evaluate the impacts of selenium on viability of avian eggs, since the birds were predominantly migratory and the local breeding and nesting activity for birds feeding at the ponds was not documented.

The most numerous groups of birds found using the Harper Lake SEGS evaporation ponds in the spring were the large shorebirds (e.g., American avocet and black-necked stilts) and in the summer were the small shorebirds (e.g., sandpipers and western snowy plovers). Fall and winter seasons displayed the lowest utilization of the ponds. Other species observed included waterfowl (e.g., grebes, northern shovelers, teals, mallards, gadwall, red heads, and phalaropes). Bird numbers at the ponds displayed two peaks; one in late winter/early spring and a second in late summer/early fall.

Birds that could be exposed to selenium in the evaporation ponds do not have a uniform tolerance to selenium. Ducks and coots appear to be most sensitive to selenium contamination, with black-necked stilts being moderately sensitive, and American avocets more tolerant (FPL Energy Operating Services, Inc., 2000). The study drew conclusions primarily upon data from the black-necked stilt due to the bird's intermediate sensitivity to selenium and its presence at the Harper Lake SEGS evaporation ponds. Similar projects have used the toxicity levels for the black-necked stilt as the standard for monitoring selenium levels.

Harper Lake SEGS evaporation ponds are similar to those that will be constructed at the BSEP Plant Site. Like Harper Lake SEGS, the BSEP is also located in a desert ecosystem and has the potential to attract similar shorebird and waterfowl migratory bird species. The Harper Lake SEGS, however, is located near an existing marsh that attracted bird species prior to construction of the evaporation ponds and is expected to attract greater numbers of

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birds than BSEP throughout the life of the project due to the proximity to this resource. The ponds at both sites serve as an essential part of the solar power generation process and are assumed to have similar equilibrium concentrations of selenium because selenium represents a similar fraction of TDS at both sites. Three separate ponds were the focus of the avian study at Harper Lake SEGS: Pond IX North, Pond VIII West, and Pond VIII East.

The three ponds ranged in salinity levels from 61 grams per liter (g/L) TDS in Pond IX North to 210 g/L TDS in Pond VIII East. The study found that differences in the food web organization of the ponds could be attributed to the differences in the levels of salinity; therefore, salinity levels affected pond use by shorebirds. The most frequented pond from January to May was Pond VIII East with an average salinity level of 167.5 g/L TDS and from June to December was Pond VIII West with an average salinity level of 90.5 g/L TDS. The least utilized pond throughout the study was Pond IX North with the lowest salinity levels (average of 73.5 g/L TDS). This correlation between salinity levels and pond use is likely due to prey availability associated with the different salinities, rather than directly to salinity concentrations in the ponds. Under lower salinity levels, the water boatman (*Trichocorixa reticulata*) were abundant and eliminated the planktonic filter-feeding brine shrimp (*Artemia franciscana*) and brine fly (*Ephydra gracilis*) larvae. In the high salinity pond, the water boatman could not survive and the brine shrimp were abundant. The moderate salinity level pond provided a balance between predator and prey in the invertebrate populations.

Both the water boatman and brine shrimp had evidence of selenium in their systems when tested, ranging from 0 to 15 milligrams per kilogram (mg/kg) dry weight (Table BR-14c). Selenium in brine flies was generally not detected. Although both water boatman and brine shrimp had evidence of selenium in their systems and in some cases exceeded the minimum thresholds considered by the study to have adverse impacts (Table BR-14d), they were not the primary invertebrate food source for the shorebirds. The primary food source at the ponds was identified as the brine fly. Levels of selenium were undetectable in brine fly in all but one sample, where it was very low. In addition, the study revealed no evidence of sick shorebirds. Therefore, the study concluded that algae treatment at the ponds was not recommended unless future monitoring provided evidence that birds were being negatively impacted by selenium concentrations. Treatment for algae could cause a shift in invertebrate dominance that would affect the food chain order. The results in the study also indicated that selenium-contaminated bird food sources at SEGS VIII and IX ponds was not chronic, not present in the main food item (flies), and probably not of sufficient magnitude to be toxic to birds or damaging to reproductive processes.

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**Table BR-14c**  
**Selenium Concentrations for Invertebrates from Harper Lake SEGS Evaporation Ponds**

<b>Invertebrate</b>	<b>Range mg/L</b>	<b>Mean mg/L</b>	<b>Detection Frequency*</b>
Brine Flies ( <i>Ephydra gracilis</i> )	0-2.4	0.2	1/12
Brine Shrimp ( <i>Artemia franciscana</i> )	0-15	6.7	2/3
Water Boatman ( <i>Trichocorixa reticulata</i> )	0-12	3.0	5/10

\* Samples collected on 9/1997, 6/1998, 8/1998, 12/1998, and 3/1999 from each of the three ponds for each of the primary invertebrate species as available (total samples possible = 18)

**Source:** FPL Energy Operating Services, Inc., 2000

**Table BR-14d**  
**Minimum Selenium Levels (mg/kg dry weight) Invertebrate Food Producing Adverse Effects on Avian Reproduction**

<b>Site*</b>	<b>Minimum Selenium in Diet Producing Adverse Effects</b>	<b>Selenium Range in Invertebrate Food Organisms</b>	<b>Avian Species Affected</b>
Tulare Basin	2.9	1-250	Black-necked stilts Ducks
Kesterson	Selenium in diet above minimum levels of adverse impact	20-110	Black-necked stilts Ducks American coots American avocets Eared grebes
Salton Sea	3.1	2-13	Black-necked stilts (low toxicity observed)

\* Select Case Studies from Southern California Saline Evaporation Ponds

**Source:** FPL Energy Operating Services, Inc., 2000

*Blythe Energy Project*

In a letter dated March 14, 2005, the CEC expressed concern that the evaporation ponds at the BEP, in Blythe, California, had exhibited excessive levels of selenium and sodium. In response, the potential for adverse effects to avian species at BEP was analyzed and a program was implemented to deter bird use of the ponds (Karl, 2005). Like the Harper Lake SEGS study, this analysis also suggested that the risk to bird species from selenium and

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sodium concentrations at the ponds was low. This conclusion was based on low bird usage of the ponds, primarily migratory versus resident populations, lack of observed bird mortalities, and the bird deterrent program.

### **Evaporation Pond Monitoring Program Recommendations**

Based on the Harper Lake SEGS and BSEP analyses, it can be concluded that selenium and TDS concentrations in water and selenium concentrations in invertebrate food sources are important components in evaluating selenium and salt toxicity to birds. The BSEP will include a monitoring program that incorporates monitoring of bird populations at the evaporation ponds and monitoring water quality in the ponds for both selenium and TDS. The monitoring program will consider the following factors:

- Selenium and TDS concentrations in evaporation pond water
- Pond water levels, temperature, and salinity
- Bird species utilizing the ponds
- Nesting activities at the ponds

If significant adverse effects to birds are observed during the evaporation pond monitoring, and those effects are determined to be the result of selenium or salt toxicity (by autopsy of deceased birds), additional monitoring may be needed to further assess impacts to bird species, including:

- Selenium concentrations in invertebrate populations
- Selenium concentrations in avian eggs collected at the site, if any
- Collection of additional water quality samples, analyzed for selenium or TDS

A detailed evaporation pond monitoring plan will be prepared for the BSEP and submitted for agency review and approval prior to construction. The key components of the monitoring program for the BSEP are summarized below.

#### Avian Monitoring

Avian monitoring at the evaporation ponds will be conducted by the BSEP Designated Biologist twice monthly for the first two years of project operation. The BSEP Environmental Compliance Monitor (ECM) will continue monitoring after the first two years, under the direction of the BSEP Designated Biologist, at least twice a month for the life of the project. The monitors (biologist or ECM) will identify bird species and/or functional groups (e.g., waterfowl, waders, shorebirds, upland shorebirds) utilizing the ponds, record the behavior of the birds (e.g., feeding, swimming, wading, nesting), and note any mortalities or physical infirmities (e.g., birth defects or reduced growth) associated with any bird observed on or adjacent to the evaporation ponds. Any dead bird that can be safely retrieved from the evaporation ponds will be collected by the biologist or ECM and sent to a qualified laboratory

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to determine if the mortality was directly related to selenium poisoning or salt toxicosis or encrustation. Documented mortality resulting from selenium poisoning or salt toxicosis or encrustation will result in corrective measures implemented in coordination with the agencies.

#### Water Quality Monitoring

Water quality in the evaporation ponds will be monitored quarterly for selenium and TDS with sampling conducted by the ECM or BSEP designated individual trained in water quality sampling and sample handling. Individual water samples will be taken from each pond. Should bird mortality occur, an additional water grab sample will be collected from the ponds for analysis at the time of discovery. Because water quality is difficult to tie directly to ecological risk by implementation of numeric standards, selenium and TDS concentrations will not trigger remedial action; however, the data will be collected to assess potential long-term correlations between water quality, as well as the pond water level, pond salinity, and temperature data discussed below, and bird behaviors and mortality, if any.

#### Pond Management

Each actively used evaporation pond will be outfitted with a level gauge for daily water level measurements, a hydrometer for daily salinity measurements, and a direct reading thermometer with the temperature data recorded at least diurnally. If the average overnight water temperature in the active evaporation ponds is at or below 4 degrees Celsius, the ECM will conduct a visual survey of the ponds immediately upon the following morning. If during inspection of the active ponds, the ECM observes evidence of recent substantive increases in salt crystallization anywhere within the pond (e.g., at or near the waterline), or if water levels in any of the ponds are observed to fall below a minimum depth of one foot (which could cause elevated levels of TDS), the ECM will route all of the wastewater into one or two ponds to increase the pond volume and lower the average salinity within the pond(s). At the same time, the remaining pond or ponds will be pumped dry. The pond to which the combined flow is discharged during this time will be rotated each year, periodically as needed, so that water levels do not rise too high and minimum freeboard requirements are met.

In the event that climatic conditions are such that evaporation must be increased to maintain pond levels below the freeboard limits, evaporative disposal nozzles (see for example <http://www.bete.com/applications/disposal.html>) will be used to increase wastewater evaporation rates.

In addition to managing the ponds to minimize bird usage, bird hazing measures will be implemented, as necessary, to deter birds from using the ponds. Potential hazing techniques include:



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- Initiate use of an air canon in order to haze waterfowl and frighten them away from the evaporation ponds. The air canon will be stored on site, but only used under this circumstance, since birds may become acclimated to the disturbance caused by air canon hazing, if used on a regular basis. The air canon will be used until the evaporation process is completed in the pond, or until the crystallized salts returned to solution.
- Deploy "Bird-B-Gone Balloon" (a visual scare device) or other hazing devices into the pond, to discourage waterfowl from landing on the pond.

### Reporting

At the conclusion of every operational year, the ECM will prepare a report for submittal to the CEC Compliance Project Manager, summarizing the results of the various tests and monitoring efforts, described as a part of the evaporation pond monitoring plan. The summary report will include copies of the water quality tests, a chronological listing of the overnight water temperatures, water levels and salinity measurements for the active evaporation ponds, and any results of necropsies performed on birds salvaged from in or around the ponds. Recommendations for changes to the monitoring program or pond management approach will be made, as warranted.

### **Summary**

Based on an analysis of water quality and bird use at similar facilities, the BSEP facility is not expected to result in significant impacts to birds from selenium or salts in the evaporation ponds. The BSEP will implement a monitoring program to further assess and monitor potential impacts and if impacts are identified, changes to the program may occur under the auspices of adaptive management for the biological compliance program.

### REFERENCES

FPL Energy Operating Services, Inc. (Prepared by Blood, Herbst, and Hattie), 2000. Avian Feeding Behavior and Aquatic Invertebrate Populations at the SEGS VIII and IX Project Area.

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<b>Technical Area: Cultural Resources</b> <span style="float: right;"><b>Response Date: October 13, 2008</b></span>

**Data Request 79:**

Please clarify the strategy that the applicant plans to use to conclude the evaluation of the California Register of Historical Resources (CRHR) eligibility of the 15 archeological sites (12 prehistoric lithic scatters and 3 historic refuse deposits) that the project apparently would not avoid and that are not presently undergoing evaluation.

**Response:**

The sites that are potentially being affected by BSEP, but are not slated for additional work as part of the evaluation field work, were assessed for significance based on archival research, and surface observations and documentation. These efforts are summarized in the Cultural Resources Evaluation Report prepared in support of the AFC and in response to CEC Data Request 32, and provided as Attachment DR-32. This report will be provided on or before October 23, 2008.

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**Data Request 80:**

Please provide a table of these resources, based on the information provided in (1) above, which includes the regulatory remedy proposed for each resource.

- a. Please indicate whether the applicant has been able to determine, subsequent to the filing of the AFC, that the project would avoid any of these resources.
- b. If not, please recommend the CRHR eligibility of archaeological sites that cannot be avoided, based on extant surface observations or a further round of field observation.
- c. Should the applicant conclude that more field data is needed to evaluate any of the 15 subject archaeological sites, please provide, for staff approval, proposals for any protocols that the applicant wishes to use to programmatically evaluate resource types, prior to the implementation of those protocols.

**Response:**

Please see Table DR-80 provided below.

- a. Subsequent to the filing of the AFC, BSEP has determined that they will avoid Sites 20, 21, 22, 23, 24, 25, 26, and 27 (Note there are additional sites that will be avoided as identified in the AFC).

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- b. For those sites that cannot be avoided, recommendations regarding CRHR eligibility are provided in the Cultural Resources Evaluation Report (provided as Attachment DR-32, which will be submitted on or before October 23, 2008) and Table DR-80.
- c. No additional field data are needed for evaluations at this time.

**Table DR-80  
Management Recommendations for Archaeological Sites Potentially Affected by BSEP**

<b>P-Number/ Trinomial or Temporary Number</b>	<b>Site Type</b>	<b>CRHR Recommendation</b>	<b>Project Component</b>	<b>Management Recommendation</b>
15-003366/ CA-KER-3366H	Southern Pacific Railroad	Potentially significant under Criterion 1 of CRHR	Plant site	Avoid
15-006415/ CA-KER-5264H	Debris scatter	Not eligible	Plant site	None
Site 3	Historic debris and lithic scatter	Not eligible	Transmission Line Option 2 (southern)	None
Site 6	Lithic scatter and refuse	Potentially significant under Criterion 4 of CRHR	Transmission Line Option 2 (southern)	Avoid
Site 8	Fire-affected rock	Eligible under Criterion 4 of CRHR	Plant site/ Rerouted wash	Avoid
Site 9	Fire-affected rock	Eligible under Criterion 4 of CRHR	Plant site/ Rerouted wash	Avoid or data recovery
Site 10	Camp	Not eligible	Plant site/ Rerouted wash	None
Site 11	Fire-affected rock	Eligible under Criterion 4 of CRHR	Plant site/ Rerouted wash	Avoid or data recovery
Site 12	Fire-affected rock	Eligible under Criterion 4 of CRHR	Plant site/ Rerouted wash	Avoid or data recovery

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<b>P-Number/ Trinomial or Temporary Number</b>	<b>Site Type</b>	<b>CRHR Recommendation</b>	<b>Project Component</b>	<b>Management Recommendation</b>
Site 13	Fire-affected rock	Eligible under Criterion 4 of CRHR	Plant site	Avoid or data recovery
Site 16	Refuse scatter	Not eligible	Plant Site	None
Site 17	Lithic scatter	Not eligible	Plant Site	None
Site 18	Lithic scatter	Not eligible	Plant Site	None
Site 19	Lithic scatter	Not eligible	Plant Site	None
Site 54	Lithic scatter	Potentially significant under Criterion 4 of CRHR	Transmission Line Option 1 (northern)	Avoid
Site 59	Trail	Not eligible	Transmission Line Option 2 (southern)	None
Site BSPL-H-1	Refuse scatter	Not eligible	Pipeline	None
Site BSPL-H-2	Foundation and refuse	Potentially significant under Criterion 4 of CRHR	Pipeline	Avoid

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<b>Technical Area: Socioeconomics</b>	<b>Response Date: October 13, 2008</b>

**Data Request 81:**

Please provide the amount of state and local taxes projected to be paid during the construction period.

**Response:**

The requested information was previously provided in the Beacon Solar Energy Project (BSEP) Application for Certification (AFC) submitted in March 2008 in Section 5.11.3.2 – Construction: Fiscal Resources (page 5.11-26). Below is a summary of the response:

Based on local construction expenditures of \$14.5 million, the sales tax generated for the State is estimated at \$0.9 million; Kern County operations would receive approximately \$109,000; and County Transportation Fund sales tax revenues are estimated at approximately \$36,000.

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**Data Request 82:**

Please provide the tax rate.

**Response:**

The requested information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.2 – Construction: Fiscal Resources (page 5.11-26). Below is a summary of the response:

The 7.25 percent Kern County sales tax rate is divided into 6.25 percent for the State; 0.75 percent for Kern County operations, and 0.25 percent goes to the Kern County Transportation Fund.

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**Data Request 83:**

Please provide an estimate of taxes projected to be paid for the life of plant and the tax rate on which the estimate was based.

**Response:**

The information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.3 – Operations: Fiscal Resources (page 5.11-28). Below is a summary of the response:

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Applying the Kern County sales tax rate of 7.25 percent, approximately \$435,000 would be generated annually in local sales tax as a direct result of the Project, or approximately \$8.7 million for the life of the project (until year 2030).

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**Data Request 84:**

Please provide the valuation year of dollars on which amounts are based or in constant dollars.

**Response:**

2006 dollars.

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**Data Request 85:**

Please provide the amount of indirect and induced revenues resulting from the operation of the plant over the life of the project.

**Response:**

The information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.3 – Operation: Employment (page 5.11-27). Below is a summary of the response:

For the purpose of the input-output model, the annual expenditures that would benefit local economies were assumed to be \$6 million annually; and this figure was used as an input into the model to predict employment and economic impacts.

The following information was not previously provided in the BSEP AFC:

Indirect Regional Revenues - \$649,000  
Induced Regional Revenues - \$950,000

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**Data Request 86:**

Please provide the amount of the gas franchise fee to be paid to SoCalGas during the operation of the project.

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**Response:**

The gas franchise fee is based on the following calculation:

Volume of gas used X Market price of gas (per therm) X 1.5%.

It is not possible to provide the exact gas franchise fee to be paid to SoCalGas during the operation of the project because of the varying cost and demand (volume) for gas to the project. However, in a hypothetical situation, if the plant plans to use 50 million cubic square feet per year (MMcf/yr), that is equivalent to (500,000 \* 1.03) therms/year or approximately 515,000 therms/year. With a current gas rate of 1.489 cents per therm<sup>1</sup>, an estimate of the annual gas franchise fee to be paid is:

515,000 therms X 1.489 cents X 1.5% = \$11,503

Over the 30 year expected operations phase, this would total \$345,090.

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**Data Request 87:**

Please provide the amount of the gas franchise fee surcharge.

**Response:**

The gas franchise fee surcharge is based on the following calculation:

Volume of gas used X Market price of gas (per therm) X 1.462%.

Similar to the response above, it is not possible to provide the exact gas franchise fee surcharge to be paid to SoCalGas during the operation of the project because of the varying cost and demand (volume) for gas to the project. However, in a hypothetical situation, if the power plant plans to use 50 million cubic square feet per year (MMcf/yr), that is equivalent to (500,000 \* 1.03) therms/year or approximately 515,000 therms/year. With a current gas rate of 1.489 cents per therm, an example of the gas franchise fee surcharge to be paid is:

515,000 therms X 1.489 cents X 1.462% = \$11,211

Over the 30 year expected operations phase, this would total \$336,330.

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<sup>1</sup> Southern California Gas, GT-3FT Tier II pricing, Oct. 1, 2008.



<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 81 - 92</b>
<b>Technical Area: Socioeconomics</b> <span style="float: right;"><b>Response Date: October 13, 2008</b></span>

**Data Request 88:**

Please provide the valuation year of dollars on which amounts are based or in constant dollars.

**Response:**

The above example calculations are based on 2008 dollars (pricing as of Oct. 1, 2008).

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**Data Request 89:**

Please provide the projected dollar amount of property tax without the exemption.

**Response:**

The information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.3 – Operations: Fiscal Resources (page 5.11-28). Below is a summary of the response:

At present, there is no property tax on solar components (mirrors, solar boiler, heat exchangers) improvements by law (Section 73 of the California Taxation and Revenue Code). Components included under the exemption include storage device, power conditioning equipment, transfer equipment, and parts. The proposed project property value is estimated at roughly \$1 Billion. After applying the California solar equipment property tax exemption, the taxable portion of the property value would be approximately \$40 Million. Assuming a Kern County rate of 1.1 percent, the beginning year (year 2010) property tax for the proposed project would be an estimated \$440,000.

The following information was not previously provided in the BSEP AFC:

The capital costs for the combined-cycle component of the Project are estimated at \$385 million to \$445 million (2008 dollars), and thus, using a Kern County tax rate of 1.1 percent, approximately \$4.24-\$4.90 million would be generated in property tax revenue.

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**Data Request 90:**

Please provide the tax rate.

**BEACON SOLAR ENERGY PROJECT (08-AFC-02)**  
**CEC STAFF DATA REQUEST NUMBERS 81 - 92**

**Technical Area: Socioeconomics**

**Response Date: October 13, 2008**

**Response:**

The information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.3 – Operations: Fiscal Resources (page 5.11-28). This section indicates that a Kern County rate of 1.1 percent was assumed.

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**Data Request 91:**

Please provide an estimate of taxes for the life of plant, tax rate on which the estimate is based, and valuation year of dollars or in constant dollars.

**Response:**

The information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.3 – Operations: Fiscal Resources (page 5.11-28). Below is a summary of the response:

Accounting for depreciation during the 20-year life of the project (through year 2030), (and assuming the salvage value would be 50 percent of present value after 20 years) the total property taxes which would be paid to Kern County during the operation phase (2010 to 2030) would be approximately \$630 million (all in 2006 dollars).

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**Data Request 92:**

Please provide the projected total amount of capital costs associated with this project.

**Response:**

The information was previously provided in the BSEP AFC submitted in March 2008 in Section 5.11.3.2 – Construction: Employment and Economy (page 5.11-24). Below is a summary of the response:

The following project expenditures were projected for capital costs associated with construction of the facility:

1. Total Craft Payroll - \$151,000,000
2. Total Staff Payroll - \$14,500,000
3. Local Expenditures - \$14,500,000
- Total \$180,000,000

<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 93 - 95</b>	
<b>Technical Area: Soils</b>	<b>Response Date: October 13, 2008</b>

**Data Request 93:**

As presented in the AFC, there is no outlet structure at the end of the channel to equally dissipate flows across the width at the channel mouth. Please explain and provide revised drawings, as needed, to show how the channelized flows would be converted to sheet flow at the channel outlet.

**Response:**

The drawings that were presented in the AFC have been revised to show the proposed outlet structure. Please see page S-8 of Data Response No. 45 and Attachment DR-45, sheets C1, C4, and C7, included in the Supplemental Data Request Responses submitted to the CEC on August 18, 2008. These sheets show the conceptual location and details of the outlet structure.

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**Data Request 94:**

On Figure C-4, the southern half of the "outlet" slopes toward the center of the channel, forcing flows to concentrate rather than dissipate. Please explain and provide revised drawings, as needed, to show how this proposed channel configuration returns channelized flow to sheet flow at the channel outlet.

**Response:**

The channel grades have been revised at the "outlet" to produce a sheet flow condition. Please see the revised sheet C4 included in Attachment DR-45 of the Supplemental Data Request Responses, submitted to the CEC on August 18, 2008.

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**Data Request 95:**

The right (eastern) bank of the artificial channel intercepts a natural swale that likely conveys water during wet periods. This artificial barrier would cause flows to accumulate, concentrate, and flow down the eastern edge of the structure. This condition would likely cause excessive erosion along the edge of the structure and deposition of sediment on the neighboring property. Please explain and provide revised drawings, as needed, to show what erosion/sedimentation control measures would be implemented in this area.

<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 93 - 95</b>
<b>Technical Area: Soils</b> <span style="float: right;"><b>Response Date: October 13, 2008</b></span>

**Response:**

The applicant does not believe that the re-aligned channel intercepts a natural swale. To the east of the re-aligned channel, from the 90 degree bend on the south east corner to the area where the channel begins to widen, is the property line of the Beacon site. The property line is located on a slight berm (not swale) and the expected runoff from the Beacon property will drain directly into the re-aligned channel. The expected runoff to the east of the Beacon property will continue along its current path of travel and drain into the "outlet" or transition area of the channel. Any expected runoff that drains to the small triangular area in the south east (located between the new channel and the property line in the SE corner) will drain into the channel at a location where rock slope protection exists, and no additional erosion control measures are proposed.

<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 96-127</b>	
<b>Technical Area: Water Resources</b>	<b>Response Date: October 13, 2008</b>

**Data Request 96:**

Please provide a map delineating the contemporary boundary between poor quality water (>1,000 ppm TDS) and high quality (<1, 000 ppm TDS) groundwater.

**Response:**

Figure 5.17-11 provided in the AFC shows the total dissolved solids (TDS) concentrations in groundwater samples collected between 1953 and 2007. This is a composite map of TDS data from a review of USGS and DWR records that was summarized in Table J.4-1 in Appendix J-4 of the AFC. The figure shows that TDS concentrations have generally remained stable over time.

In response to this data request, separate figures (Figures DR-96a, DR-96b and DR-96c) were prepared showing available TDS data for the period of between 1953 to 1958, 1976 to 1978, and 1999 to 2007. These figures provide a time series of TDS concentrations within the Koehn Sub-basin. The periods were selected to show the most data over the widest geographic area within the sub-basin. The figures show that the most groundwater samples were collected during the period from 1953 to 1958 (i.e., 70 wells sampled), and that during subsequent periods, sampling was conducted in about one half the wells by comparison to the prior period. The data for these figures were taken from the geochemical database provided in Table J.4-1 of the AFC, and are summarized in Tables DR-96a (1953-1958), DR-96b (1976-1978) and DR-96c (1999-2007) attached.

Using a TDS concentration of 1,000 milligrams per liter (mg/L), the data for each of these time frames were contoured to show the distribution between poor and high water quality. As shown from the available data, the water quality has not varied significantly over time. Groundwater samples from wells located southwest of the lake, and in the direction of the Project site have consistently had TDS concentrations reported below 1,000 mg/L. Groundwater samples collected from wells between the Rand Mountains, south of the lake, and the El Paso Mountains, north of the lake, have had concentrations above 1,000 mg/L. There are few wells in these areas and those located north and south of the lake are generally situated at the margins of the lake or on the alluvial fans between strands of the Garlock Fault and Randsburg-Mojave Fault and Koehn Lake.

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**Data Request 97:**

Please provide a map showing the locations of the wells described in Data Response #58.

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<b>Technical Area: Water Resources</b>	<b>Response Date: October 13, 2008</b>

**Response:**

Please see Figure DR-97 attached. This figure has been annotated to show township and range grids for the Koehn Sub-basin. In the response to Data Request No. 58, wells were referred in their corresponding township and range. Wells within Township 30 South and Range 38 East and Sections 21, 22, 23, 27, 28, 29, 32, 33 and 34 are located southwest of Koehn Lake, between the lake and the project site. These sections are at the southwestern margin and southwest of Koehn Lake. Groundwater samples from these wells have historically contained TDS concentrations below 1,000 mg/L, as shown on Figures DR-96a through DR-96c.

In addition, the response to Data Request No. 58 (submitted July 18, 2008) indicated groundwater samples from wells Township 30 South, Range 38 East, Sections 3, 4, and 5 and 24, had historically contained TDS concentrations above 1,000 mg/L. These sections are located north and south of the lake. Groundwater samples from wells in these sections have historically contained TDS concentrations above 1,000 mg/L.

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**Data Request 98:**

Please revise all figures and tables to show source of well construction details (e.g., field verification, written documentation, or Mr. Switzer's recollection).

**Response:**

The information provided by Mr. Switzer was not from recollection. What he provided was a figure from a prior study at the property which was in the possession of Mr. Switzer. Figure 4, "Fremont Valley Ranch, Groundwater Well Map", is attached for reference. This information was provided to ENSR as part of the Phase I ESA as referenced in the AFC (i.e., Switzer 2007).

The following figures from the AFC have been revised in response to this request are attached:

- Figure 5-17.6 – Site Map Showing Wells on the Project Site
- Figure 5-16.7 – Cone of Depression at the End of the Well No. 63 Pumping Test
- Figure 5-17.8 – Cone of Depression at the End of the Well No. 48 Pumping Test
- Figure 5-17.9 – Cone of Depression at the End of the Well No. 43 Pumping Test
- Figure 5-17.10 – Post-pumping Test Water Level Contour Map (October 2007)
- Figure J.3-2 – Pumping Test Well Nos. 43, 48 and 63
- Figure J.3-5 – Cone of Depression at the End of the Well No. 43 Pumping Test
- Figure J.3-6 – Cone of Depression at the End of the Well No. 48 Pumping Test
- Figure J.3-7 – Cone of Depression at the End of the Well No. 63 Pumping Test

<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 96-127</b>
<b>Technical Area: Water Resources</b> <span style="float: right;"><b>Response Date: October 13, 2008</b></span>

- Appendix J-1, Table J.1-2, Plant Site Well Details
- Appendix J-3, Table J.3-1, Plant Site Well Details

AFC Table 5-17.5 (Well Completion Data for Water Supply Wells on the Plant Site), contained the information requested and was not modified. Figures 5.17-6 through 5.17-10 have been updated, referencing Table 5-17.5 and the well completion details therein, and the sources of information for the well details. Pumping test Figures J.3-5 through J.3-7 have been updated, referencing Table J.3-1 and the well completion details therein, and the sources of information for the well details.

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**Data Request 99:**

Please revise and provide to staff Figure 5.17-8 to represent actual measured conditions. In areas where there is no data to support the interpretation, please indicate by using appropriate symbols.

**Response:**

All figures associated with the pumping test program (Figures 5-17.7, 5-17.8 and 5-17.9) have been revised as requested to reflect the appropriate uncertainty for the interpretation of drawdown for each pumping test. These figures follow the format of Figure 5-17.10, and have been annotated to show the drawdown for each of the observation and the pumping wells at the end of the test prior to the pump being shut off. Table J.3-5 from Appendix J.3-5 of the AFC contains the data for the water levels used to construct these figures and is provided below.



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**Table J.3-5 Summary of Drawdown at the End of the Constant Rate Discharge Test**

Well name	Saturated <sup>1</sup> Thickness October 2007	Discharge Rate (gpm)	Static Water Level (ft)	Water level at end of pumping test (ft)	Drawdown at end of pumping test (ft)	Drawdown at end of recovery test (ft)	Percent Recovery
<b>Pumping Well 63</b>							
Well 63	1427	2000	313.03	341.26	28.23	1.26	95.5
OB Well 42	246		357.08	357.07	NO RESPONSE		
OB Well 44	288		316.370	323.620	7.250	2.740	62.2
OB Well 45b	--		297.760	298.677	0.917	0.437	52.3%
OB Well 49	500		329.90	6.174	6.174	0.549	91.1%
<b>Pumping Well 48</b>							
Well 48	409	1770	404.10	474.27	70.17	0.42	99.4%
OB Well 41	241		358.80	360.73	1.93	0.17	91.4%
OB Well 42	246		356.62	356.64	NO RESPONSE		
OB Well 47	372		437.70	440.46	2.76	2.01	27.2%
OB Well 49	500		328.76	329.17	0.41	0.07	81.9%
<b>Pumping Well 43</b>							
Well 43	619	2000	245.45	453.87	208.42	9.89	95.3%
OB Well 46	610		209.13	210.17	1.04	1.02	1.7%
OB Well 50	647		256.27	257.12	0.85	NO RESPONSE	
OB Well USGS	--		285.38	297.75	12.37	8.76	29.8%

Notes:

<sup>1</sup> – Saturated thickness based on water level measurements taken in October 2007. Saturated thickness is the distance between the water table and the bottom of the well.

Key:

ft = Feet

gpm = gallons per minute

OB – Observation well

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**Data Request 100:**

Please revise and provide to staff the corresponding sections in the AFC to describe actual measured groundwater conditions.

**Response:**

The discussion regarding water level measurements is provided in Section 5.17.2.6 "Aquifer Properties", beginning on page 5.17-15 and ending on page 5.17-18. Information regarding the "actual measured groundwater conditions", was provided in Appendix J-1, Table J.1-2, "Plant Site Well Details" and in Appendix J-3, Table J.3-1, "Plant Site Well Details". These tables are attached in partial fulfillment of this data request.

Water level data collected at the end of the pumping test programs prior to the pumps being shutoff were provided in Table J.3-5, "Summary of Water Level Data at the End of the Constant Rate Discharge Test". This table was provided in response to Data Request No. 99 above.

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**Data Request 101:**

Please clarify the extent of the evaluation of offsite wells located north and east across the Cantil Fault to reflect the actual information collected in that area during the pumping test and the statistical support for the applicant's conclusions regarding the hydrogeologic conditions in that area.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 102:**

Please revise and provide to staff the figures pertinent to this data request to reflect the information collected during the site specific tests. Where the interpretation uses assumptions based on previous investigators' basin-wide evaluations, please identify those assumptions separately.

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**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 103:**

Please explain how hydrographs collected from wells located on both sides of the Cantil Fault are similar, given the assumption that the fault is a barrier to groundwater movement.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 104:**

The purpose statement for the groundwater-flow model indicates potential impacts were developed by “superimposing” project pumping on to the calibrated flow model. Please explain whether the calibrated flow model was formally converted to a superposition model. If so, please provide the details describing the conversion. If not, please provide the details documenting the selection of simulated recharge, pumping, and specified-fluxes for the 30-year projection.

**Response:**

The model did not use superposition to compute drawdown. Rather, the projected pumping rates for each well on the Beacon site were added to the steady state model. The model was then run for 30 years to determine the impact from the proposed pumping.

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**Data Request 105:**

Please provide the complete citation for the following reference: Konikow (1978). It is missing from Section 6.0 (References) of Appendix J.2

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**Response:**

Konikow, L.F., 1978. Calibration of groundwater models, in Proceedings of the Specialty Conferences on Verification of Mathematical and Physical Models in Hydraulic Engineering, College Park, Maryland, August 9-11, 1978.

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**Data Request 106:**

Please provide a map showing locations of the model calibration targets (the well locations reported in Table 4.2).

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 107:**

Please provide a map that overlays and compares observed (Figure 3.2) and simulated (Figure 4.6) 1958 groundwater level contours. Figure 4.6 is titled "observed vs. simulated 1958", but there is only one set of contours and the figure does not identify which set is shown (i.e., observed or simulated).

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 108:**

Please provide a map that overlays and compares observed (Figure 3.4) and simulated 1976 groundwater level contours.

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**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 109:**

Please provide a map that overlays and compares observed (Figure 5.17-3) and simulated 2007 groundwater level contours.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 110:**

For Figures 5.17-3, 5.17-7, 5.17-8, 5.17-9:

- a. Please identify how contours were prepared.
- b. Please post the values contoured.
- c. Please query the contours as appropriate to show where data is lacking and/or assumptions were made in selecting the shape of the contours (i.e., faults assumed to act as partial barriers to flow). (See Figure 5.17-10 as an example of a contour map that more adequately considers data limitations and uncertainty.)

**Response:**

Please see response to Data Request No. 99 above. The figures have been revised to reflect the appropriate uncertainty and annotated to provide the water level data from which the contouring was completed. They have been prepared in the manner of Figure 5.17-10.

Regarding Figure 5.17-3, available data were posted for water levels collected from 2007. This figure was created with limited available water level data from 13 wells within the Koehn Sub-basin. Information was not available in sufficient density to draw the contours in consideration of

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the faulting that are reported to be barriers to groundwater flow within the basin. As such, contouring was done without this consideration of the condition to provide a general understanding of groundwater flow within the Koehn Sub-basin.

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**Data Request 111:**

Please clarify the ambiguity between the discussions of the two basins.

**Response:**

From the AFC (page 5.17-12),

“As a part of the South Lahonton Hydrologic Region, the Fremont Valley Groundwater Basin is divided into six sub-basins: California City (which contains a portion of the linears associated with the Project), Koehn (which includes the plant site), Chaffee, Gloster, Oak Creek, and Willow Springs (Figure 5.17-1). The sub-basins are typically separated by faults that form partial, and in some cases, complete barriers to groundwater movement (Bloyd 1967, Koehler 1977, Saint-Armand 1991).”

The Koehn Sub-basin is a subset of the larger Fremont Valley Groundwater Basin. The Fremont Valley Groundwater Basin and the associated sub-basins are shown on Figure 5.17-1. The numerical groundwater model encompassed the Koehn Sub-basin.

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**Data Request 112:**

Please provide documentation of the specific data sources and calculations used to develop all simulated volumetric water budget components specified in the groundwater model.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 113:**

Please provide MODFLOW files\* for:

- a. The model calibration run (1958 steady-state calibration);
- b. The model "verification" run (1958-2007 simulation period); and
- c. The two predictive impact assessments (1,600 AFY of continuous pumping for 30 years, and 5-month construction period pumping).

\*Note: In order to keep the file size manageable, the binary heads and cell-by-cell flow files are not needed for review at this time.

**Response:**

The modeling files are provided on the CD that has been provided with this response to CEC Staff Data Requests, Set 2.

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**Data Request 114:**

Please provide a sensitivity analysis for the model that includes the plausible ranges for aquifer parameters, recharge, and pumpage, summarized in a tabular format.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 115:**

Based on the sensitivity analysis, please report the magnitude of change in the simulated impacts.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call,

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applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 116:**

Please explain why evaporation from shallow groundwater beneath Koehn Lake is not explicitly simulated in the model.

**Response:**

Koehn Lake was simulated as a drain rather than with evapo-transpiration (ET) to keep the model stable. The ultimate effect of a drain is the same as ET. If the water level rises to a certain level, water is extracted. Below that level, water is not extracted. The only difference between using ET and a drain is the linear relationship between the water table surface and depth to water. However, since Koehn Lake does have standing surface water, water will only flow into the lake if the head in the aquifer is above the lake level. In reality then, this water balance acts more like a drain than ET. In addition, the USGS model of the Death Valley flow system also simulated all playa lakes as drains instead of ET.

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**Data Request 117:**

Please provide the simulated volumetric budget for all budget components.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 118:**

Please clarify and provide justification for the above discrepancies between simulated and observed conditions.



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**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 119:**

Please provide plots comparing observed and simulated water levels for the data locations reported in Table 4.3.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 120:**

Please provide the geologic data, analysis, and interpretation required to justify the simulated hydraulic conductivity distribution.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 121:**

Please provide hydrographs for additional wells. The number and distribution of wells should encompass as much of the geographic area represented by the model as possible.

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**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 122:**

Because recharge and/or pumpage were “changed” in the “verification” run in order to match between observed and simulated groundwater levels, please provide a comparison, using either tables or figures, of estimated and “changed” recharge and pumpage values over the 1958-2007 simulation period.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 123:**

Please provide the simulated volumetric budget and compare to previously estimated flow components. Because it is a transient model run, and simulates the period 1958 through 2007, average, annual flow rates will suffice.

**Response:**

Beacon Solar arranged a conference call on October 7, 2008 to discuss this request with CEC staff to gain a better understanding of the information needed. As a result of the conference call, applicant requests additional time to provide a response. A response to this data request will be provided by October 23, 2008.

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**Data Request 124:**

Please identify the origin of the proposed evaporation pond dilution water.

**BEACON SOLAR ENERGY PROJECT (08-AFC-02)**  
**CEC STAFF DATA REQUEST NUMBERS 96-127**

**Technical Area: Water Resources**

**Response Date: October 13, 2008**

**Response:**

Through the majority of the year, wastewater will be discharged to each of the three ponds at an equal rate, but during the months when evaporation significantly exceeds discharge and water levels drop below 1 foot, or if the rate of salt crystallization is observed to increase significantly, all of the wastewater will be routed to one or two of the ponds and the water remaining in the inactive pond(s) will be pumped to the active pond(s). As such, the wastewater flow will be used to dilute the water in the active evaporation ponds and maintain minimum water levels. Dilution therefore will consist of management of the existing wastewater flow, not of the addition of water from a new source. Additional information on this wastewater management strategy is provided in response to Biological Resources Data Request No. 74.

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**Data Request 125:**

Please describe the quality of the water proposed to dilute the evaporation ponds.

**Response:**

Dilution will be accomplished by management of the existing wastewater flow. No additional water will be added from any new source. A table summarizing the quality of the wastewater discharged to the evaporation ponds is presented below. (Note that this table updates and corrects the information presented in Tables 5.17.4 and 5.17.34 in the AFC. The tables in the AFC contained a spreadsheet error that has been corrected in the attached table. The concentration values are only slightly different, and do not affect our evaluation of evaporation pond water quality or management.)

<b>Table DR-125. Revised Predicted Chemistry of BSEP Wastewater Streams</b>					
<b>Constituent</b>	<b>Mean Well Water</b>	<b>Cooling Tower Blow Down</b>	<b>Ion Exchange Regeneration Wastewater</b>	<b>Evaporation Pond Discharge</b>	<b>Units</b>
Calcium (total)	47	70.5	517	330	(mg/L Ca)
Magnesium (total)	11	16.5	121	77	(mg/L Mg)
Sodium (total)	78	117.0	858	548	(mg/L Na)
Potassium (total)	4.1	6.150	45	29	(mg/L K)
Iron (total)	0.047	0.071	0.517	0.33	(mg/L Fe)
Ammonia	0.038	0.057	0.418	0.27	(as N)

**BEACON SOLAR ENERGY PROJECT (08-AFC-02)**  
**CEC STAFF DATA REQUEST NUMBERS 96-127**

Technical Area: Water Resources

Response Date: October 13, 2008

**Table DR-125. Revised Predicted Chemistry of BSEP Wastewater Streams**

Constituent	Mean Well Water	Cooling Tower Blow Down	Ion Exchange Regeneration Wastewater	Evaporation Pond Discharge	Units
Aluminum (total)	0.023	0.035	0.253	0.16	(mg/L Al)
Zinc (total)	0.012	0.018	0.132	0.08	(mg/L Zn)
Boron (total)	0.18	0.270	1.980	1.26	(mg/L B)
Chloride	15.5	23.3	171	109	(mg/L Cl)
Sulfate	118	177.0	1298	829	(mg/L SO <sub>4</sub> )
Nitrate	1.183	1.775	13.013	8.3	(mg/L as NO <sub>3</sub> )
M-Alkalinity	207	29.97	0	12.54	(mg/L as CaCO <sub>3</sub> )
HCO <sub>3</sub> (bicarbonate alkalinity)	257	37.23	0	15.57	(mg/L HCO <sub>3</sub> )
Fluoride	0.459	0.689	5.049	3.2	(mg/L as F)
Cyanide (total)	0.007	0.011	0.077	0.049	(mg/L as HCN)
Silica	33.3	49.95	366	234	(mg/L as SiO <sub>2</sub> )
Silicon	15.7	23.550	173	110	(mg/L as Si)
Phosphate (total)	0.019	0.029	0.209	0.13	(mg/L as PO <sub>4</sub> )
Phosphorous (total as P)	ND	0.000	0	0.00	(mg/L)
Arsenic (total)	0.0035	0.005	0.039	0.025	(mg/L As)
Strontium (total)	0.78	1.175	8.580	5.5	(mg/L Sr)
Selenium (total)	0.00039	0.0006	0.0043	0.0027	(mg/L Se)
pH	8.00	7.70	6 – 9	6 - 9	pH
Suspended Solids	0	0	0	----	(mg/L)
Total Dissolved Solids	550	1590	8447	5579	(ppm)

<b>BEACON SOLAR ENERGY PROJECT (08-AFC-02)</b> <b>CEC STAFF DATA REQUEST NUMBERS 96-127</b>
<b>Technical Area: Water Resources</b> <span style="float: right;"><b>Response Date: October 13, 2008</b></span>

**Data Request 126:**

Please provide an estimate of the volume of water required to adequately dilute the evaporation ponds.

**Response:**

Dilution will be accomplished by management of the existing wastewater flow. Therefore, the volume of water discharged to the pond system will not change. The division of flow among the ponds will be adjusted as needed to meet the objectives of maintaining a minimum pond depth of 1 foot and inhibiting active salt encrustation at or near the pond surface. In practice, the division of flow among the ponds will be determined by climatic conditions.

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**Data Request 127:**

Please revise the water budget description and diagram to include the use of water to dilute the evaporation ponds.

**Response:**

Dilution will be accomplished by management of the existing wastewater flow. No additional water will be added from any new source. Therefore, it is not necessary to revise the water budget description.

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## **Data Request 96**

### **Figures and Tables**

Figure DR-96a TDS Concentrations 1953-1958

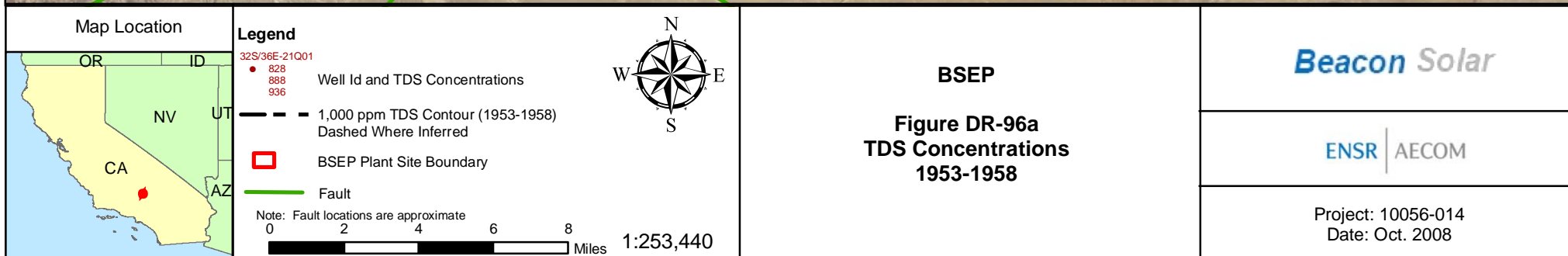
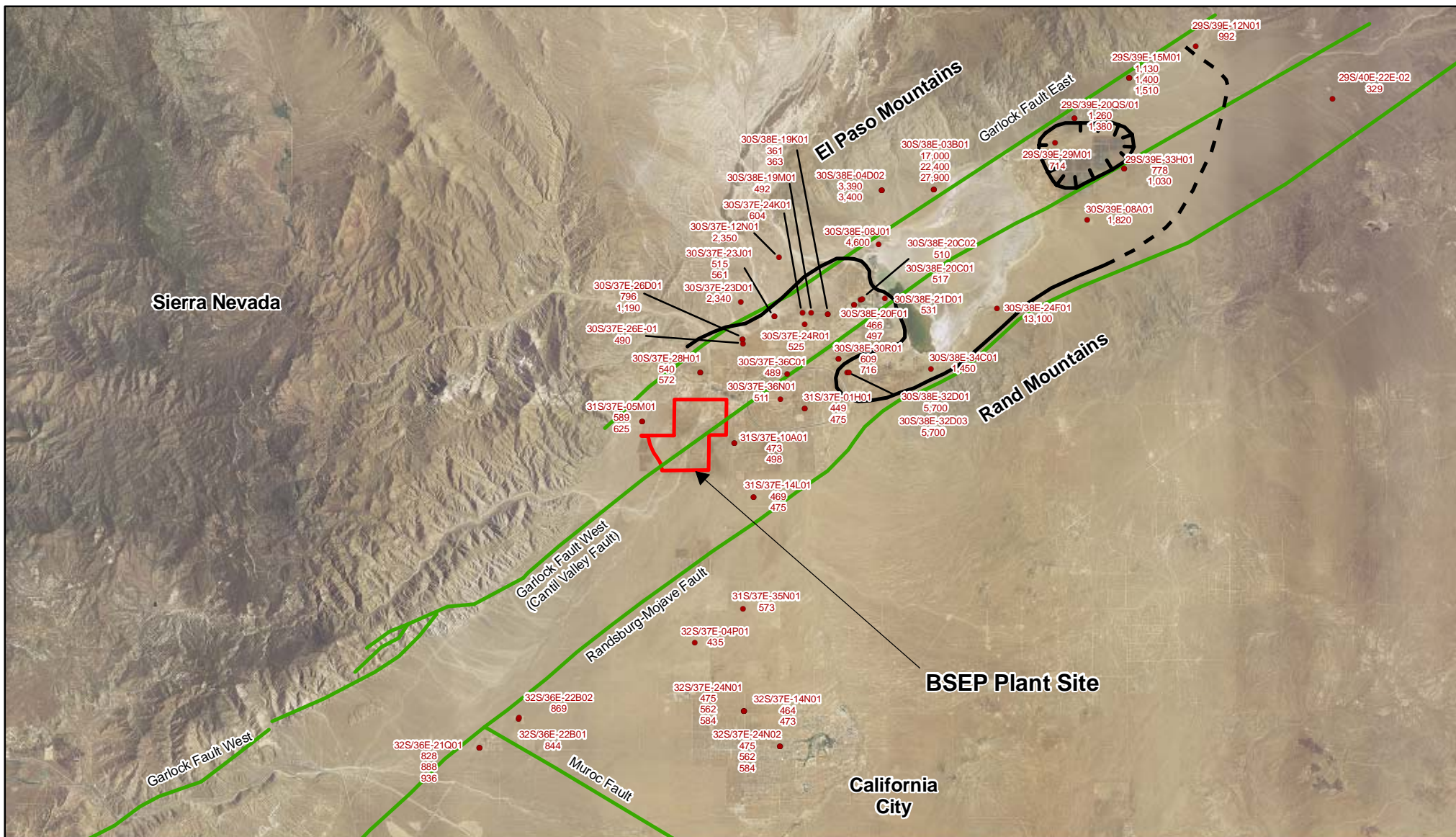
Figure DR-96b TDS Concentrations 1976-1978

Figure DR-96c TDS Concentrations 1999-2007

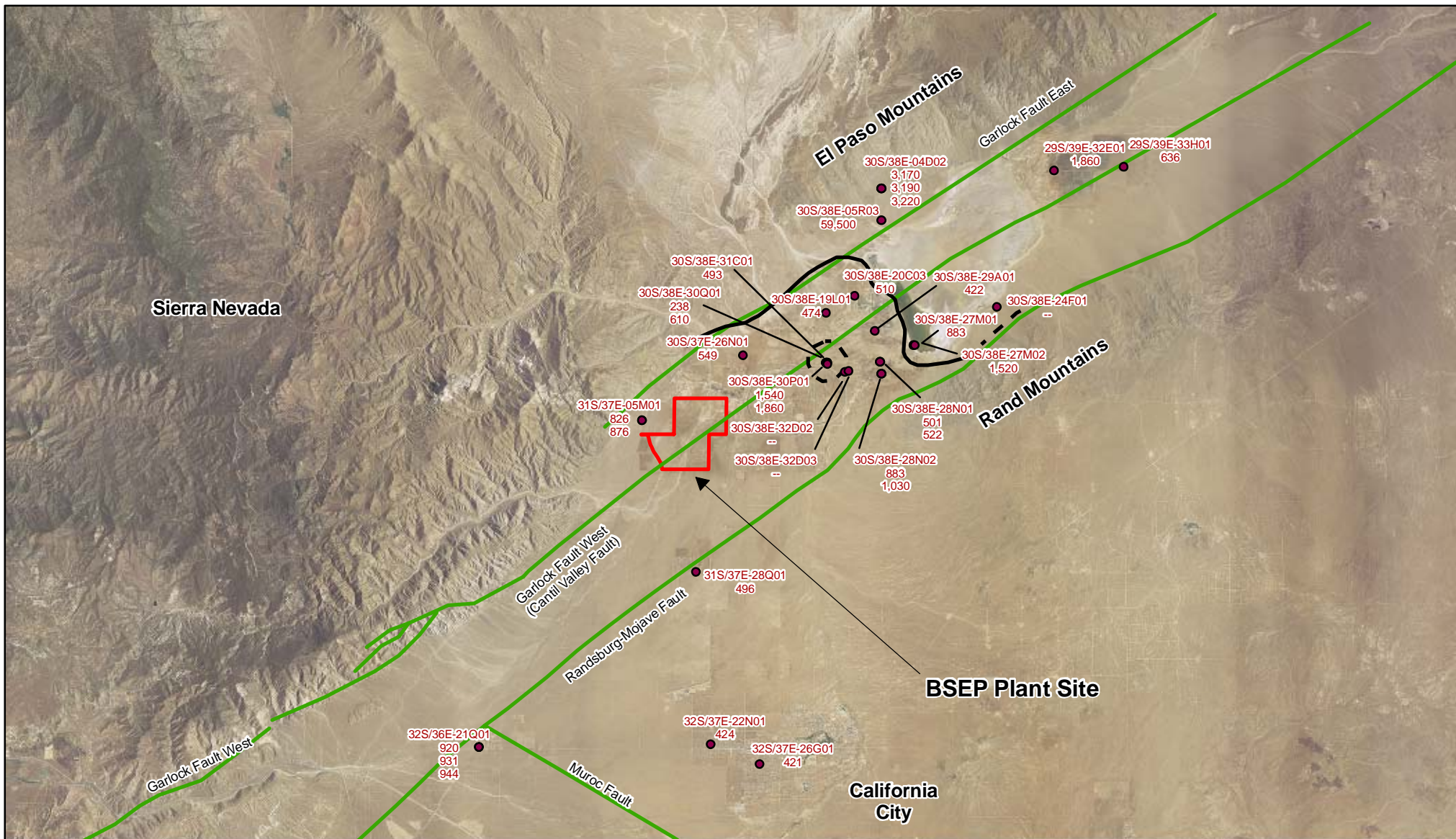
Table DR-96a Geochemical Database 1953-1958

Table DR-96b Geochemical Database 1976-1978

Table DR-96c Geochemical Database 1999-2007

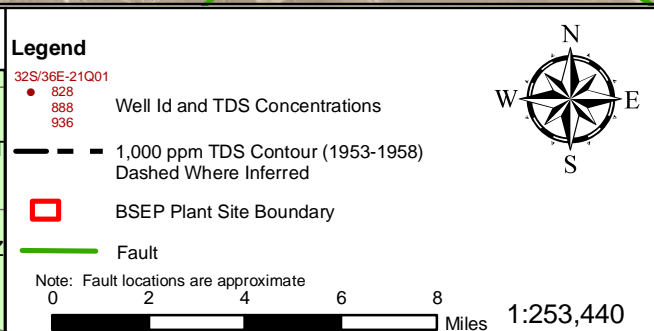
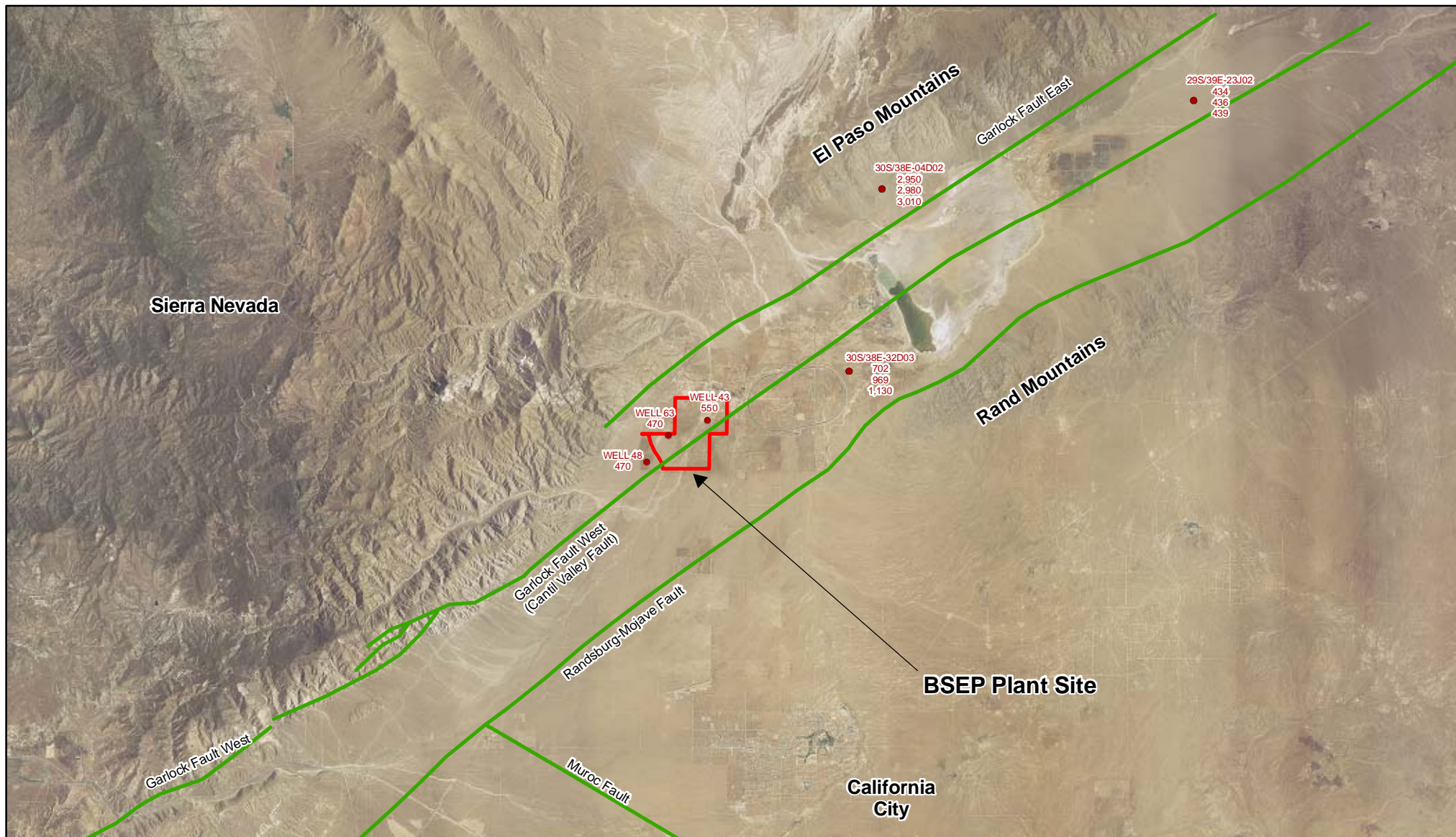






<p><b>Map Location</b></p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li>32S/36E-21Q01</li> <li>920</li> <li>931</li> <li>944</li> </ul> <p>Well Id and TDS Concentrations</p> <p>--- 1,000 ppm TDS Contour (1953-1958) Dashed Where Inferred</p> <p>□ BSEP Plant Site Boundary</p> <p>— Fault</p> <p>Note: Fault locations are approximate</p> <p>0 2 4 6 8 Miles</p> <p>1:253,440</p>	<p><b>BSEP</b></p> <p><b>Figure DR-96b</b></p> <p><b>TDS Concentrations</b></p> <p><b>1976 - 1978</b></p>	<p><b>Beacon Solar</b></p> <hr/> <p><b>ENSR   AECOM</b></p> <hr/> <p>Project: 10056-014 Date: Oct. 2008</p>
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**BSEP**

**Figure DR-96c**  
**TDS Concentrations**  
**1999 -2007**

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
Date: Oct. 2008

TABLE DR-96a  
GEOCHEMICAL DATABASE  
1953-1958  
BEACON SOLAR ENERGY PROJECT  
KERN COUNTY, CALIFORNIA

WELL DATA <sup>1,2</sup>			WATER CHEMISTRY																				
STATE WELL NUMBER (DWR)	LATITUDE	LONGTUDE	Sample Date	Temperature	pH	Total Dissolved Solids (TDS)	Silica	Calcium	Magnesium	Sodium	Potassium	Alkalinity		Sulfate	Chloride	Fluoride	Nitrate and Nitrite (as N)	Nitrate (NO3)	Arsenic	Boron	Iron	Manganese	Hardness (CaCO3)
	NAD 27	NAD 27	Yr-Mo	Degrees Centigrade	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Bicarbonate	Carbonate										
29S/40E-22E02	35°23'54"	117°40'57"	1955-08	--	7.5	329	--	8	2	115	2	165	ND	79	39	0.6	--	2.2	--	0.38	--	--	329
29S/39E-12N01	35°25'07"	117°45'16"	1955-09	--	7.4	992	--	74	60	143	7.3	302	ND	432	25	0.7	--	7.6	--	0.71	--	--	432
29S/39E-15M01	35°24'26"	117°47'12"	1953-06	--	8.4	1,400		79	117	182	11	216	4	782	50	0.7	--	3.7	--	0.60	--	--	679
29S/39E-15M01	35°24'26"	117°47'12"	1957-07	--	8.0	1,510	20	144	102	184	13	ND	ND	810	260	0.4	--	ND	--	0.75	--	--	782
29S/39E-15M01	35°24'26"	117°47'12"	1958-09	--	8.2	1,130	31	82	91	110	7.2	256	ND	576	20	0.6	--	4.1	--	0.42	--	--	579
29S/39E-20QS01	--	--	1953-03	--	8.2	1,260	34	95	96	160	4	298	--	698	24	0.5	--	1.0	--	0.90	--	--	632
29S/39E-20QS01	--	--	1954-01	--	8.0	1,380	--	97	99	160	7.3	298	ND	724	23	0.6	--	ND	--	0.21	--	--	650
29S/39E-29M01	35°22'48"	117°49'29"	1953-04	--	7.7	714	4	50	37	141	9	227	--	138	187	0.8	--	5.0	--	1.30	--	--	277
29S/39E-29N01	35°22'32"	117°49'28"	1955-08	--	8.3	739	--	49	53	132	12	285	17	225	100	1.0	--	8.4	--	1.60	--	--	340
29S/39E-29N01	35°22'32"	117°49'28"	1957-07	--	7.9	759	34	48	38	174	8	235	ND	104	230	1.2	--	3.7	--	2.20	--	--	276
29S/39E-33H01	35°22'09"	117°47'22"	1955-08	26.0	7.9	1,030	--	47	36	160	0.8	146	ND	74	305	0.2	--	6.9	--	1.00	--	--	270
29S/39E-33H01	35°22'09"	117°47'22"	1958-09	--	8.5	778	36	51	30	170	6.7	134	14	88	284	ND	--	5.2	--	0.56	--	--	250
30S/37E-12N01	35°19'55"	117°57'58"	1953-10	--	8.2	2,350	54	53	3.2	734	6	196	--	934	427	8.0	--	2.0	--	0.033	--	--	146
30S/37E-23D01	35°18'48"	117°59'08"	1953-03	--	7.5	2,340	30	164	4	602	4	102	ND	999	480	4.0	--	0.7	--	1.80	--	--	426
30S/37E-23J01	35°18'26"	117°58'06"	1955-08	--	8.3	515	--	66	12	102	2.6	256	2	156	42	0.8	--	3.9	--	1.70	--	--	214
30S/37E-23J01	35°18'26"	117°58'06"	1957-07	--	7.8	561	27	64	16	106	3.5	281	ND	155	43	1.5	--	4.7	--	2.00	--	--	226
30S/37E-24K01	35°18'32"	117°57'14"	1953-05	--	7.7	604	50	71	7	113	4	275	--	174	44	1.6	--	2.0	--	2.8	--	--	206
30S/37E-24R01	35°18'14"	117°57'10"	1953-03	--	7.5	525	40	66	19	80	2.6	294	--	135	32	1.6	--	2.5	--	1	--	--	243
30S/37E-26D01	35°17'52"	117°59'05"	1953-06	--	7.6	1,190	--	164	55	1,170	4.5	454	ND	382	133	0.5	--	52	--	0.70	--	--	636
30S/37E-26D01	35°17'52"	117°59'05"	1955-08	--	8.0	796	31	56	39	146	4.4	206	ND	290	96	0.5	--	32	--	0.48	--	--	300
30S/37E-26E01	35°17'45"	117°59'04"	1953-03	--	7.6	490	26	67	21	78	3	315	--	109	26	0.7	--	3.7	--	0.6	--	--	490
30S/37E-28H01	35°17'01"	118°00'22"	1955-07	--	7.7	540	--	70	34	75	2	305	ND	164	32	0.9	--	11.0	--	0.48	--	--	315
30S/37E-28H01	35°17'01"	118°00'22"	1958-09	--	7.8	572	23	71	31	84	1	322	ND	158	36	0.5	--	8.0	--	0.40	--	--	305
30S/37E-36C01	--	--	1953-03	--	7.7	489	40	57	16	82	4	176	--	121	80	0.4	--	0.6	--	0.7	--	--	208
30S/37E-36N01	35°16'21"	117°57'55"	1953-03	--	7.7	511	31	58	15	89	5	156	--	128	103	0.2	--	3.5	--	1	--	--	206
30S/38E-03B01	35°21'37"	117°53'12"	1955-04	--	7.7	27,900	--	268	180	10,000	52	372	ND	2,610	14,600	1.2	--	ND	--	28	--	--	493
30S/38E-03B01	35°21'37"	117°53'12"	1957-07	--	7.4	22,400	33	224	120	8,100	78	342	ND	2,110	11,500	1.8	--	ND	--	28	--	--	1,410
30S/38E-03B01	35°21'37"	117°53'12"	1958-09	--	7.4	17,000	8	210	95	5,980	52	204	ND	1,570	8,970	0.9	--	11.0	--	20	--	--	1,050
30S/38E-04D02	35°21'36"	117°54'51"	1953-10	--	7.8	--	65	148	30	653	10	123	--	1,100	501	2.4	--	1.5	--	20	--	--	4,270
30S/38E-04D02	35°21'36"	117°54'51"	1955-08	--	7.9	3,390	--	167	39	940	30	107	ND	1,150	975	2.5	--	ND	--	18	--	--	578
30S/38E-04D02	35°21'36"	117°54'51"	1957-07	--	7.6	3,400	34	154	39	918	15	108	ND	1,120	910	2.4	--	ND	--	16	--	--	545
30S/38E-08J01	35°20'15"	117°54'54"	1953-05	--	7.6	4,600	75	59	14	1,630	14	263	--	535	2,130	1.6	--	5.0	--	2.60	--	--	205
30S/38E-19K01	35°18'30"	117°56'28"	1955-08	--	8.2	361	--	35	8	86	5	219	ND	66	51	0.8	--	0.7	--	0.25	--	--	120
30S/38E-19K01	35°18'30"	117°56'28"	1957-07	26.0	7.9	363	--	36	9	84	4	244	ND	28	53	1.2	--	2.0	--	0.35	--	--	127
30S/38E-19M01	35°18'32"	117°56'58"	1953-05	--	7.7	492	40	68	14	77	2	284	--	122	26	1.6	--	1.3	--	0.40	--	--	227
30S/38E-20C01	35°18'52"	117°55'24"	1953-03	--	7.9	517	39	69	13	84	6	300	--	122	33	0.8	--	0.7	--	1.10	--	--	226
30S/38E-20C02	35°18'51"	117°55'27"	1953-05	--	8.1	510	49	60	10	105	5	355		85	28	0.9	--	0.3	--	0.80	--	--	191
30S/38E-20F01	35°18'44"	117°55'39"	1955-12	--	7.7	466	--	70	11	82	4	308	ND	117	28	1.1	--	1.1	--	0.24	--	--	220
30S/38E-20F01	35°18'44"	117°55'39"	1957-07	22.0	8.0	497	26	65	11	92	5	322	ND	109	28	2.2	--	ND	--	0.25	--	--	208

**TABLE DR-96a**  
**GEOCHEMICAL DATABASE**  
**1953-1958**  
**BEACON SOLAR ENERGY PROJECT**  
**KERN COUNTY, CALIFORNIA**

WELL DATA <sup>1,2</sup>			WATER CHEMISTRY																				
STATE WELL NUMBER (DWR)	LATITUDE	LONGITUDE	Sample Date	Temperature	pH	Total Dissolved Solids (TDS)	Silica	Calcium	Magnesium	Sodium	Potassium	Alkalinity		Sulfate	Chloride	Fluoride	Nitrate and Nitrite (as N)	Nitrate (NO3)	Arsenic	Boron	Iron	Manganese	Hardness (CaCO3)
	NAD 27	NAD 27	Yr-Mo	Degrees Centigrade	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Bicarbonate	Carbonate										
30S/38E-21D01	35°18'33"	117°54'42"	1953-05	--	7.6	531	75	67	17	70	7	253	--	134	33	1.6	--	1.5	--	0.15	--	--	237
30S/38E-24F01	35°16'21"	117°57'55"	1953-05	--	7.9	13,100	--	1,650	36	3,190	36	61	ND	844	7,250	3.2	--	5.0	--	51	--	--	915
30S/38E-30R01	35°17'22"	117°56'08"	1955-08	--	8.1	609	24	53	45	89	5	142	ND	150	170	0.4	--	2.5	--	0.26	--	--	318
30S/38E-30R01	35°17'22"	117°56'08"	1957-07	--	8.2	716	19	100	30	98	4	172	ND	163	215	1.4	--	ND	--	0.35	--	--	373
30S/38E-32D01	35°17'01"	117°55'52"	1953-05	--	7.3	5,700	30	837	370	589	10	155	ND	1,660	2,120	0.4	--	5.0	--	3.00	--	--	3,610
30S/38E-32D03	35°17'01"	117°55'52"	1953-05	--	7.3	5,700	30	837	370	589	10	155	ND	1,660	2,120	0.4	--	5.0	--	3.00	--	--	3,610
30S/38E-34C01	35°17'07"	117°53'17"	1953-05	--	7.6	1,450	20	355	10	78	4	107	ND	834	92	0.4	--	3.0	--	0.85	--	--	927
30S/39E-08A01	35°20'15"	117°48'30"	1953-05	--	7.6	1,820	3	145	36	463	13	151	--	303	778	0.4	--	5.0	--	4.60	--	--	510
31S/37E-01H01	35°16'07"	117°57'10"	1955-09	--	8.2	449	--	62	14	75	3.9	146	ND	136	81	0.2	--	4.6	--	0.33	--	--	212
31S/37E-01H01	35°16'07"	117°57'10"	1957-08	--	8.2	475	20	55	17	81	4.2	146	ND	135	85	0.3	--	5.3	--	0.21	--	--	207
31S/37E-05M01	35°14'49"	118°02'20"	1955-07	24.0	7.7	589	--	43	34	108	4.4	232	ND	240	38	0.7	--	6.0	--	1.20	--	--	247
31S/37E-05M01	35°14'49"	118°02'20	1958-09	24.6	7.9	625	24	67	16	117	0.7	224	ND	240	42	0.5	--	6.5	--	0.90	--	--	233
31S/37E-10A01	35°15'15"	117°59'20"	1955-08	27.0	8.2	473		63	12	81	4.7	151	ND	159	73	0.2	--	5.6	--	0.43	--	--	207
31S/37E-10A01	35°15'15"	117°59'20"	1957-07	27.0	8.1	498	23	52	19	90	4.6	151	ND	149	80	0.3	--	6.2	--	0.32	--	--	208
31S/37E-14L01	35°13'54"	117°58'44"	1953-03	--	7.6	475	26	62	14	79	4	164	--	119	88	0.1	--	1.0	--	0.80	--	--	212
31S/37E-14L01	35°13'54"	117°58'44"	1955-07	--	8.4	469		65	16	80	4.3	151	2	126	96	0.3	--	4.7	--	0.38	--	--	228
31S/37E-35N01	35°11'04"	117°59'04"	1953-03	--	7.9	573	30	62	14	112	3	129	--	123	158	0.3	--	2.9	--	1.00	--	--	212
32S/36E-21Q01	35°07'33"	118°07'08"	1953-06	--	8.0	888	--	20	63	196	7	342	ND	371	49	0.2	--	12.0	--	2.0	--	--	310
32S/36E-21Q01	35°07'33"	118°07'08"	1955-07	--	7.8	828	--	55	28	188	6.8	322	ND	375	48	0.5	--	4.5	--	2.4	--	--	250
32S/36E-21Q01	35°07'33"	118°07'08"	1957-07	--	7.5	936	20	82	30	191	7.4	363	ND	370	49	0.6	--	4.9	--	2.0	--	--	330
32S/36E-22B01	35°08'17"	118°05'56"	1955-07	--	8.4	844	--	124	38	102	5.9	217	3	393	59	0.3	--	9.9	--	1.7	--	--	470
32S/36E-22B02	35°08'18"	118°05'56"	1957-07	--	7.8	869	21	109	41	115	6.9	227	ND	391	63	0.2	--	8.3	--	1.8	--	--	440
32S/36E-22N01	35°07'33"	118°06'33"	1955-07	28.0	8.2	805	--	31	51.0	160	6.8	205	7	372	49	0.8	--	5.0	--	2.67	--	--	205
32S/37E-04P01	35°10'12"	118°00'32"	1955-07	--	8.3	435	--	48	12	91	3.9	192	ND	104	76	0.3	--	4.8	--	0.48	--	--	169
32S/37E-14N01	35°08'29"	117°59'02"	1953-03	--	7.9	473	26	29	7	125	4	218	--	93	79	0.9	--	1.0	--	1.30	--	--	101
32S/37E-14N01	35°08'29"	117°59'02"	1955-07	--	8.4	464	--	30	8	132	3.2	210	3	98	82	0.9	--	3.8	--	0.58	--	--	108
32S/37E-24N01	35°07'43"	117°57'57"	1953-03	27.0	7.8	562	27	44	15	136	2	218	ND	113	114	0.7	--	2.0	--	1.20	--	--	170
32S/37E-24N01	35°07'43"	117°57'57"	1955-07	--	8.0	584	--	40	13	140	3.8	183	ND	168	121	0.7	--	5.9	--	1.20	--	--	150
32S/37E-24N01	35°07'43"	117°57'57"	1957-07	27.0	8.4	475	22	22	7	137	3.5	183	18	91	80	1.8	--	2.6	--	0.32	--	--	84
32S/37E-24N02	35°07'35"	117°57'56"	1953-03	--	7.8	562	27	44	15	136	2	218		113	114	0.7	--	2.0	--	1.20	--	--	172
32S/37E-24N02	35°07'35"	117°57'56"	1955-07	--	8.0	584		40	13	140	3.8	183	ND	168	121	0.7	--	5.9	--	1.2	--	--	153
32S/37E-24N02	35°07'35"	117°57'56"	1957-07	--	8.4	475	22	22	7	137	3.5	183	18	91	80	1.8	--	2.6	--	0.32	--	--	84
<div>NOTES</div> <div>1 Data as provided in the USGS National Water Information System Database (Kern County) - <a href="http://nwis.waterdata.usgs.gov/">http://nwis.waterdata.usgs.gov/</a> and the Department of Water Resources Database and Related publications.</div> <div>2 See figure DR-96a for well locations within Kohen Subbasin.</div> <div>DEFINITIONS</div> <div>NAD-27 Noath AemERICAN Datum 1927</div> <div>mg/L Miligram per liter</div> <div>-- Data not provided or available in USGS or DWR database.</div>																							

**TABLE DR-96b  
GEOCHEMICAL DATABASE  
1976-1978  
BEACON SOLAR ENERGY PROJECT  
KERN COUNTY, CALIFORNIA**

WELL DATA <sup>1,2</sup>			WATER CHEMISTRY																				
STATE WELL NUMBER (DWR)	LATITUDE	LONGTUDE	Sample Date	Temperature	pH	Total Dissolved Solids (TDS)	Silica	Calcium	Magnesium	Sodium	Potassium	Alkalinity		Sulfate	Chloride	Fluoride	Nitrate and Nitrite (as N)	Nitrate (NO3)	Arsenic	Boron	Iron	Manganese	Hardness (CaCO3)
	NAD 27	NAD 27	Yr-Mo	Degrees Centigrade	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L										
29S/39E-29N01	35°22'32"	117°49'28"	1976-01	--	--	626	39	39	41	100	7.5	227	--	200	74	0.8	2.8	--	0.003	0.65	<0.10	--	270
29S/39E-32E01	35°22'04"	117°49'30"	1978-06	29.0	6.9	1,860	76	230	140	200	12	190	ND	420	670	0.5	4.2	--	--	1.1	0.21	--	1,200
29S/39E-33H01	35°22'09"	117°47'22"	1978-06	31.0	7.4	636	32	42	23	150	7	170	ND	80	210	0.2	1.6	--	--	0.77	0.04	--	200
30S/37E-26N01	35°17'25"	117°59'03"	1976-01	--	7.7	549	25	77	17	88	3	--	ND	130	63	0.9	--	0.1	--	0.41	--	--	21
30S/38E-03B03	35°21'32"	117°53'13"	1976-01	--	--	68,800	48	670	210	25,000	180	864	--	5,200	37,000	0.4	0.4	--	0.003	63	0.17	--	2,500
30S/38E-04D02	35°21'36"	117°54'51"	1976-05	--	7.2	3,190	41	150	30	860	13	109	ND	12,300	810	2.3	0.34	--	--	21	<0.010	--	500
30S/38E-04D02	35°21'36"	117°54'51"	1977-08	--	7.9	3,220	44	160	30	900	14	100	ND	1,100	900	2.2	--	1.6	--	22	0.24	--	520
30S/38E-04D02	35°21'36"	117°54'51"	1978-06	--	7.4	3,170	61	150	31	900	15	110	ND	1,100	840	2.2	0.33	--	--	22	0.03	--	500
30S/38E-05R03	35°20'49"	117°54'51"	1976-01	--	--	59,500	30	12	8.4	22,000	97	1,120	--	6,700	30,000	2.8	0.15	--	0.052	58	0.11	--	65
30S/38E-18H01	35°19'38"	117°56'10"	1976-01	--	8.1	561	70	68	13	99	8.4	173	ND	130	82	0.5	1.0	--	0.004	0.77	0.02	--	220
30S/38E-19L01	35°18'29"	117°56'30"	1976-01	--	8.1	474	27	65	12	80	2.8	305	ND	110	25	1.0	0.16	--	0.003	0.32	<0.010	--	210
30S/38E-20C03	35°18'55"	117°55'37"	1976-01	--	--	510	47	773	9.7	85	6	308	--	100	34	1.1	0.35	--	0.008	0.46	<0.01	--	220
30S/38E-24F01	35°16'21"	117°57'55"	1976-02	--	7.6	--	8.7	1,200	80	4,000	43	70	ND	--	9,200	3.7	0.03	--	0.001	79	0.03	--	3,300
30S/38E-27M01	35°17'40"	117°53'50"	1976-02	--	8.7	883	8.5	4.6	1.4	340	5.6	638	ND	110	86	6.1	0.67	--	0.200	2.30	0.66	--	17
30S/38E-27M02	35°17'40"	117°53'50"	1976-02	--	8.7	1,520	7.9	4.0	0.7	580	8.4	589	ND	180	380	5.1	0.02	--	0.020	2.80	0.23	--	13
30S/38E-28N01	35°17'15"	117°54'51"	1976-02	--	8.1	501	30	67	13	76	4.6	162	ND	130	98	0.4	0.33	--	0.006	0.43	<0.01	--	220
30S/38E-28N01	35°17'15"	117°54'51"	1978-06	22.5	7.7	522	33	75	15	84	5.6	200	ND	110	100	0.4	0.09	--	--	0.41	0.04	--	250
30S/38E-28N02	35°17'15"	117°54'51"	1976-02	--	8.7	883	24	290	39	120	8.5	638	ND	670	170	0.6	0.31	--	0.004	0.5	<0.1	--	880
30S/38E-28N02	35°17'15"	117°54'51"	1978-06	24.0	7.6	1,030	26	150	43	130	7	150	ND	390	210	0.4	0.1	--	--	0.55	0.07	--	550
30S/38E-29A01	35°18'02"	117°55'00"	1978-06	23.5	7.8	422	28	38	11	92	5.0	210	ND	100	42	1.0	0.19	--	--	0.42	,0.01	--	140
30S/38E-30P01	35°17'14"	117°56'30"	1976-01	--	7.6	1,860	25	330	95	160	7.8	122	ND	560	620	0.4	0.14	--	0.0	0.44	<0.1	--	1,200
30S/38E-30P01	35°17'14"	117°56'30"	1976-04	--	8.1	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	--	0.81	0.72	--
30S/38E-30P01	35°17'14"	117°56'30"	1978-06	21.5	7.4	1,540	26	340	110	180	8.5	130	ND	380	430	0.3	0.10	--	--	0.40	0.18	--	1,300
30S/38E-30Q01	35°17'14"	117°56'28"	1976-02	--	8.8	610	3.0	45	10	140	23	175	ND	220	76	0.3	1.3	--	0.002	0.68	0.06	--	150
30S/38E-30Q01	35°17'14"	117°56'28"	1978-06	20.5	8.5	238	8.3	26	6.1	50	6.7	150	3	57	6.0	0.4	0.0	--	--	0.21	0.02	--	90
30S/38E-31C01	35°17'12"	117°56'28"	1978-06	25.0	7.7	493	29	69	15	78	5	130	ND	120	110	0.3	0.54	--	--	0.29	<0.10	--	230
30S/38E-32D02	35°17'00"	117°55'55"	1976-04	--	7.5	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.001	--	0.06	0.64	--
30S/38E-32D03	35°17'01"	117°55'52"	1976-04	--	7.5	--	--	--	--	--	--	--	--	--	--	--	--	--	0.004	--	<0.010	<0.010	--
31S/37E-04J01	35°15'48"	118°00'16"	1978-06	27.5	7.5	410	32	49	10	70	4.1	200	ND	130	16	0.5	--	--	--	0.17	<0.010	--	160
31S/37E-05M01	35°14'49"	118°02'20"	1977-08	34.5	7.6	876	32	71	23	190	6.3	320	ND	340	52	0.7	--	3.7	--	2.90	ND	--	270
31S/37E-05M01	35°14'49"	118°02'20"	1978-06	31.0	7.3	826	34	57	22	200	6.2	350	ND	280	48	0.7	0.63	--	--	2.90	0.03	--	230
31S/37E-05M02	35°15'45"	118°02'11"	1976-05	--	7.1	995	30	110	33	170	6.4	290	ND	430	68	0.6	0.33	--	--	2.8	0.02	--	410
31S/37E-08D01	35°15'18"	118°02'13"	1976-01	--	8.0	566	29	72	23	90	4.4	309	ND	150	29	0.8	3.3	--	0.002	0.35	<0.010	--	270
31S/37E-28Q01	35°11'58"	118°00'30"	1976-01	--	7.8	496	28	59	11	92	4.4	176	ND	110	99	0.4	1.1	--	0.001	0.51	0.02	--	190
32S/36E-21Q01	35°07'33"	118°07'08"	1976-05	--	7.0	944	27	883	83	190	7.2	352	ND	380	47	0.4	1.4	--	--	2.2	<0.010	--	320
32S/36E-21Q01	35°07'33"	118°07'08"	1977-08	28.0	7.5	920	27	86	86	190	7.2	350	ND	370	44	0.4	--	6.2	--	2.2	ND	--	330
32S/36E-21Q01	35°07'33"	118°07'08"	1978-06	28.0	7.3	931	28	92	92	190	7.6	350	ND	360	44	0.4	1.4	--	--	2.2	<0.010	--	350
32S/37E-22N01	35°07'37"	118°00'03"	1978-12	--	7.7	424	--	17	5.6	1135	2.3	210	ND	85	69.4	1.4	--	4.4	<0.010	--	--	<0.010	66
32S/37E-26G01	35°07'07"	117°58'33"	1978-12	--	7.7	421	--	16	5.6	135	2.3	216	ND	83	68.3	1.5	--	3.1	--	--	<0.01	--	63
32S/37E-26M10	35°06'23"	117°59'04"	1977-08	26.5	7.8	480	26	23	6	140	3	240	ND	90	72	1.4	--	2.0	--	0.40	<0.01	--	82
32S/37E-26M11	35°06'23"	117°59'04"	1978-06	27.0	7.7	481	26	11	6.1	150	3	240	ND	91	72	1.5	0.46	--	--	0.42	<0.01	--	53
<div>NOTES</div> <div>1 Data as provided in the USGS National Water Information System Database (Kern County) - <a href="http://nwis.waterdata.usgs.gov/">http://nwis.waterdata.usgs.gov/</a> and the Department of Water Resources Database and Related publications.</div> <div>2 See figure DR-96b for well locations within Kohen Subbasin.</div> <div>DEFINITIONS</div> <div>NAD-27 Noath American Datum 1927</div> <div>mg/L miligram per liter</div> <div>-- Data not provided or available in USGS or DWR database.</div>																							

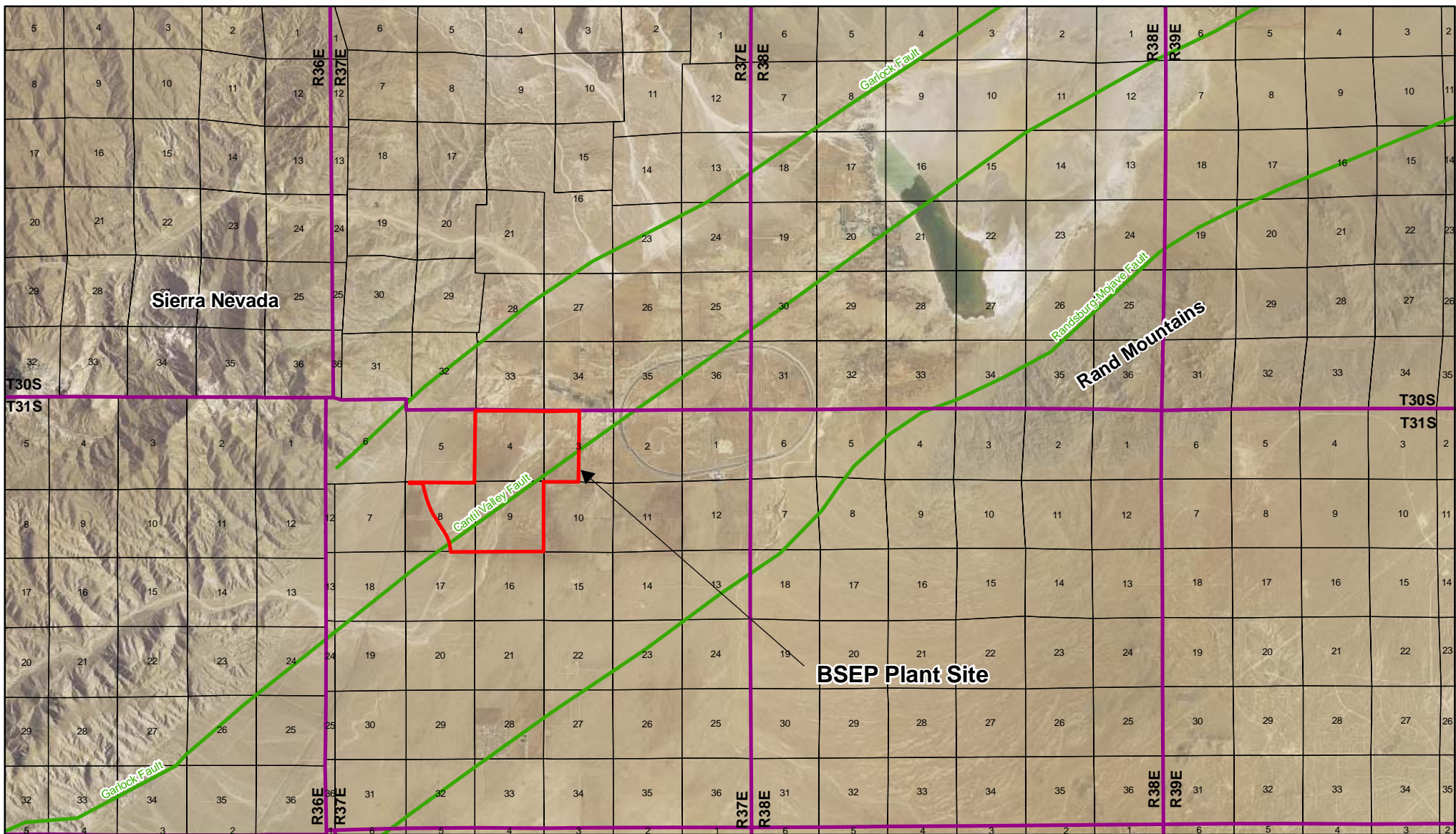
**TABLE DR-96c**  
**GEOCHEMICAL DATABASE**  
**1999-2007**  
**BEACON SOLAR ENERGY PROJECT**  
**KERN COUNTY, CALIFORNIA**

WELL DATA <sup>1,2</sup>			WATER CHEMISTRY																				
STATE WELL NUMBER (DWR)	LATITUDE	LONGTUDE	Sample Date	Temperature	pH	Total Dissolved Solids (TDS)	Silica	Calcium	Magnesium	Sodium	Potassium	Alkalinity		Sulfate	Chloride	Fluoride	Nitrate and Nitrite (as N)	Nitrate (NO3)	Arsenic	Boron	Iron	Manganese	Hardness (CaCO3)
												Bicarbonate	Carbonate										
		NAD 27	NAD 27	Yr-Mo	Degrees Centigrade	pH units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
29S/39E-23J02	35°23'50"	117°45'16"	1996-06	27.0	7.7	439	40	42	13	78	5.9	201		91	51	0.3	4.2	--	--	0.548	<0.003	0.001	150
29S/39E-23J02	35°23'50"	117°45'16"	1999-07	27.0	7.8	434	40.3	37.6	13.3	79.8	5.96	--	--	90.4	46.9	0.31	4.02			0.555	<0.010	<0.010	150
29S/39E-23J02	35°23'50"	117°45'16"	2004-08	27.0	7.7	436	38.4	37.9	13.3	84	5.58	197	--	92	48.9	0.35	4.08	--	0.01	0.569	<0.006	<0.006	--
30S/38E-04D02	35°21'36"	117°54'51"	1996-06	24.5	7.8	2,980	53	160	29	780	13	116	--	1,100	760	2.3	0.68	2.9	--	20.6	0.029	0.016	520
30S/38E-04D02	35°21'36"	117°54'51"	1999-07	26.0	7.7	3,010	52	151	31	816	12	--	--	1,080	784	2.3	0.28	--	--	22.4	0.053	0.0038	500
30S/38E-04D02	35°21'36"	117°54'51"	2004-08	24.5	7.6	2,950	52	144	26	789	21	100	--	1,080	775	2.2	0.28	--	0.005	20.5	0.129	0.0068	470
30S/38E-32D03	35°17'01"	117°55'52"	1996-06	23.5	7.5	1,130	33	190	41	130	5.2	116	--	320	350	0.30	0.84	--	--	0.57	<3	0.001	640
30S/38E-32D03	35°17'01"	117°55'52"	1999-07	23.0	7.5	969	31.7	148	34.2	120	4.99	--	--	261	287	0.25	--	--	--	0.53	<0.010	--	510
30S/38E-32D03	35°17'01"	117°55'52"	2004-08	24.5	7.6	702	28.9	99.3	22.3	92.7	4.11	129	--	193	173	0.26	0.74	--	--	0.47	0.043	--	340
31S/37E-01R02	35°15'34"	117°57'00"	1996-06	27.5	7.7	544	30	72	13	88	3.9	--	--	120	130	0.2	1.2	--	--	0.541	0.005	<0.001	230
31S/37E-01R02	35°15'34"	117°57'00"	1999-07	27.5	7.7	528	28.9	67	13.7	91.6	4	--	--	115	125	0.25	1.16	--	--	0.558	<0.010	<0.003	220
31S/37E-01R02	35°15'34"	117°57'00"	2004-08	27.5	7.6	525	28.3	69	13.7	89.9	4	--	--	114	125	0.26	1.17	--	--	0.547	<0.006	,0.008	230
Well No. 43	--	--	2007-09	--	--	550	--	45	11	74	3.6	210	--	120	18	0.6	1	--	0.004	0.24	0.06	0.057	160
Well No. 48	--	--	2007-09	--	--	470	--	46	12	84	4.3	360	120	110	14	0.4	1.5	--	0.003	0.16	0.014	0.015	160
Well No. 63	--	--	2007-09	--	--	470	35.9	50	10	76	4.1	200	--	120	15	0.4	1.1	--	0.003	0.14	0.067	0.047	170
NOTES																							
1		Data as provided in the USGS National Water Information System Database (Kern County) - <a href="http://nwis.waterdata.usgs.gov/">http://nwis.waterdata.usgs.gov/</a> and the Department of Water Resources Database and Related pubications.																					
2		See figure DR-96c for well locations within Kohen Subbasin.																					
DEFINITIONS																							
NAD-27		Noath American Datum 1927																					
mg/L		milligram per liter																					
--		Data not provided or available in USGS or DWR database.																					

## **Data Request 97**

Figure DR-97 Township and Range in the Koehn Subbasin

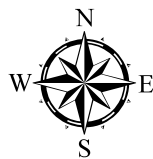
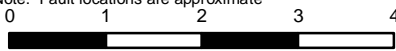




#### Legend

- BSEP Plant Site Boundary
- town\_range
- plsa

Note: Fault locations are approximate



1:126,720

### BSEP

#### Figure DR-97

#### Township and Range

#### in the Koehn Lake Subbasin

Beacon Solar

ENSR | AECOM

Project: 10056-014  
Date: Oct. 2008

## **Data Request 98**

### **Figures and Tables**

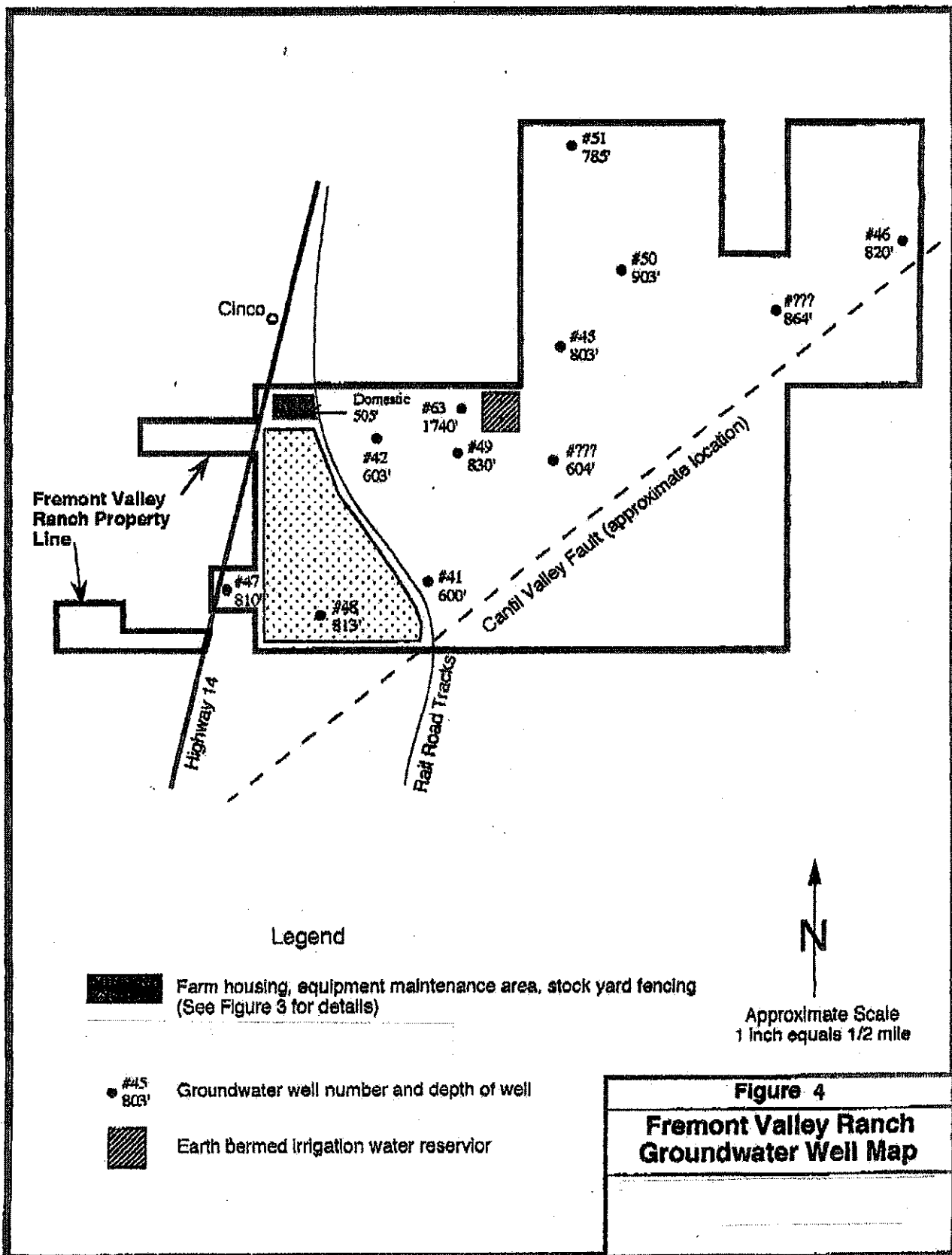
Figure 4 Freemont Valley Ranch - Groundwater Well Map  
(Switzer 2007)

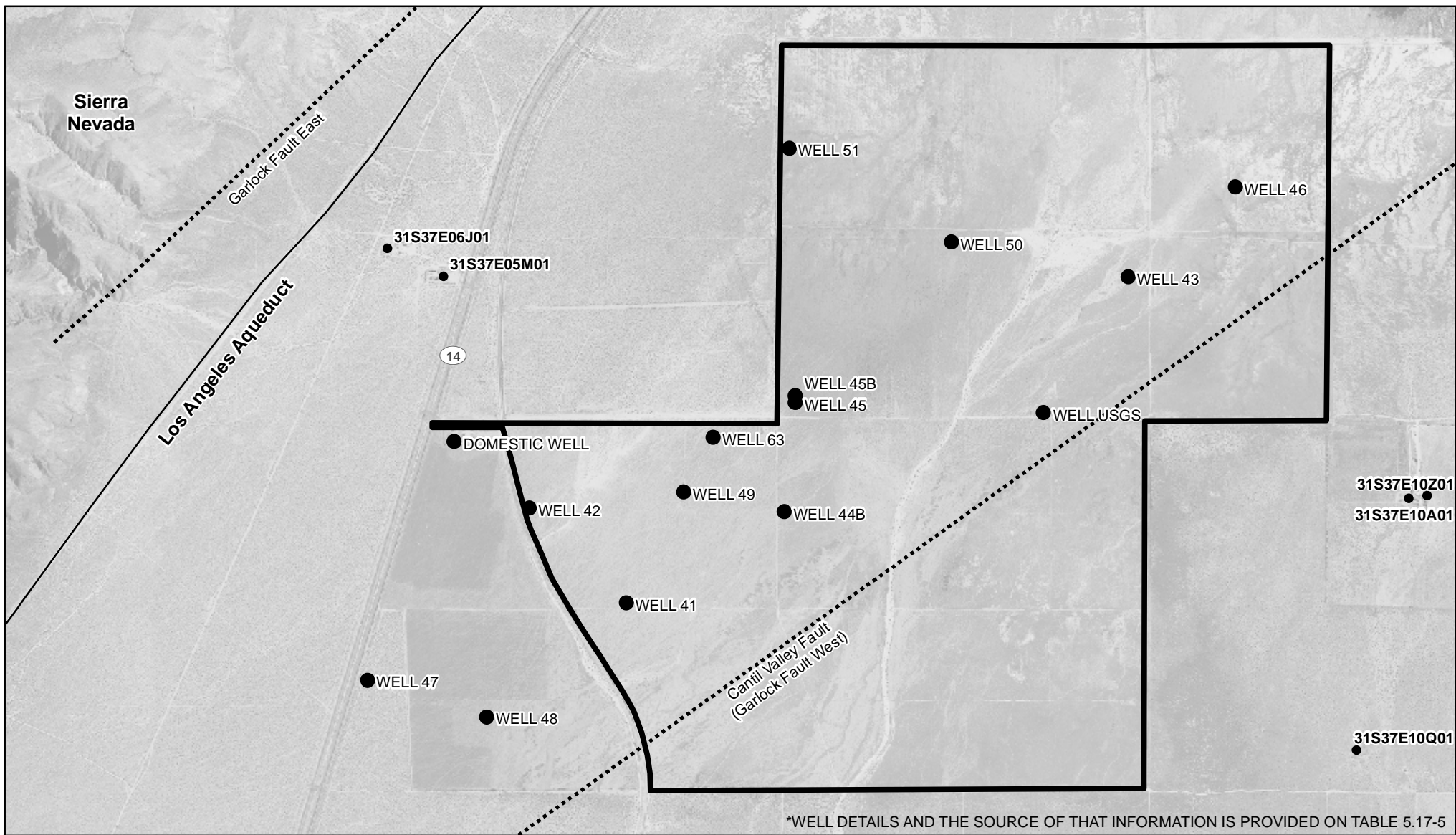
Figure 5.17-6 Site Map Showing Wells on the Project Site  
Figure 5.17-7 Cone of Depression at the End of the Well No. 63  
Pumping Test (Revised October 2008)  
Figure 5.17-8 Cone of Depression at the End of the Well No. 48  
Pumping Test (Revised October 2008)  
Figure 5.17-9 Cone of Depression at the End of the Well No. 43  
Pumping Test (Revised October 2008)  
Figure 5.17-10 Post Pumping Water Test Level Contour Map  
(October 2007)

Figure J.3-2 Pumping Test Well Nos. 43, 48, and 63  
Figure J.3-5 Cone of Depression at the End of the Well No. 43  
Pumping Test (Revised October 2008)  
Figure J.3-6 Cone of Depression at the End of the Well No. 48  
Pumping Test (Revised October 2008)  
Figure J.3-7 Cone of Depression at the End of the Well No. 63  
Pumping Test (Revised October 2008)

Table J 1-2 Plant Site Well Details (October 2008)  
Table J 3-2 Well Details – Water Supply Wells on the Plant Site  
(October 2008)







\*WELL DETAILS AND THE SOURCE OF THAT INFORMATION IS PROVIDED ON TABLE 5.17-5



#### Legend

- Groundwater Supply Wells
- Water Supply Well Location
- ▭ BSEP Plant Site Boundary
- ..... Fault
- Los Angeles Aqueduct

Note: Appendix J.1 presents well completion data  
Fault locations are approximate.

0 1,000 2,000 3,000 4,000 Feet 1:24,000



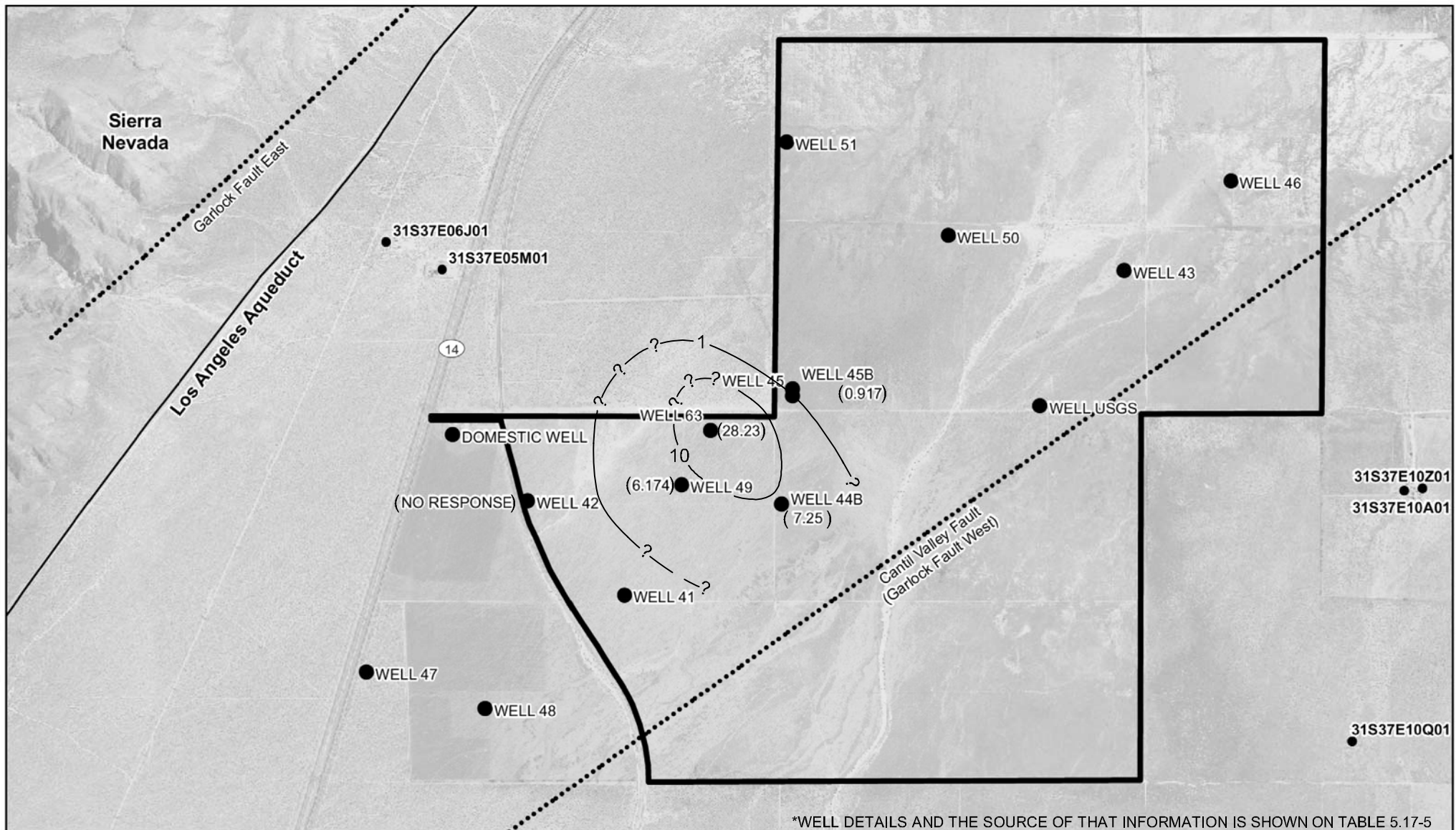
### BSEP Figure 5.17-6 Site Map Showing Wells on the Project Site

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
Date: Oct. 2008





#### Legend

- Groundwater Supply Wells
  - Water Supply Well Location
  - Los Angeles Aqueduct
  - Drawdown Contour (feet) (28.23) Drawdown at the end of the test
  - BSEP Plant Site Boundary
  - ..... Fault
- Note: Appendix J.3 presents pumping test data  
Fault locations are approximate
- 0 1,000 2,000 3,000 4,000 Feet
- 1:24,000



BSEP

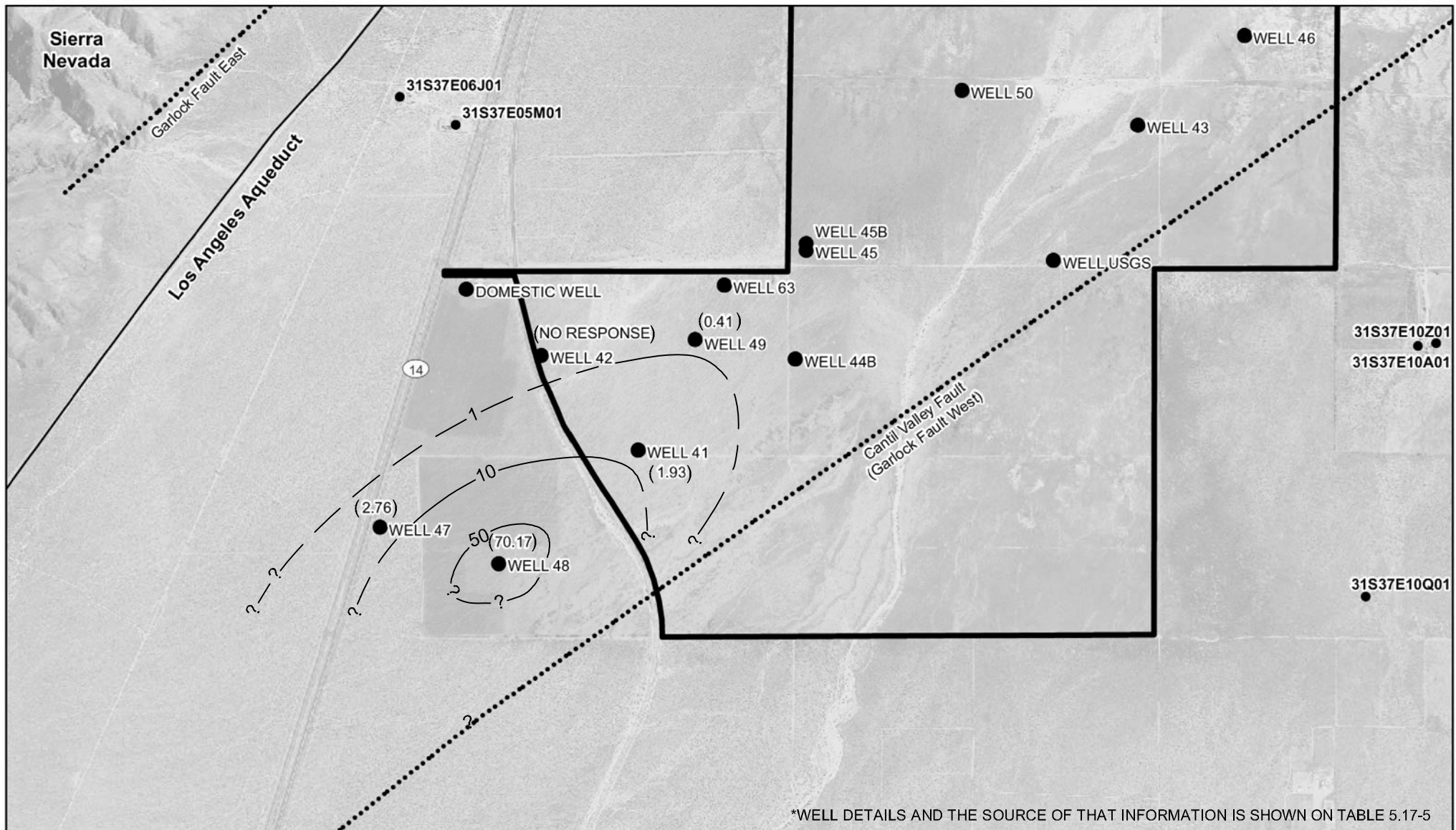
**Figure 5.17-7**  
**Cone of Depression at the End of**  
**the Well No. 63 Pumping Test**  
**(Revised October 2008)**

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
Date: Oct. 2008





#### Legend

- Groundwater Supply Wells
  - Water Supply Well Location
  - Drawdown Contour (feet) (70.17) Drawdown at the end of the test
  - ▬ BSEP Plant Site Boundary
  - ..... Fault
  - Los Angeles Aqueduct
- Note: Appendix J.3 presents pumping test data  
Fault locations are approximate
- 0 1,000 2,000 3,000 4,000 Feet
- 1:24,000



#### BSEP

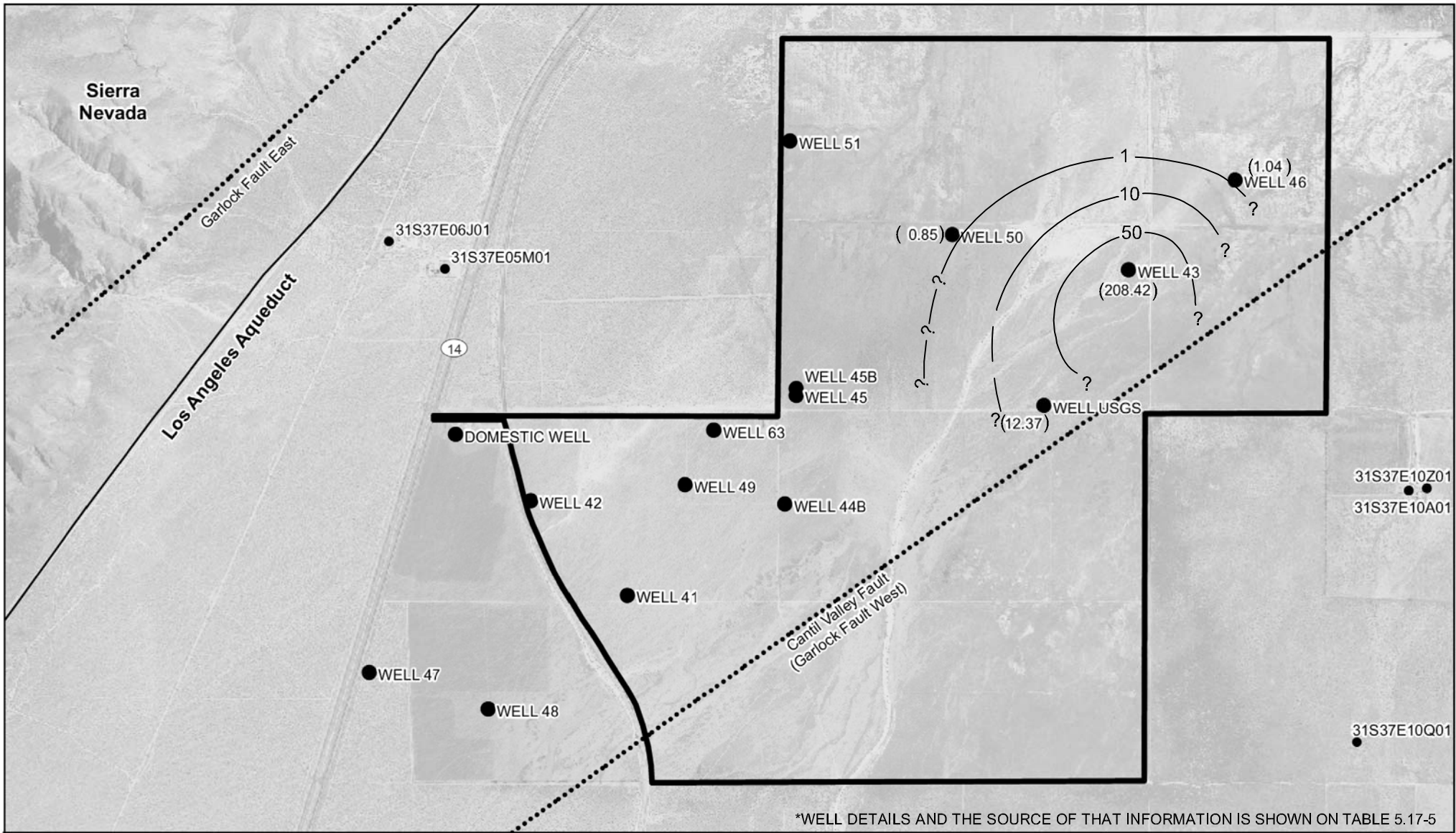
**Figure 5.17-8**  
**Cone of Depression at the End of**  
**the Well No. 48 Pumping Test**  
**(Revised October 2008)**

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
Date: Oct. 2008





**Legend**

- Groundwater Supply Wells
- Water Supply Well Location
- Drawdown Contour (feet) (208.42) Drawdown at the end of the test
- BSEP Plant Site Boundary
- ..... Fault
- Los Angeles Aqueduct

Note: Appendix J.3 presents pumping test data  
Fault locations are approximate

0 1,000 2,000 3,000 4,000 Feet

1:24,000

N  
W E  
S

**BSEP**

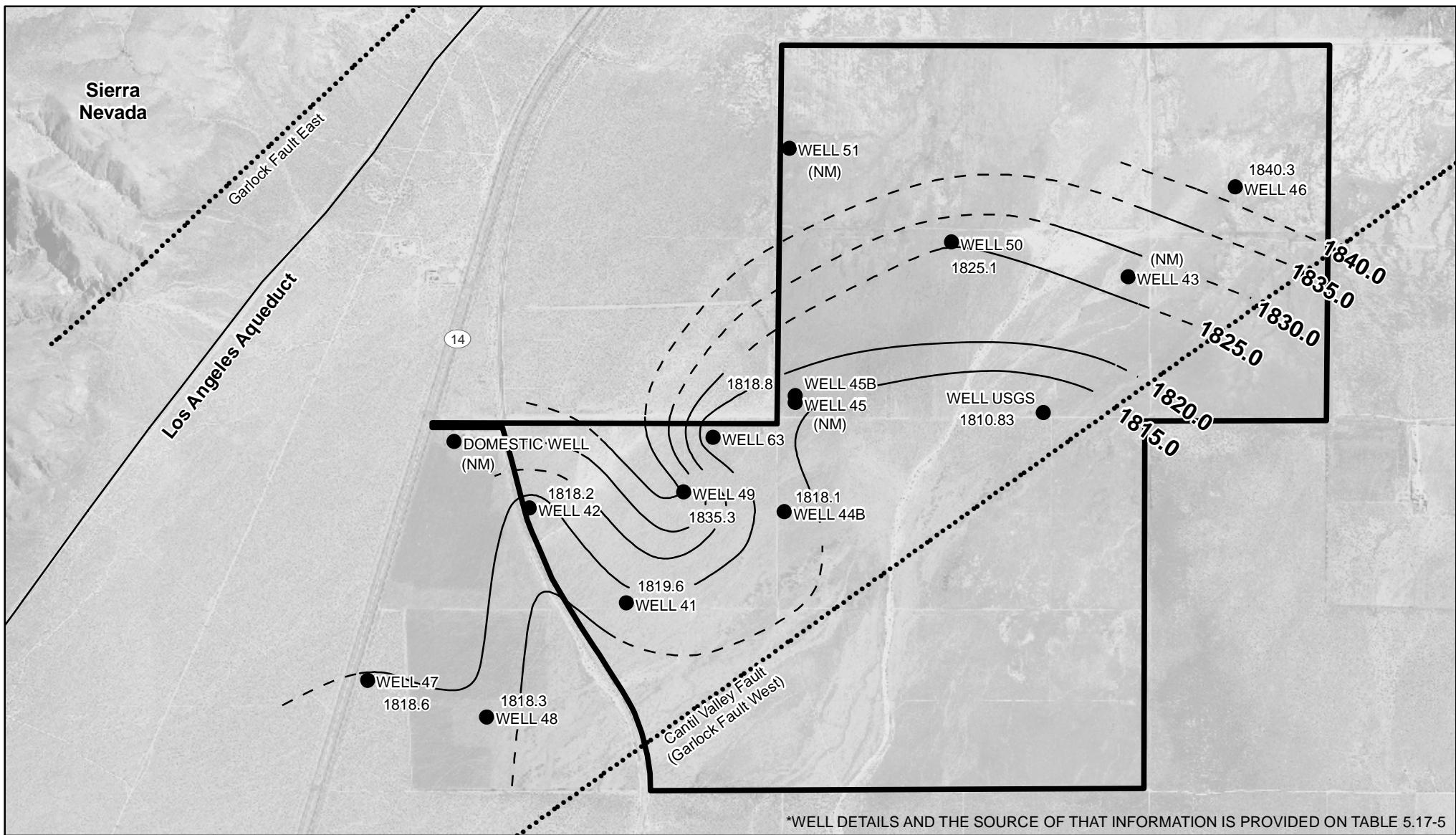
**Figure 5.17-9**  
**Cone of Depression at the End of the Well No. 43 Pumping Test**  
**(Revised October 2008)**

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
Date: Oct. 2008





\*WELL DETAILS AND THE SOURCE OF THAT INFORMATION IS PROVIDED ON TABLE 5.17-5



**Legend**

- Water Supply Well Location
- Groundwater Contour (feet amsl)
- - Dashed Where Inferred
- Approximate Site Boundary
- ..... Fault
- Los Angeles Aqueduct
- NM = Not Measured - Well abandoned or no access

Note: Fault locations are approximate.

0 1,000 2,000 3,000 4,000 Feet

1:24,000

**BSEP**

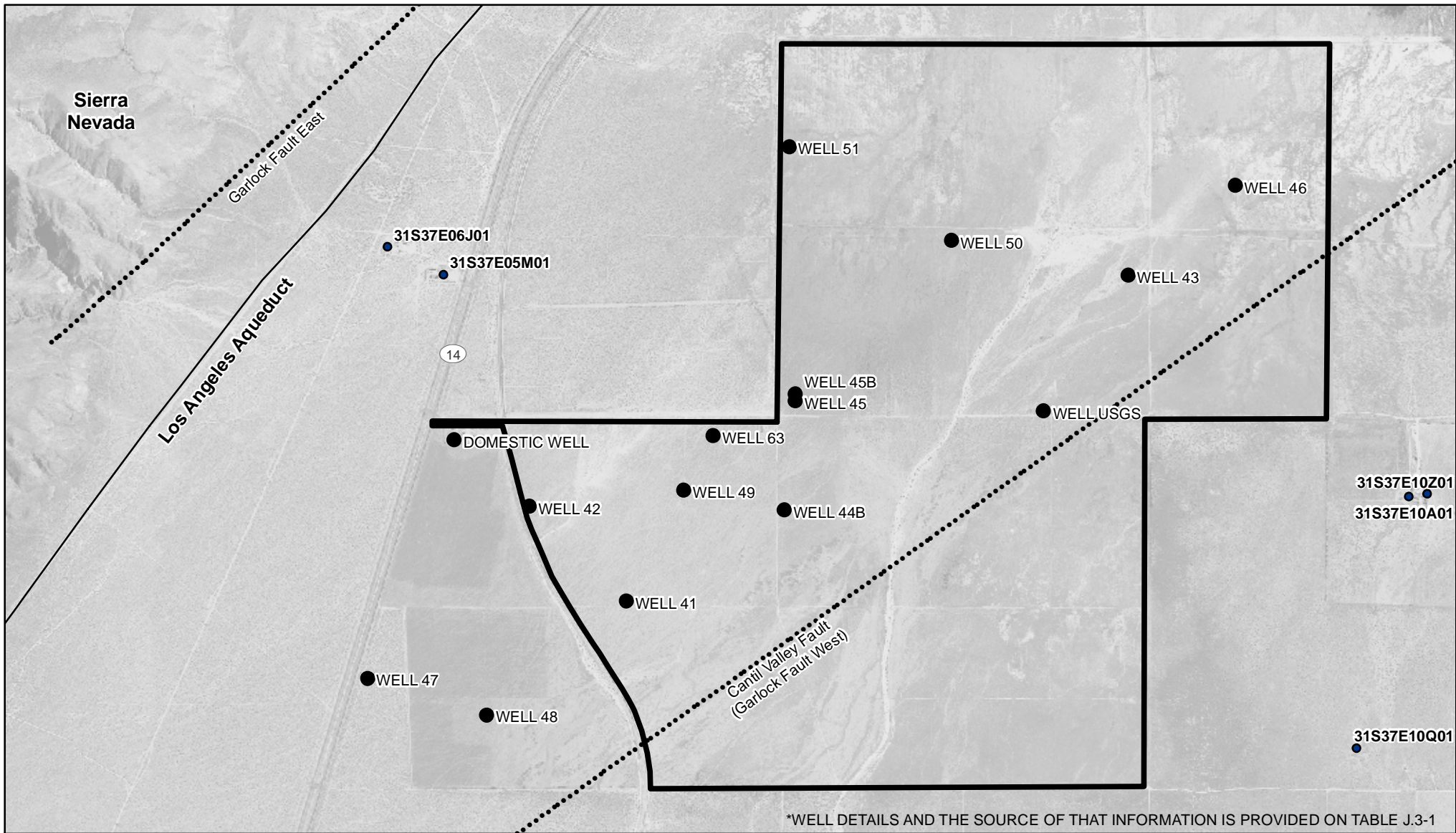
**Figure 5.17-10**  
**Post-pumping Test Water Level**  
**Contour Map (October 2007)**

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
 Date: Oct. 2008





#### Legend

- Groundwater Supply Wells
- Water Supply Well Location
- ▭ BSEP Plant Site Boundary
- ..... Fault
- Los Angeles Aqueduct

Note: Fault locations are approximate.

0 1,000 2,000 3,000 4,000 Feet 1:24,000



### BSEP

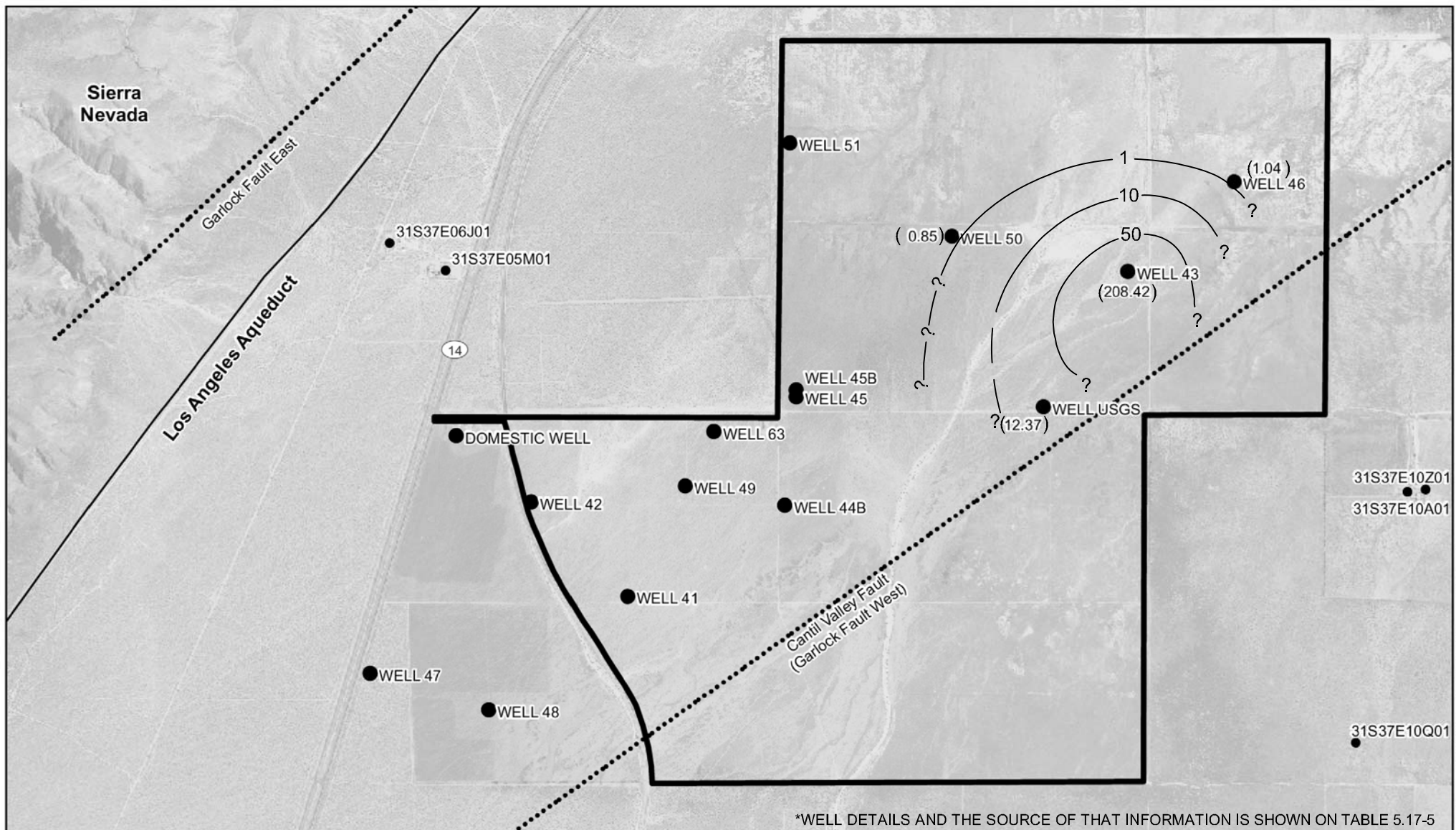
#### Figure J.3-2 Pumping Test Well Nos. 43, 48, and 63

Beacon Solar

ENSR | AECOM

Project: 10056-014  
Date: Oct. 2008





#### Legend

- Groundwater Supply Wells
- Water Supply Well Location
- Drawdown Contour (feet) (208.42) Drawdown at the end of the test
- ▭ BSEP Plant Site Boundary
- ..... Fault
- Los Angeles Aqueduct

Note: Appendix J.3 presents pumping test data  
Fault locations are approximate

0 1,000 2,000 3,000 4,000 Feet 1:24,000



#### BSEP

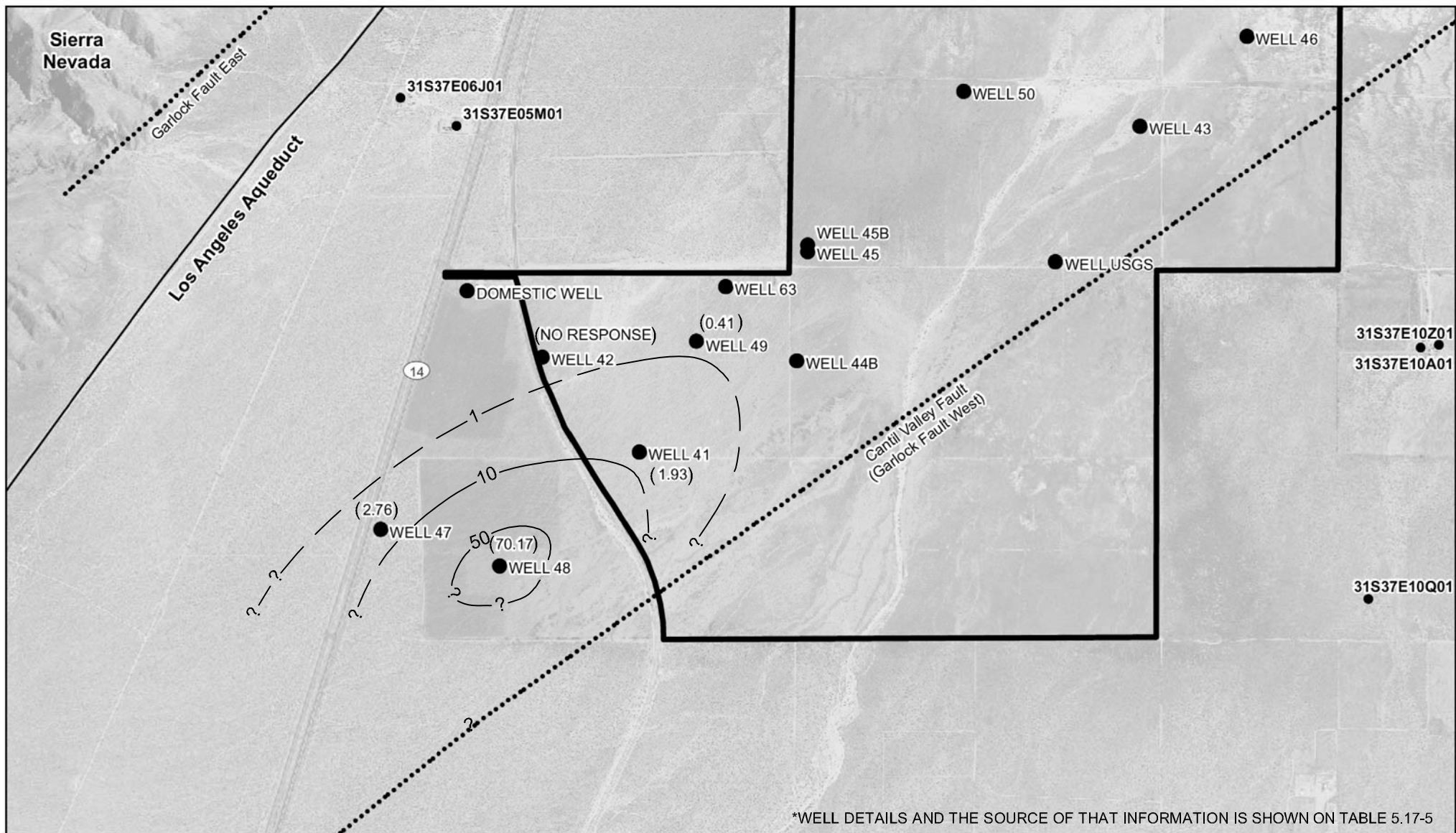
#### Figure J.3-5 Cone of Depression at the End of the Well No. 43 Pumping Test (Revised October 2008)

Beacon Solar

ENSR | AECOM

Project: 10056-014  
Date: Oct. 2008





#### Legend

- Groundwater Supply Wells
  - Water Supply Well Location
  - Drawdown Contour (feet) (70.17) Drawdown at the end of the test
  - BSEP Plant Site Boundary
  - ..... Fault
  - Los Angeles Aqueduct
- Note: Appendix J.3 presents pumping test data  
Fault locations are approximate
- 0 1,000 2,000 3,000 4,000 Feet
- 1:24,000



#### BSEP

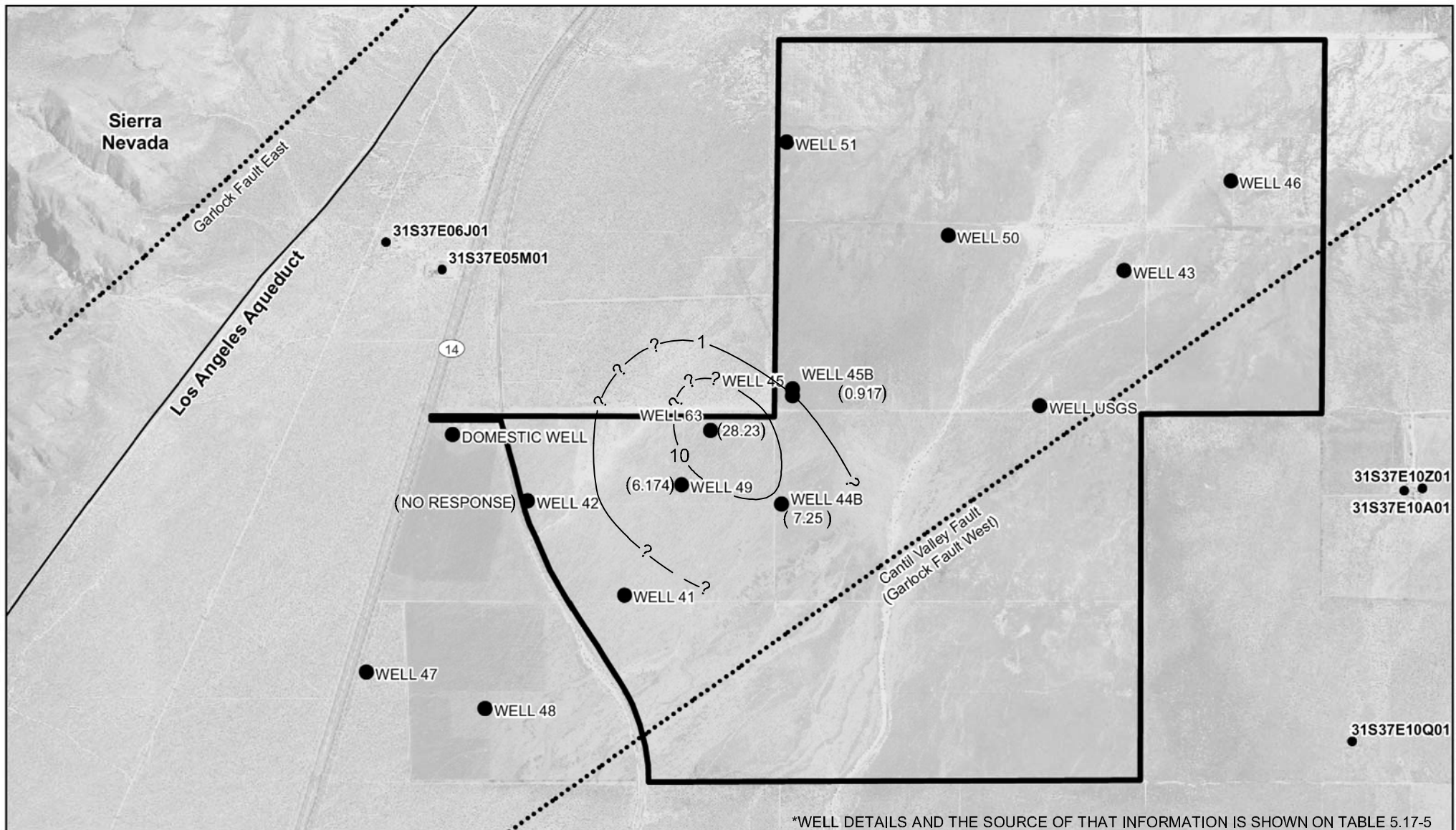
**Figure J.3-6**  
**Cone of Depression at the End of**  
**the Well No. 48 Pumping Test**  
**(Revised October 2008)**

**Beacon Solar**

**ENSR | AECOM**

Project: 10056-014  
Date: Oct. 2008





#### Legend

- Groundwater Supply Wells
- Water Supply Well Location
- Los Angeles Aqueduct
- Drawdown Contour (feet) (28.23) Drawdown at the end of the test
- ▭ BSEP Plant Site Boundary
- ..... Fault

Note: Appendix J.3 presents pumping test data  
Fault locations are approximate

0 1,000 2,000 3,000 4,000 Feet 1:24,000



#### BSEP

### Figure J.3-7 Cone of Depression at the End of the Well No. 63 Pumping Test (Revised October 2008)

Beacon Solar

ENSR | AECOM

Project: 10056-014  
Date: Oct. 2008

**Table J.1-2  
Plant Site Well Details  
(REVISED OCTOBER 2008)  
Beacon Solar Energy Project**

Well Number <sup>1</sup>	Northing <sup>2</sup>	Easting <sup>2</sup>	Top of Casing <sup>2</sup>	Ground Surface Elevation <sup>2</sup>	Total Depth <sup>3</sup>	Depth to Water <sup>4</sup>		Groundwater Elevation <sup>5</sup>	Pumping Rate <sup>4</sup>	Pumping Water Level <sup>4</sup>	Drawdown <sup>4</sup>	Specific Capacity <sup>6</sup>	Estimate of Transmissivity <sup>7</sup>	Pump <sup>4</sup>
			feet-msl	feet-msl	feet-bgs	Date	feet-bgs		Apr-80 gpm	Apr-80 feet-bgs	Apr-80 feet-bgs	Apr-80 gpm/ft	Apr-80 ft <sup>2</sup> /day	Horse Power (Hp)
<b>Domestic</b>	2279600.94	6550585.41	2178.50	2177.72	505	Oct-07	--	--	--	--	--	--	--	5
<b>USGS</b>	2280021.34	6559139.44	2105.14	2104.00	--	Oct-07	294.31	1810.83	--	--	--	--	--	--
<b>41</b>	--	--	--	2160	600	Jan-80	397.3	1762.7	--	--	--	--	--	200
						Apr-80	397.3	1762.7	1693	410.2	12.9	131	26,318	
						Feb-81	410.0	1750.0	--	--	--	--	--	
	2277255.98	6553083.68	2177.33	2175.82		Oct-07	357.78	1819.6	--	--	--	--	--	
<b>42</b>	--	--	--	2175	603	Jan-80	393.5	1781.5	--	--	--	--	--	--
						Apr-80	393.5	1781.5	1391	476.0	82.5	17	3,381	
						Feb-81	409.0	1766.0	--	--	--	--	--	
	2278636.34	6551678.11	2174.16	2172.92		Oct-07	355.91	1818.2	--	--	--	--	--	
<b>43</b>	--	--	--	2060	864	Jan-80	350.0	1710.0	--	--	--	--	--	200
						Apr-80	350.0	1710.0	1568	400.0	50.0	31	6,289	
						Feb-81	313.4	1746.6	--	--	--	--	--	
	2281995.44	6560367.11	2070.73	2069.39		Oct-07	--	--	--	--	--	--	--	Pump Removed
<b>44</b>	--	--	--	2145	604	Jan-80	361.1	1783.9	--	--	--	--	--	200
						Apr-80	361.1	1783.9	1507	383.0	21.9	69	13,799	
						Feb-81	372.0	1773.0	--	--	--	--	--	
	2278583.88	6555376.36	2135.57	2134.38		Oct-07	317.52	1818.1	--	--	--	--	--	
<b>45A</b>	--	--	--	2125	803	Jan-80	344.2	1780.8	--	--	--	--	--	--
						Apr-80	344.2	1780.8	1514	375.0	30.8	49	9,857	
						Feb-81	336.8	1788.2	--	--	--	--	--	
	2280169.10	6555537.87	2117.53	2116.67		--	--	--	--	--	--	--	--	

**Table J.1-2  
Plant Site Well Details  
(REVISED OCTOBER 2008)  
Beacon Solar Energy Project**

Well Number <sup>1</sup>	Northing <sup>2</sup>	Easting <sup>2</sup>	Top of Casing <sup>2</sup>	Ground Surface Elevation <sup>2</sup>	Total Depth <sup>3</sup>	Depth to Water <sup>4</sup>		Groundwater Elevation <sup>5</sup>	Pumping Rate <sup>4</sup>	Pumping Water Level <sup>4</sup>	Drawdown <sup>4</sup>	Specific Capacity <sup>6</sup>	Estimate of Transmissivity <sup>7</sup>	Pump <sup>4</sup>
			feet-msl	feet-msl	feet-bgs	Date	feet-bgs		Apr-80 gpm	Apr-80 feet-bgs	Apr-80 feet-bgs	Apr-80 gpm/ft	Apr-80 ft <sup>2</sup> /day	Horse Power (Hp)
45B	--	--	--	--	--	Jan-80	--	--	--	--	--	--	--	--
						Apr-80	--	--	--	--	--	--	--	--
						Feb-81	--	--	--	--	--	--	--	--
	2280268.84	6555538.15	2116.41	2115.19		Oct-07	298.05	1818.36	--	--	--	--	--	
46	--	--	--	2040	820	Jan-80	350.0	1690.0	--	--	--	--	--	150
						Apr-80	350.0	1690.0	1286	391.0	41.0	31	6,290	
						Feb-81	335.3	1704.7	--	--	--	--	--	
	2283302.96	6561922.49	2050.49	2050.09		Oct-07	210.22	1840.3	--	--	--	--	--	
47	--	--	--	2255	810	Jan-80	470.2	1784.8	--	--	--	--	--	150
						Apr-80	470.2	1784.8	1584	481.0	10.8	147	29,412	
						Feb-81	487.2	1767.8	--	--	--	--	--	
	2276132.32	6549327.05	2254.34	2251.57		Oct-07	435.74	1818.6	--	--	--	--	--	
48	--	--	--	2215	813	Jan-80	441.4	1773.6	--	--	--	--	--	200
						Apr-80	441.4	1773.6	1419	451.6	10.2	139	27,898	
						Feb-81	455.8	1759.2	--	--	--	--	--	
	2275598.60	6551058.74	2223.23	2222.73		Oct-07	404.95	1818.3	--	--	--	--	--	Pump Removed
49	--	--	--	2165	830	Jan-80	371.0	1794.0	--	--	--	--	--	150
						Apr-80	371.0	1794.0	1114	380.0	9.0	124	24,822	
						Feb-81	383.0	1782.0	--	--	--	--	--	
	2278867.08	6553918.23	2146.13	2145.15		Oct-07	310.82	1835.3	--	--	--	--	--	

**Table J.1-2  
Plant Site Well Details  
(REVISED OCTOBER 2008)  
Beacon Solar Energy Project**

Well Number <sup>1</sup>	Northing <sup>2</sup>	Easting <sup>2</sup>	Top of Casing <sup>2</sup>	Ground Surface Elevation <sup>2</sup>	Total Depth <sup>3</sup>	Depth to Water <sup>4</sup>		Groundwater Elevation <sup>5</sup>	Pumping Rate <sup>4</sup>	Pumping Water Level <sup>4</sup>	Drawdown <sup>4</sup>	Specific Capacity <sup>6</sup>	Estimate of Transmissivity <sup>7</sup>	Pump <sup>4</sup>
			feet-msl	feet-msl	feet-bgs	Date	feet-bgs		Apr-80 gpm	Apr-80 feet-bgs	Apr-80 feet-bgs	Apr-80 gpm/ft	Apr-80 ft <sup>2</sup> /day	Horse Power (Hp)
50	--	--	--	2085	903	Jan-80	303.4	1781.6	--	--	--	--	--	125
						Apr-80	303.4	1781.6	500	471.5	168.1	3	596	
						Feb-81	304.2	1780.8	--	--	--	--	--	
	2282504.17	6557805.80	2081.95	2081.20		Oct-07	256.8	1825.1	--	--	--	--	--	
51	--	--	--	2085	785	Jan-80	324.0	1761.0	--	--	--	--	--	150
						Apr-80	324.0	1761.0	965	357.7	33.7	29	5,742	
						Feb-81	301.0	1784.0	--	--	--	--	--	
	2283866.63	6555448.03	2083.24	2082.84		Oct-07	--	--	--	--	--	--	--	
63			--	--	1740	--	--	--	--	--	--	--	--	no pump
	2279660.56	6554343.52	2132.16	2131.00		Oct-07	313.25	1818.9	--	--	--	--	--	
<b>AVERAGE</b>											<b>43</b>	<b>70</b>	<b>14,037</b>	

**NOTES**

- Wells shown on **Figure 5.17-8**.
- Survey conducted October 2, 2007 to provide coordinates, ground surface elevation and top of casing. Survey conducted by WM Holdings Incorporated (William Meagher, Liscense 5948). Ground surface elevations for January 1980 provided by Switzer (2007). Elevations resurveyed October 2007.
- Total depth of the well as provided by Switzer (2007). Well depth taken from Figure 4, "Fremont Valley Ranch - Groundwater Well Map". Figure provide by Switzer (2007) as part of the Phase I ESA.
- Information provided by Switzer (2007) from a pumping test performed by Southern California Edison April 1980
- January 1980, April 1980 and February 1981 estimated from ground surface elevation data. October 2007 elevations estimated from top of casing elevation that was resurveyed October 2, 2007.
- Specific Capacity (Q/ds) estimated as the rate of water pumped divided by the drawdown (gpm/ft).
- Transmissivity estimated after Driscoll (1986, pg. 1021). Q/ds = Transmissivity/1,500 (assuming an unconfined aquifer).

**DEFINITIONS**

bgs	below ground surface
ft <sup>2</sup> /day	feet squared per day
gpm	gallons per minute
gpm/ft	gallons per minute per foot of drawdown
Hp	horse power
msl	mean sea level
--	unknown or information not provided

**Table J.3-1**  
**Well Details - Water Supply Wells on The Plant Site**  
**(REVISED OCTOBER 2008)**  
**Beacon Solar Energy Project**

Well Number <sup>1</sup>	Northing <sup>2</sup>	Easting <sup>2</sup>	Top of Casing <sup>2</sup>	Ground Surface Elevation <sup>2</sup>	Total Depth <sup>3</sup>	Depth to Water <sup>4</sup>		Groundwater Elevation <sup>5</sup>	Saturated Thickness	Pumping Rate <sup>4</sup>	Pumping Water Level <sup>4</sup>	Drawdown <sup>4</sup>	Specific Capacity <sup>6</sup>	Estimate of Transmissivity <sup>7</sup>	Pump <sup>4</sup>
			feet-msl	feet-msl	feet-bgs	Date	feet-bgs		feet (Oct-07)	Apr-80 gpm	Apr-80 feet-bgs	Apr-80 feet-bgs	Apr-80 gpm/ft	Apr-80 ft <sup>2</sup> /day	HP
<b>Domestic</b>	2279600.94	6550585.41	2178.50	2177.72	505	Oct-07	--	--	--	--	--	--	--	--	5
<b>USGS</b>	2280021.34	6559139.44	2105.14	2104.00	--	Oct-07	294.31	1810.83	--	--	--	--	--	--	--
<b>41</b>	--	--	--	2160	600	Jan-80	397.3	1762.7	203	--	--	--	--	--	200
						Apr-80	397.3	1762.7	203	1693	410.2	12.9	131	26,318	
						Feb-81	410.0	1750.0	190	--	--	--	--	--	
	2277255.98	6553083.68	2177.33	2175.82		Oct-07	357.78	1819.6	242	--	--	--	--	--	
<b>42</b>	--	--	--	2175	603	Jan-80	393.5	1781.5	210	--	--	--	--	--	--
						Apr-80	393.5	1781.5	210	1391	476.0	82.5	17	3,381	
						Feb-81	409.0	1766.0	194	--	--	--	--	--	
	2278636.34	6551678.11	2174.16	2172.92		Oct-07	355.91	1818.2	247	--	--	--	--	--	
<b>43</b>	--	--	--	2060	864	Jan-80	350.0	1710.0	514	--	--	--	--	--	200
						Apr-80	350.0	1710.0	514	1568	400.0	50.0	31	6,289	
						Feb-81	313.4	1746.6	551	--	--	--	--	--	
	2281995.44	6560367.11	2070.73	2069.39		Oct-07	--	--	--	--	--	--	--	--	Pump Removed
<b>44</b>	--	--	--	2145	604	Jan-80	361.1	1783.9	243	--	--	--	--	--	200
						Apr-80	361.1	1783.9	243	1507	383.0	21.9	69	13,799	
						Feb-81	372.0	1773.0	232	--	--	--	--	--	
	2278583.88	6555376.36	2135.57	2134.38		Oct-07	317.52	1818.1	286	--	--	--	--	--	
<b>45A</b>	--	--	--	2125	803	Jan-80	344.2	1780.8	459	--	--	--	--	--	--
						Apr-80	344.2	1780.8	459	1514	375.0	30.8	49	9,857	
						Feb-81	336.8	1788.2	466	--	--	--	--	--	
	2280169.10	6555537.87	2117.53	2116.67		--	--	--	--	--	--	--	--	--	

**Table J.3-1**  
**Well Details - Water Supply Wells on The Plant Site**  
**(REVISED OCTOBER 2008)**  
**Beacon Solar Energy Project**

Well Number <sup>1</sup>	Northing <sup>2</sup>	Easting <sup>2</sup>	Top of Casing <sup>2</sup>	Ground Surface Elevation <sup>2</sup>	Total Depth <sup>3</sup>	Depth to Water <sup>4</sup>		Groundwater Elevation <sup>5</sup>	Saturated Thickness	Pumping Rate <sup>4</sup>	Pumping Water Level <sup>4</sup>	Drawdown <sup>4</sup>	Specific Capacity <sup>6</sup>	Estimate of Transmissivity <sup>7</sup>	Pump <sup>4</sup>
			feet-msl	feet-msl	feet-bgs	Date	feet-bgs		feet (Oct-07)	Apr-80	Apr-80	Apr-80	Apr-80	Apr-80	HP
										gpm	feet-bgs	feet-bgs	gpm/ft	ft <sup>2</sup> /day	
45B	--	--	--	--	--	Jan-80	--	--	--	--	--	--	--	--	--
						Apr-80	--	--	--	--	--	--	--	--	--
						Feb-81	--	--	--	--	--	--	--	--	--
	2280268.84	6555538.15	2116.41	2115.19		Oct-07	298.05	1818.36	--	--	--	--	--	--	
46	--	--	--	2040	820	Jan-80	350.0	1690.0	470	--	--	--	--	--	150
						Apr-80	350.0	1690.0	470	1286	391.0	41.0	31	6,290	
						Feb-81	335.3	1704.7	485	--	--	--	--	--	
47	2283302.96	6561922.49	2050.49	2050.09		Oct-07	210.22	1840.3	610	--	--	--	--	--	
	--	--	--	2255	810	Jan-80	470.2	1784.8	340	--	--	--	--	--	150
						Apr-80	470.2	1784.8	340	1584	481.0	10.8	147	29,412	
						Feb-81	487.2	1767.8	323	--	--	--	--	--	
	2276132.32	6549327.05	2254.34	2251.57		Oct-07	435.74	1818.6	374	--	--	--	--	--	
48	--	--	--	2215	813	Jan-80	441.4	1773.6	372	--	--	--	--	--	200
						Apr-80	441.4	1773.6	372	1419	451.6	10.2	139	27,898	
						Feb-81	455.8	1759.2	357	--	--	--	--	--	
	2275598.60	6551058.74	2223.23	2222.73		Oct-07	404.95	1818.3	408	--	--	--	--	--	Pump Removed
49	--	--	--	2165	830	Jan-80	371.0	1794.0	459	--	--	--	--	--	150
						Apr-80	371.0	1794.0	459	1114	380.0	9.0	124	24,822	
						Feb-81	383.0	1782.0	447	--	--	--	--	--	
	2278867.08	6553918.23	2146.13	2145.15		Oct-07	310.82	1835.3	519	--	--	--	--	--	

**Table J.3-1**  
**Well Details - Water Supply Wells on The Plant Site**  
**(REVISED OCTOBER 2008)**  
**Beacon Solar Energy Project**

Well Number <sup>1</sup>	Northing <sup>2</sup>	Easting <sup>2</sup>	Top of Casing <sup>2</sup>	Ground Surface Elevation <sup>2</sup>	Total Depth <sup>3</sup>	Depth to Water <sup>4</sup>		Groundwater Elevation <sup>5</sup>	Saturated Thickness	Pumping Rate <sup>4</sup>	Pumping Water Level <sup>4</sup>	Drawdown <sup>4</sup>	Specific Capacity <sup>6</sup>	Estimate of Transmissivity <sup>7</sup>	Pump <sup>4</sup>
			feet-msl	feet-msl	feet-bgs	Date	feet-bgs		feet (Oct-07)	Apr-80 gpm	Apr-80 feet-bgs	Apr-80 feet-bgs	Apr-80 gpm/ft	Apr-80 ft <sup>2</sup> /day	HP
50	--	--	--	2085	903	Jan-80	303.4	1781.6	600	--	--	--	--	--	125
						Apr-80	303.4	1781.6	600	500	471.5	168.1	3	596	
						Feb-81	304.2	1780.8	599	--	--	--	--	--	
	2282504.17	6557805.80	2081.95	2081.20		Oct-07	256.8	1825.1	646	--	--	--	--	--	
51	--	--	--	2085	785	Jan-80	324.0	1761.0	461	--	--	--	--	--	150
						Apr-80	324.0	1761.0	461	965	357.7	33.7	29	5,742	
						Feb-81	301.0	1784.0	484	--	--	--	--	--	
	2283866.63	6555448.03	2083.24	2082.84		Oct-07	--	--	--	--	--	--	--	--	
63			--	--	1740	--	--	--	--	--	--	--	--	--	no pump
	2279660.56	6554343.52	2132.16	2131.00		Oct-07	313.25	1818.9	1427	--	--	--	--	--	
												Average	43	70	14,037

**Notes:**

- 1 Wells shown on **Figure 5.17-8**.
- 2 Survey conducted October 2, 2007 to provide coordinates, ground surface elevation and top of casing. Survey conducted by WM Holdings Incorporated (William Meagher, Liscense 5948). Ground surface elevations for January 1980 provided by Switzer (2007). Elevations resurveyed October 2007.
- 3 Total depth of the well as provided by Switzer (2007). Well depth taken from Figure 4, "Fremont Valley Ranch - Groundwater Well Map". Figure provide by Switzer (2007) as part of the Phase I I
- 4 Information provided by Switzer (2007) from a pumping test performed by Southern California Edison April 1980
- 5 January 1980, April 1980 and February 1981 estimated from ground surface elevation data. October 2007 elevations estimated from top of casing elevation that was resurveyed October 2, 2007
- 6 Specific Capacity (Q/ds) estimated as the rate of water pumped divided by the drawdown (gpm/ft).
- 7 Transmissivity estimated after Driscoll (1986, pg. 1021). Q/ds = Transmissivity/1,500 (assuming an unconfined aquifer).

**Definitions:**

bgs below ground surface  
ft<sup>2</sup>/day feet squared per day  
gpm gallons per minute  
gpm/ft gallons per minute per foot of drawdown  
Hp horse power  
msl mean sea level  
-- unknown or information not provided