SES SOLAR ONE

Supplemental Information
In Response to CEC Data Adequacy Requests
Application for Certification (08-AFC-13)

April 2009

DOCKET	
08-AFC-13	
DATE	APR 06 2009
RECD.	APR 06 2009

Submitted to:
California Energy Comission
1516 9th Street, MS 15
Sacramento, CA 95814-5504

Submitted by:
SES Solar Three, LLC
SES Solar Six, LLC

Stirling Energy Systems
2920 E. Camelback Rd., Suite 150
Phoenix, AZ 85016

Data Adequacy Requests Response Guide

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TECHNICAL AREA: AIR QUALITY

Data Adequacy Request 1. Provide a discussion of the mitigation measures that will be proposed to mitigate the potentially adverse operations maintenance emissions of NO_x, VOC, PM_{10} and $PM_{2.5}$.

Response: Operations maintenance activities will consist of mirror washing, servicing and maintenance of Suncatchers, site inspection and security, and delivery and removal of supplies and waste. The air pollutant emission sources associated with these maintenance activities include combustion exhaust from on-road vehicles (*i.e.,* trucks) and off-road equipment such as forklifts and man lifts, and the fugitive dust these vehicles create while driving on paved and sealed roads.

The new design of the site operations, the improved travel demand assumptions, and the use of fuel-efficient and low emitting gasoline wash and maintenance trucks present a drastic reduction of maintenance and delivery vehicles trips and miles traveled. Second, all roads that access the SunCatchers will be sealed with a sealant such as Soiltac™, to minimize fugitive dust emissions. Consequently, emissions from the operations maintenance will drastically decrease as compared to the first estimates. These emission estimates are still being refined, although an onsite dust reduction of approximately 60% is anticipated primarily due to the travel of vehicles on sealed roads as opposed to travel on unpaved roads.

The mitigation measures that are proposed to mitigate the potentially adverse operations maintenance emissions of NO_x, VOC, PM_{10} and $PM_{2.5}$ are presented below.

- Application of the chemical dust suppressant Soiltac™ or similar product to all maintenance roads. This will reduce particulate emissions. Soiltac™ is an acrylic-based liquid copolymer used to stabilize and solidify any soil as well as control erosion and suppress dust, manufactured by SoilWorks, LLC. Once applied to the soil, the copolymer molecules coalesce to form bonds between the soil particles. As water dissipates from the soil, a durable matrix of flexible solid mass is created. Once cured, Soiltac™ becomes:
    - completely transparent, leaving the natural landscape to appear untouched,
    - completely odorless,
    - biodegradable,
    - non-flammable and non-volatile,
    - non-hazardous,
    - non-corrosive and safe for all equipment,
    - non-slippery and safe to walk and drive on,

- ecologically and environmentally safe,
- human, animal, marine life and vegetation safe,
- water resistant (will not break down with water),
- non-tracking & non-transferable (will not be picked up onto vehicles),
- non-leaching (will not continue to seep into the soil),
- ultraviolet ray resistant (will not break down in sunlight),
- non-dissipating (will not wash away with water once cured), and
- alkaline soil resistant (will not break down in alkaline soils).

- For dust suppression, a modest application creates a 3-dimensional cap or surface crust that reacts like a paved road and can remain effective for several months or years, depending on the application rate. Soiltac™ has been successfully applied to unpaved dirt roads, construction sites, aircraft runways, helipads, and parking lots for fugitive dust control, erosion control, silt loading control and road/soil stabilization. Tests conducted by ERDC in Douglas, AZ during the period from March to August 2004, showed that depending on the application rate and length, dust control efficiency ranging from 79% to 93% can be achieved in a desert environment. (Reference: Evaluation of Application Methods and Products for Mitigating Dust for Lines-of-Communication and Base Camp Operations. U.S. Army Engineer Research and Development Center (ERDC), March 2005.) Applicant realizes that re-application may be required to maintain dust control efficiency.
- A requirement that all vehicle travels associated with maintenance activities occur only on paved or chemically-sealed roads.
- It is anticipated that each wash vehicle will wash two (2) SunCatchers at the same time. This will reduce by half the number of wash vehicles needed, number of maintenance trips, idling time and vehicle miles traveled. Consequently, the emissions of PM_{10}, $PM_{2.5}$, NO_x and VOCs will be reduced.
- Use of only one 5,000 gallon regular gasoline storage tank that incorporates CARB-certified Phase I & II vapor recovery systems. Furthermore, the tank will be filled only when necessary to reduce turnover. Truck refueling will also be kept to a minimum.
- All previously proposed diesel-fueled wash vehicles and other maintenance trucks will be replaced with new gasoline-fuel vehicles that meet California vehicle emissions standards. This will eliminate the emissions of toxic diesel particulate and reduce ozone precursor emissions.
- All security vehicles used for site inspection and security will now be

hybrid vehicles, most likely Toyota Highlander Hybrid sport utility vehicles (SUV) or similar vehicle. The Toyota Highlander SUV is a super ultra low emission vehicle (SULEV) that meets both Tier 2/Bin 3 Federal standards and California ULEV II standards.

- Van pooling of employees from Barstow during operations will be provided.
- Hydrogen will be produced and stored onsite and distributed to each SunCatcher. The hydrogen will be generated from water and project or grid generated electricity. The previously proposed individual hydrogen cylinders associated with each SunCatcher will be eliminated and replaced with a central distribution system. Thus, all hydrogen cylinder delivery truck trips would be eliminated. Moreover, less maintenance of the SunCatcher hydrogen system will be required and will be conducted from the maintenance trucks instead of cylinder delivering trucks, thus reducing trips and VMTs and total emissions.
- Scheduled and well planned vacuum-sweeping and/or water-flushing will be utilized on paved road surfaces to remove buildup of loose material to control dust emissions from travel on the paved access road and paved parking areas.
- Propane-fuel fork lift and man lifts will be utilized for maintenance activities requiring such equipment.
- SES is committed to better travel demand management so as to reduce VMTs whenever and wherever possible and to using alternatively fueled vehicles as they become available for maintenance activities.

TECHNICAL AREA: AIR QUALITY

Data Adequacy Request 2. Please provide the permit application completeness letter from the Mojave Desert Air Quality Management District. This letter is expected in early January.

Response: The permit was submitted to the Mojave Desert Air Quality Management District (MDAQMD) on January 29, 2009. The completeness letter dated January 6, 2009 was received from MDAQMD on March 3, 2009. The District stated in its letter: **"On a preliminary basis, the District finds that there is a substantial likelihood that the proposed facility will satisfy applicable District rules and regulations; the District has reviewed this application and finds it to' be complete; as required by 'Rules 1302(B) and 1306(C). "** Both are provided as attachment AQ-1.

AQ-1

Mojave Desert Air Quality Management District
14306 Park Avenue, Victorville, CA 92392-2310
760.245.1661 • fax 760.245.2699
Visit our web site: http://www.mdaqmd.ca.gov
Eldon Heaston, Executive Director

March 3, 2009

Robert Liden
Executive VP, Stirling Energy Systems
2920 E. Camelback Road, Suite 150
Phoenix, AZ, 85016

Re: Application Completeness

Dear Mr. Liden:

The Mojave Desert Air Quality Management District (District) has reviewed the application submittals for the emergency internal combustion engine and aboveground gasoline dispensing tank, and have determined them to be complete. Work will now begin on the Preliminary Decision Document pursuant to District Regulation XIII, which is anticipated to be completed by March 31, 2009.

If you have any questions regarding this action, please contact Samuel J. Oktay PE, Air Quality Engineer, at (760) 245-1661, x1610.

Sincerely,

Alan De Salvio
Supervising Air Quality Engineer

cc: Christopher Meyer, Solar One Project Manager, CEC

MOJAVE
air quality management district
DESERT

Mojave Desert Air Quality Management District
14306 Park Avenue, Victorville, CA 92392-2310
760.245.1661 • fax 760.245.2699
Visit our web site: http://www.mdaqmd.ca.gov
Eldon Heaston, Executive Director

January 6, 2009

DOCKET
08-AFC-13
DATE JAN 06 2009
RECD. JAN 12 2009

Christopher Meyer, Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814-5512

Re: SES Solar One Project, Request for Agency Participation, Application for Certification (08-AFC-13)

Dear Mr. Meyer:

The Mojave Desert Air Quality Management District (District) received a Request for Agency Participation and Application for Certification for the **SES Solar One Project** (Solar One), **Docket 08-AFC-13, dated December 21, 2008.** In accordance with Rule 1306(B)(1), the District is hereby notifying you of its intent to participate in the Solar One proceedings. On a preliminary basis, the District finds that there is a substantial likelihood that the proposed facility will satisfy applicable District rules and regulations; the District has reviewed this application and finds it to be complete, as required by Rules 1302(B) and 1306(C).

The District understands that the proposed project is a Solar Electric generating facility utilizing Stirling Heat Engines and solar collector technology that will not require combustion for energy production. Air pollutant emissions is limited to a relatively small diesel fueled emergency electrical generator, emergency diesel fueled fire pumps, fugitive emissions associated with grading operations and subsequent emissions from vehicles for array maintenance and general facility operations.

If you have any questions regarding this letter, please contact Samuel J. Oktay, PE, assigned Air Quality Engineer, at 760-245-1661, extension 1610, or Alan De Salvio, Supervising Air Quality Engineer, at (760) 245-1661 extension 6726.

Sincerely,

Elden

Eldon Heaston
Executive Director

cc: Director, Office of Air Division USEPA Region IX
Chief, Stationary Source Division CARB
Will Walter, CEC Air Quality Analyst

SES_Solar_One_AFC_Complete.doc

URS

January 28, 2009

Ms. Barbara Weese
Air Quality Specialist
Mojave Desert Air Quality Management District
14306 Park Avenue
Victorville, CA 92392

Subject: Authority to Construct/Permit to Construct Application
URS Project No. 27658172.10000

Dear Ms. Weese:

Stirling Energy Systems (SES) is pleased to submit this ATC/PTC General Permit Application to the Mojave Desert Air Quality Management District (MDAQMD) for the Solar One facility. The Solar One Project Site will be a newly constructed solar power plant located in an undeveloped area of San Bernardino County, California between Newberry Springs and Ludlow, California, near Interstate 40.

An Application for Certification has been submitted to the California Energy Commission and a copy has been, or will be sent to the MDAQMD.

Operational stationary sources of emissions for the Solar One Project will be limited to one emergency diesel generator. The emergency generator will be rated at approximately 345 horsepower. The emergency generator will be tested 1 hour per week (52 hours per year) to ensure operability in the event of an emergency.

In addition to the above-mentioned source, there will be one 5,000-gallon gasoline storage tank located at the project site. This tank will dispense gasoline to onsite maintenance vehicles and will incorporate appropriate control devices.

Included in this Application submittal are the required MDAQMD forms signed by the appropriate Responsible Individuals, a brief description of each source to be permitted including operating hours, a plot plan indicating the locations of all permitted sources, tables presenting estimated pollutant emissions, and a check for $452.00 to cover all required permitting fees. Specifically, Rule 301 (E)(7)(g)(i) or (ii) for one emergency generator ($226.00) and Rule 301 (E)(5)(a) for one above-ground storage tank less than 10,001 gallons ($226.00).

URS Corporation
1615 Murray Canyon Road
Suite 1000
San Diego, CA 92108
Tel: 619.294.9400
Fax: 619.293.7920

URS

Please do not hesitate to contact me for additional information or to answer any questions that may arise. Thank you for your time.

Sincerely,

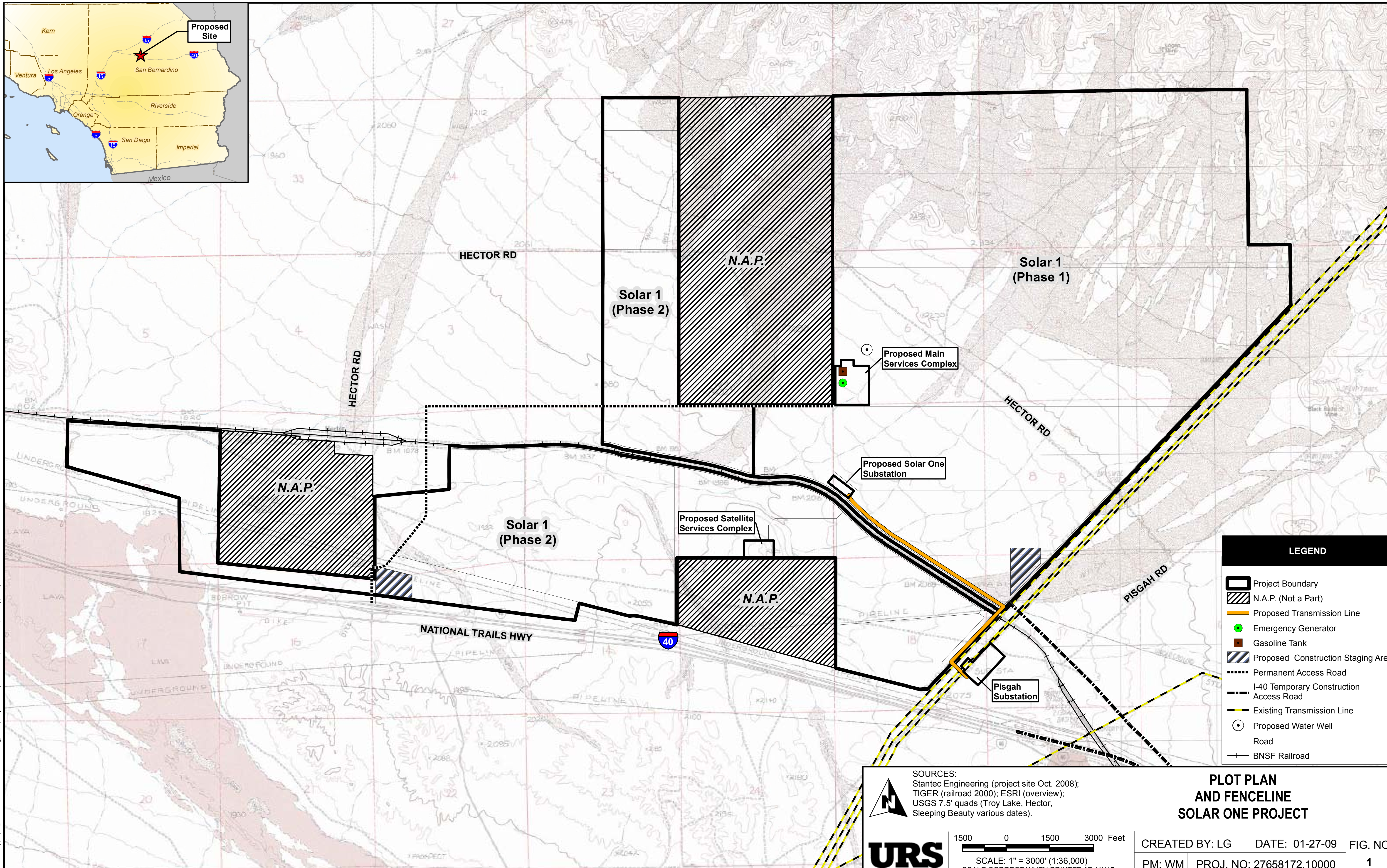
URS CORPORATION

Julie Mitchell
Senior Air Quality Scientist

JM:ml

cc: Robert Liden, Stirling Energy Systems
Christopher Meyer, California Energy Commission
Bill Magdych, URS

Attachments: Solar 1 Site Plan
MDAQMD Gas Tank Application
MDAQMD ICE Application



Path: G:\gis\projects\1577\27658100\mxd\AQ\air_plotplan_airpermit.mxd, 01/27/09, lisa_garvey

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
14306 Park Avenue, Victorville, CA 92392-2383
(760) 245-1661 Facsimile: (760) 245-2022

http://www.mdaqmd.ca.gov
Eldon Heaston
Executive Director

APPLICATION FOR GASOLINE DISPENSING FACILITIES

PLEASE REMIT $226.00 WITH APPLICATION; $129.00 FOR CHANGE OF OWNER

1. Permit To Be Issued To (company name to receive permit):
SES Solar 3 LLC, and Solar Six LLC

1a. Federal Tax ID No.:
20-3678921, 38-3782460

2. Mailing/Billing Address (for above company name):
2920 E Camelback Rd., Suite 150, Phoenix AZ 85016

3. Facility or Business License Name (for equipment location):
Solar One

4. Facility Address - Location of Equipment (if same as for company, enter "Same"):
San Bernardino County

Location UTM or Lat/Long:
34 degrees, 47' 00.52" N, 116 degrees 22' 57.05" W

5. Contact Name/Title:
Robert Liden

Email Address:
rliden@stirlingenergy.com

Phone/Fax Nos.:
602-957-1818 P
602-957-1919 F

6. Application is for:
[X] New Construction [ ] Modification* [ ] Change of Owner*

For modification or change of owner:
*Current Permit Number: ____________

7. Type of Organization (check one):
[ ] Individual Owner [ ] Partnership [X] Corporation [ ] Utility [ ] Local Agency [ ] State Agency [ ] Federal Agency

8. Vapor Control Equipment: Compliance w/ARB Exec. Order:

Phase I: [X] Two-Point [ ] Coaxial G-70- 97-A / 200-B

Phase II: [X] Balance [ ] Assist [ ] None G-70- 200-B

If Phase II is complying with Exec Order G-70-52, Exhibit # is: 5

9. Dispensers: No., Type, Make & Model: ____________

10. Nozzles:

	Single Product	Single Product	Single Product	Dual Product	Triple Product	Diesel/ Other	Diesel/ Other
Fuel or Octane Number	87						
No. of Existing Nozzles:	1						
No. of Nozzles to Add:	0						
No. of Nozzles to Remove:	0						
New Total No. of Nozzles:	1						

11. Nearest Receptors: Distance (feet or meters):

Residential Property Line > 1 mile
Off-site Workplace Property Line > 1 mile
School Property Line > 7 miles
Medical Facility Structure > 7 miles

(Distance from center of closest island or dispenser)

12. Signature of Responsible Person: [signature] Date: 27-Jan-09

Print or Type Name: Robert B. Liden Title: Executive Vice President

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
FUEL DISPENSING STORAGE TANK INFORMATION

13. Facility Name: Solar One

14. Contact Name: Robert Liden

15. Storage Tanks: *Note: asterisked (*) equipment is required on gasoline storage tanks*

16. Operating Schedule: Hours per day 24

Days per week 7

Weeks per year 52

Tank Number	Type		Remove?		Partition?		Capacity	Product	Position		Submerged Fill Tube?*		Fill Tube Type		Overfill Protect?*		Vent Valve?*	
	New	Exist	Y	N	Y	N	(gallons)	(type)	Above ground	Under ground	Y	N	Dual Point*	Coax*	Y	N	Y	N
1	X			X		X	5,000	gasoline	X		X		X		X		X	

17. Fuel Throughput or Sales (gallons):

Fuel	Monthly	Annual
Gasoline	1,667	20,000
Diesel		

Notes: For on-site refueling of company vehicles only.

Gasoline is defined as any organic liquid ... having a Reid Vapor Pressure of 200 mm Hg (3.9 psi) or greater, and used as a motor vehicle fuel... [District Rule 461]

Gasoline includes but is not limited to all octanes (87U, 89U, 92U and various "high performance") of gasoline, methanol, ethanol, and "aviation gasoline" (AvGas).

Gasoline does not include diesel, JP-4 (Jet-B), JP-5 (Jet-A), JP-8, kerosene, propane, LPG, natural gas (CNG or LNG).

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
14306 Park Avenue, Victorville, CA 92392-2310
(760) 245-1661 Facsimile: (760) 245-2022

www.mdaqmd.ca.gov
Eldon Heaston
Executive Director

APPLICATION FOR INTERNAL COMBUSTION ENGINE (I.C.E.) ONLY

Page 1 of 2: please type or print — REMIT $226.00 WITH THIS DOCUMENT ($129.00 FOR CHANGE OF OWNER)

1. Permit To Be Issued To (company name to receive permit): SES Solar 3 LLC, and Solar Six LLC

1a. Federal Tax ID No.: 20-3678921, 38-3782460

2. Mailing/Billing Address (for above company name): 2920 E Camelback Rd., Suite 150, Phoenix AZ 85016

3. Facility or Business License Name (for equipment location): Solar One

4. Facility Address - Location of Equipment (if same as for company, enter "Same"): San Bernardino County

Facility UTM or Lat/Long: 34 degrees, 47' 00.52" N, 116 degrees 22' 57.05" W

5. Contact Name/Title: Robert Liden

Email Address: rliden@stirlingenergy.com

Phone/Fax Nos.: 602-957-1818 P, 602-957-1919 F

6. Application is hereby made for Authority To Construct (ATC) and Permit To Operate (PTO) the following equipment: emergency generator

7. Application is for: [X] New Construction [ ] Modification* [ ] Change of Owner*

For modification or change of owner: *Current Permit Number: ____

8. Type of Organization (check one): [ ] Individual Owner [ ] Partnership [X] Corporation [ ] Utility [ ] Local Agency [ ] State Agency [ ] Federal Agency

9. Distances (feet and direction to closest): 400 ft Fenceline; > 1 mile (7500 ft East) Residence; > 1 mile Business; > 7 miles School

10. General Nature of Business: solar electric generating facility

11. Principal Product: electricity

12. Facility Annual Throughput by Quarters (percent):

Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
%	%	%	%

13. Expected Operating Hours of IC Engine:

Hrs/Day	Days/Wk	Wks/Yr	Total Hrs/Yr
1	1	52	52

14. Do you claim Confidentiality of Data (if yes, state nature of data in attachment)? [ ] Yes [ ] No

15. Signature of Responsible Official: Robert S. Liden

Official Title: Executive Vice President

Typed or Printed Name of Responsible Official: Robert Liden

Phone Number: 602-957-1818

Date Signed: 27-Jan-09

- For District Use Only -

Application Number:	*Invoice Number:*	*Permit Number:*	*Company/Facility Number:*

MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
I.C.E. APPLICATION, continued

16. INFORMATION ON I.C.E.:

Manufacturer: Cummins

Model No.: QSL9-G3 Serial No.:

Number of Cylinders: 6 Year of Manufacture: #

Rating: 345 BHP Speed: RPM

I.C.E. is? [x] New [ ] Existing Date Installed (MM/YYYY):

Prime [ ] Standby [ ] Emergency [x] Portable (Yes or No)?: n

CARB engine certification: Family: EPA tier 3 Certification EO#:

Is this engine included in a Demand Response plan?: Yes [ ] No [ ]

Type of Fuel(s): Natural Gas [ ] Digester Gas [ ] Ethanol [ ] Landfill Gas [ ]
Propane [ ] CARB Diesel [X] Methanol [ ] Other:

Max fuel usage per hour: 17.2 Fuel units (ft^3, gal, etc.): gal

Engine Lat/Long or UTM Coordinates: 34 degrees, 47' 00.40" N, 116 degrees 22' 57.05" W

Exhaust Stack Height (feet): 6.5 Inside Diameter (inches): 8 Y/N: Vertical? y Capped? n

Is this I.C.E. (select all that apply):

Direct Injected? [X] After Cooled? [ ]
Turbo Charged? [X] Inter Cooled? [ ]
Timing Retarded? [ ] Other - Please specify:

17. EMISSION RATES: Origin of Emission Rate data:

Pollutant	at Max.Load	Units	Manufacturer or	Source Test
Oxides of Nitrogen (NOx)	0.54	g/s	x	
Oxides of Sulfur (SOx)	0.01	g/s	x	
Carbon Monoxide (CO)	0.04	g/s	x	
Particulates (PM10)	0.01	g/s	x	
Total Hydrocarbons (VOC)	0.01	g/s	x	

18. EMISSION CONTROL EQUIPMENT: Add on emission control equipment? [ ] Yes [x] No

If yes: Manufacturer: Model No.:
Serial No.: *CARB EO#:

Type: SCR: [ ] Particulate Trap*: [ ] Ammonia Injection: [ ] Water Injection: [ ]
Non-S CR: [ ] Exhaust Gas Recirc*: [ ] Oxidation Catalyst*: [ ]

Other - Please specify:

19. INFORMATION OF ITEM BEING POWERED: This I.C.E. is used to power:

Electrical Generator [X] Compressor [ ] Pump [ ]
Paint Spray Gun [ ] Conveyor or Drive [ ] Fire Pump [ ]

Other - Please specify:

Manufacturer:

Model No.: Serial No.:

Type, Size or Rating:

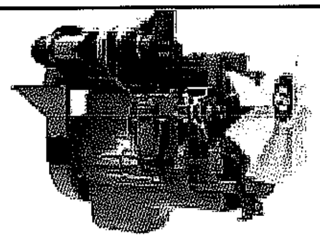
Solar One Emergency Generator Emissions and Stack Parameters

Standby Generator
Standby Generator Set: 257kW
Exhaust Stack Height: 6' 6"
Exhaust diameter: 8"
Exhaust flow rate @ full standby: 34.5 m^3/min (1218.0 cfm)
Exhaust gas temperature @ full standby: 465 deg. C
Maximum exhaust backpressure: 10.2 kPa
EPA compliance: Tier 3 compliant
HC (Total Unburned Hydrocarbons) @ full standby: .07 grams/HP-Hour
NOx @ full standby: 5.67 grams/HP-Hour
CO @ full standby: 0.39 grams/HP-Hour
PM (Particulate Matter): 0.06 grams/HP-Hour
SO2: 0.12 grams/HP-Hour
Smoke (Bosch #): 0.49 grams/HP-Hour
Sound Pressure Data @ 7 meters: 86.3 dB(A)

Emissions from Emergency Diesel Generator

Rated Horsepower	**345**	**BHP**			
Testing duration	**60**	**min/week**			
Yearly testing	**52**	**week/year**			
Expected non-emergency usage	**52**	**hr/yr**			
Pollutant	Emision Factor	Emission Rate per Testing	Yearly Emission Rate	Hourly Emission Rate	Annual Emission Rate
	g/HP/Hr	lb/hr	lb/yr	g/s	g/s
NO_X	5.67	4.31	224.02	0.543	3.23E-03
CO	0.39	0.30	15.41	0.037	2.22E-04
VOC (Total Hydrocarbons)	0.07	0.05	2.77	0.007	3.98E-05
SO_X	0.12	0.09	4.74	0.0115	6.83E-05
PM_{10}	0.06	0.05	2.37	0.006	3.41E-05

QSL9-G3



EPA T3/EU SIIIA

> Specification sheet

Our energy working for you.™

Description

Cummins QSL engines are built to deliver heavy-duty performance in every piece of machinery. Full-authority electronic engine controls combine with the high-pressure fuel system, 24-valve design and centred injectors for one of the highest power-to-weight ratios in its class, with up to 50% torque rise. At the same time, the QSL delivers better fuel economy, has better cold starting capability and is up to 50% quieter in operation than predecessors.

CE — This engine has been built to comply with CE certification.

This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.

Features

Common Rail fuel System and Controls - Bosch high pressure common rail (HPCR) - Optimize engine performance to provide seamless integration and advanced diagnostics and programming options.

Holset HX40 Turbocharging - Wastegated design optimizes operation across the torque curve with improved response.

Integrated Block Design - Integrated fluid circuits replace hoses and eliminate potential leaks.

24-Valve Cylinder Head - Four valves per cylinder for increased power with faster response at every rpm.

Coolpac Integrated Design - products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1500 rpm (50 Hz) Ratings

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
257/345	227/304	193/259	257/344	227/304	192/258	220	275	200	250	170	213

1800 rpm (60 Hz) Ratings

Gross Engine Output			Net Engine Output			Typical Generator Set Output					
Standby	Prime	Base	Standby	Prime	Base	Standby (ESP)		Prime (PRP)		Base (COP)	
kWm/BHP			kWm/BHP			kWe	kVA	kWe	kVA	kWe	kVA
297/398	262/351	223/299	284/381	249/334	210/282	250	313	227	284	194	243

General Engine Data

Type	4 cycle, in-line, Turbo Charged, Air-cooled
Bore mm	114 mm (4.5in)
Stroke mm	145 mm (5.7in)
Displacement Litre	8.8 litre (543 in³)
Cylinder Block	Cast iron, 6 cylinder
Battery Charging Alternator	70 amps
Starting Voltage	24 volt, negative ground
Fuel System	Direct injection
Fuel Filter	Spin-on fuel filters with water separator
Lube Oil Filter Type(s)	Spin-on full flow filter
Lube Oil Capacity (l)	26.5
Flywheel Dimensions	2/11.5

Coolpac Performance Data

Cooling System Design	Air Air Charge Cooled
Coolant Ratio	50% ethlene glycol; 50% water
Coolant Capacity (l)	16.0
Limiting Ambient Temp.**	53.0
Fan Power	7.5
Cooling system air flow (m³/s)**	5.4
Air Cleaner Type	Dry replaceable element with restriction indicator

** @ 13 mm H2O

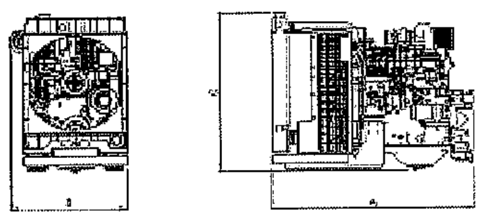
Ratings Definitions

Emergency Standby Power (ESP):
Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):
Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):
Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN6271 and BS 5514.



Weights & Dimension

Length	Width	Height	Weight (dry)
mm	mm	mm	kg
1624	1064	1463	810

Fuel Consumption 1500 (50 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	257	345	65	17.2
Prime Power				
100	227	304	59	15.3
75	170	228	49	12.7
50	114	152	34	8.8
25	57	76	18	4.7
Continuous Power				
100	193	259	53	13.8

Fuel Consumption 1800 (60 Hz)

%	kWm	BHP	L/ph	US gal/ph
Standby Power				
100	297	398	77	20.0
Prime Power				
100	262	351	70	18.2
75	197	264	58	15.1
50	131	176	41	10.7
25	66	88	21	5.5
Continuous Power				
100	223	299	53	13.8

Cummins G-Drive Engines

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Solar One Emergency Generator Greenhouse Gas Emissions

The calculation below is referenced in the "*Power/Utility Reporting Protocol Version 1.0 April 2005*", Calif. Climate Action Registry

Step 1. Identify the annual consumption of each fossil and non-fossil fuel

Diesel fuel for the generator

Step 2. Determine annual consumption of the fuel

	Max Fuel Flow HHV (MMBtu/hr)	Hours of Operation (hr/yr)	Fuel Consumed (MMBtu)	number of unit	Total Annual Fuel Consumed (MMBtu)
Emergency Diesel Power Generator	2.08	52.00	108.10	1	108
Total					108

Note

1. Max Fuel Flow HHV: used 8,089 Btu/hp-hr power output to energy input conversion ratio for the No. 2 fuel oil/internal combustion engine. (Source: Table 3-6, API - Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry, December 2003)

Step 3. Apply or Derive an Appropriate CO_2 Emission Factors for Each Fuel

Find the emission factors for diesel

Diesel (Distillate Oil)	Unit
73.14	(kg CO_2/MMBtu)
0.000907	(kg CH_4/MMBtu)
0.000358	(kg N_2O/MMBtu)

Step 4. Calculate fuel's carbon dioxide (CO_2) emissions

Total Emissions (metric tons) = Adjusted Emission Factor (kg CO_2/MMBtu) x Fuel Consumed (MMBtu) x 0.001 metric tons/kg

= 7.91 metric tons

Step 5a . Calculate each fuel's methane (CH_4) emissions .

Total Emissions (metric tons) = Adjusted Emission Factor (kg CH_4/MMBtu) x Fuel Consumed (MMBtu) x 0.001 metric tons/kg

= 9.8048E-05 metric tons

Step 5b. Calculate each fuel's N_2O emissions

Total Emissions (metric tons) = Adjusted Emission Factor (kg N_2O/MMBtu) x Fuel Consumed (MMBtu) x 0.001 metric tons/kg

= 3.87003E-05 metric tons

Step 6. Convert CH_4 and N_2O emissions to CO_2 equivalents and sum all subtotals

Greenhouse Gas	GWP (SAR, 1996)
CO_2	1
CH_4	21
N_2O	310

Note:

1. Greenhouse Gas GWP (SAR, 1996)
2. Source: Intergovernmental Panel on Climate Change, Second Assessment Report (1996)

RESULTS

Total Metric Tons of CO_2e = Total Metric Tons of CO_2 + CH_4 Tons of CO_2e + N_2O Tons of CO_2e

Equipment / Cases	**Emergency Diesel Power Generator**	**Annual Emissions - Total Metric Tons of CO_2e**
1 Emergency Diesel Power Generator	7.92	7.92

TECHNICAL AREA: AIR QUALITY

Data Adequacy Request 3. Provide a discussion of the mitigation measures that will be proposed to limit the operations maintenance criteria pollutant emissions of NOx, VOC, PM10 and PM2.5.

Response: Please see the response to Data Adequacy Request 1 above.

TECHNICAL AREA: AIR QUALITY

Data Adequacy Request 4. Provide an air quality modeling analysis that includes the operations maintenance criteria pollutant emission sources.

Response: On February 4, 2009, CEC staff was contacted to discuss how to best address this data adequacy request. In light of the previously filed AFC by SES for the Solar Two Project being required to conduct extensive re-analysis of both construction and operational emissions and conduct new modeling for each of these times, it was agreed that to minimize CEC staff review time for both projects, it would be prudent to allow CEC time to review the Solar Two Project new analyses, then conduct the Solar One new analyses in a similar fashion, ensuring only one iteration of the Solar One analyses for CEC to review.

Staff agreed that a modeling protocol could be submitted to fulfill this data adequacy request, given that SES ultimately will provide new operational modeling that includes the maintenance sources. Staff noted that a delay in providing the new operational modeling may cause a delay in review of that modeling analysis. SES is committed to providing the revised operational modeling analysis as soon as practical.

The modeling protocol for conducting the operational modeling is provided as Attachment AQ-2.

AQ-2

MODELING PROTOCOL FOR THE OPERATIONAL EMISSIONS FOR SES SOLAR ONE PROJECT SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for

California Energy Commission

URS Project No. 27658189.10000

March 30, 2009

URS

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μm	Micrometers or microns
AAQS	Ambient Air Quality Standards
AERMOD	American Meteorological Society/ Environmental Protection Agency Regulatory Model
AFC	Application For Certification
BLM	Bureau of Land Management
BPIP	Building profile input program
°C	degrees Celsius
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	Carbon monoxide
DOC	Determination of Compliance
EMFAC2007	The EMission FACtors (EMFAC) model from CARB
GEP	Good engineering practice
km	Kilometers
kW	Kilowatt
LLC	Limited Liability Company
MDAQMD	Mojave Desert Air Quality Management District
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NNSR	Non-attainment New Source Review
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NSR	New source review
O_3	Ozone
OFFROAD2007	Off-Road Emission Factor Model from CARB
O&M	operational and maintenance
OLM	ozone-limiting method
Pb	Lead
PCU	Power Conversion Unit
$PM_{2.5}$	Particulate matter less than 2.5 μm in diameter
PM_{10}	Particulate matter less than 10 μm in diameter
ppm	Parts per million
PSD	Prevention of Significant Deterioration
ROC	Reactive organic compound
SO_2	Sulfur dioxide
SES	Stirling Energy Systems
tpy	Tons per year
USEPA	United States Environmental Protection Agency

USGS	United States Geological Survey
VOC	Volatile organic compound

SECTION 1 INTRODUCTION

1.1 BACKGROUND

The Stirling Energy Systems (SES) Solar One (Solar One or Project) will be a solar thermal electric generation facility consisting of approximately 34,000 solar dish Stirling systems, SunCatchers, its associated equipment and systems, and its support infrastructure. The only stationary source of air pollutant emissions for the Project operation will be one emergency diesel generator. The nominal design electric capacity of the Project is approximately 850 megawatts (MW). The Project will be one of the world's largest solar power projects. It will be owned and operated by SES Solar Three, LLC (Limited Liability Company) and SES Solar Six, LLC.

The Project Site is approximately 8,230 acres and is located in a rural area in San Bernardino County, California between Newberry Springs and Ludlow, California, near I-40. Barstow is approximately 37 miles west of the site; Newberry Springs is located approximately 17 miles west of the site; Victorville is approximately 57 miles southwest of the site; and Ludlow is located approximately 13 miles east of the site. The area where the Project would be constructed is primarily open, undeveloped land within the Mojave Desert.

1.2 PURPOSE

In Data Adequacy Request 4 for SES Solar One Application for Certification (08-AFC-13), CEC has requested an air quality modeling analysis that includes criteria pollutant emissions from all operational sources, including on-site maintenance activities. In the AFC an air quality analysis of the stationary emission sources was conducted, and that analysis was appropriate for air permitting requirements of the MDAQMD. The analysis requested in Data Adequacy Request 4 goes beyond the normal requirements for air permitting and CEQA analyses. This document summarizes the procedures proposed by URS Corporation to conduct the requested additional operational air quality modeling analysis. The techniques described here are similar in many respects to those that were used in the AFC analysis of the Project's construction phase impacts to air quality. These same modeling techniques will be also used to assess the overlap between the construction and operations phases, if this is required. Modeling of overlapping construction and operational emissions will not be conducted, if the peak concentrations predicted from the construction phase plus the peak concentrations predicted during the operational summed are less than the most stringent AAQS.

This protocol is being submitted in response to Data Adequacy Request 4 for review and comment by CEC prior to conducting the operations modeling for the Solar One Project. The proposed model selection and modeling approach is based on review of applicable regulations and agency guidance documents.

1.3 DESCRIPTION OF THE PROPOSED SOURCES

The only stationary sources associated with the Solar One Project that emit air pollutants and require air permits from the Mojave Desert AQMD are a 250kW emergency diesel generator and a 5,000 gallon gasoline tank. The gasoline tank will have emissions of VOCs, but these are not included in the air quality modeling. The diesel firewater pump engine that was included in the AFC has been replaced by an electric pump, and will operate from project generated electricity, grid electricity or electricity from the emergency generator.

There will also be fuel combustion exhaust emissions from the mobile sources used to wash and maintain the SunCatchers and other facility components, and the fugitive dust associated with the travel of these vehicles.

1.4 REGULATORY SETTING

The project is subject to the site licensing requirements of the California Energy Commission (CEC). The CEC will coordinate its independent air quality evaluations with the Mojave Desert Air Quality Management District (MDAQMD) through the Determination of Compliance (DOC) process.

The Federal 40 CFR Part 51 and 40 CFR Part 93 Subpart B §93.150 to §93.160 establish the criteria for siting new emission sources and the requirement for General Conformity analysis, respectively. The Project is potentially subject to the General Conformity regulations because the site will be on BLM lands. BLM has authority as the responsible federal agency. MDAQMD has the authority by USEPA for administering the NSR process and helping BLM to determine Federal General Conformity, as described in MDAQMD Regulation XIII and Regulation XX, respectively. The analyses outlined in this protocol, will fulfill the MDAQMD and USEPA requirements. The Project's operational and construction emission estimates will be compared with the applicability thresholds to determine if the Project needs to perform a further general conformity analysis.

USEPA, in response to the federal CAA of 1970, established federal NAAQS in 40 CFR Part 50. The federal NAAQS include both primary and secondary standards for six "criteria" pollutants, O_3, CO, NO_2, SO_2, PM_{10}, and Pb. Ambient air quality impact modeling will be conducted to demonstrate compliance with the NAAQS.

The area around the proposed Project Facility is classified as unclassified/attainment with respect to the national ambient standards for nitrogen dioxide (NO_2), CO, SO_2, and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$), and non-attainment for ozone (O_3) and particulate matter less than 10 micrometers in diameter (PM_{10}). With respect to the California Ambient Air Quality Standards (CAAQS), the area around the proposed Project Facility is classified as attainment for NO_2, CO, and SO_2, and non-attainment for O_3, $PM_{2.5}$, and PM_{10}. NO_2 and SO_2 are regulated as PM_{10} precursors, and NO_2 and reactive organic compounds (ROCs) as O_3 precursors.

The purpose of the air quality dispersion modeling analysis is to demonstrate that air emissions from the proposed Project will not cause or contribute significantly to an AAQS violation. Compliance with the MDAQMD Rule 1303 modeling requirements for attainment pollutants will be demonstrated by determining the maximum impact of the proposed Project at any receptor and adding a conservative background concentration. The proposed Project facility will not be considered to cause or contribute to a near-field ambient air quality violation unless impacts from these sources combined with the background concentration exceed the most stringent ambient air quality standard or contribute significantly to an existing violation of a standard for a nonattainment pollutant.

SECTION 2 MODELS PROPOSED AND MODELING TECHNIQUES

This section describes the dispersion models and modeling techniques that are proposed to be used in performing the air quality analysis for the proposed Project. The objectives of the modeling are to demonstrate that air emissions from the proposed Project will not cause or contribute significantly to an exceedance of the ambient air quality standards.

2.1 AIR QUALITY DISPERSION MODELING

The USEPA American Meteorological Society/ Environmental Protection Agency Regulatory Model (AERMOD) version (07026) will be used for the air quality analyses associated with the proposed Project facility. The maximum modeled pollutant concentrations due to project sources will be added to a conservative background concentration, based on recent data from the CARB and MDAQMD air quality monitoring stations determined to be most representative of pre-project conditions in the project area. The modeled plus background concentrations will be compared with the most stringent ambient air quality standard.

Air quality modeling using AERMOD will be conducted to evaluate the criteria pollutant impacts from the operational phase of the Project in a similar manner as was done for the construction phase. The construction analysis was presented in the AFC. Specific modeling techniques used in the AERMOD analyses for the required AAQS analysis are discussed below.

As in the construction analysis, the land use will be rural and all regulatory model default options will be used, including building and stack tip downwash (in the operation model only), default wind speed profiles, exclusion of deposition and gravitational settling, consideration of buoyant plume rise, and complex terrain.

For the AERMOD simulations that evaluate operational impacts on NO_2 concentrations, the ozone-limiting method (OLM) option of the model will be used to take into account the role of ambient O_3 in limiting the conversion of emitted NO_x (which occurs mostly in the form of NO) to NO_2, the pollutant regulated by ambient standards. The input data to the AERMOD-OLM model will include the representative hourly O_3 monitoring data for the same year corresponding to the meteorological input record. The simulations will use the O_3 data from the MDAQMD Barstow Monitoring Station for the year 2005, the same year as the meteorological input data to the model. This station was judged to be most representative of conditions at the proposed Project site, and the AERMOD-OLM version of the model will be run for both the one-hour and annual averaging times. The peak NO_2 concentration predicted with AERMOD will be added to the peak NO_2 concentration measured at the three nearest monitoring stations. If the one hour NO_2 concentration predicted using the peak background concentration is greater than the CAAQS, then a less conservative approach will be used. The NO_2 concentration measured at the Barstow monitoring station for the same hour as when the model predicted the peak concentration will be added to the peak model concentration.

2.1.1 Building Wake Effects

The effect of building wakes (i.e., downwash) upon the stack plumes of the proposed Project operational emission sources will be evaluated in accordance with USEPA guidance (USEPA, 1985). Direction-specific building data will be generated for stacks below good engineering practice (GEP) stack height using the most recent version of USEPA Building Parameter Input Program – Prime (BPIP-Prime). Appropriate information on the locations and dimensions of building, tanks and other structures of the operational Project site will be provided in the analysis to supplement the AFC. The AERMOD model considers direction-specific downwash using both the Huber Snyder and Schulman-Scire algorithms as evaluated in the BPIP-Prime program.

2.1.2 Receptor Grid

Based on extensive experience modeling power plant construction phase effects, maximum concentrations for all pollutants due to maintenance vehicle operations are expected to occur within the first 100 meters from the Project boundary. Maximum operational pollutant concentrations from the backup diesel generator engine and on-site operational maintenance mobile sources can also be expected to occur at receptor points on or near to the Project boundary. Accordingly, the model receptor grid for the AERMOD simulations described in this protocol for both operational and construction sources will be configured as follows:

- 50-meter spacing along the fence line, and
- 100-meter spacing from fence line to approximately 1 km beyond the property line.

Terrain heights at receptor grid points will be determined from USGS digital elevation model files.

2.1.3 Meteorological Data

The AERMOD modeling analysis to evaluate the potential effects of Project operations will use the same one year of hourly meteorological data set described in the AFC and used for the construction analysis. The meteorological data were collected at the nearest long-term meteorological station to the Project Site, the Barstow Daggett Airport, which is located approximately 13 miles east of the Project Site. Hourly meteorological data for year 2005 was selected due to the high data capture available in that year for that station (greater than 90 percent). Details regarding the meteorological data processing can be found in the AFC.

2.1.4 Air Quality Monitoring Data

The same ambient air quality data used in the construction modeling presented in the AFC will be used to represent the background air quality for the operations modeling. The maximum measured pollutant concentrations from the Barstow, Victorville and Trona air monitoring sites over the last three years (2005-2007) will be used to represent background air quality for the modeling analyses and will be added to the modeled peak impacts due to proposed Project emission sources. The convention of assuming that the peak concentration resulting from project emission sources will occur at the same time and location as the highest recorded concentration at the nearest monitoring station is extremely conservative, and will ensure that the modeling analysis will error on the side of overestimation with regard to the comparison of predicted impacts with applicable ambient standards.

2.2 MODELING EMISSIONS INVENTORY

2.2.1.1 Operational Project Sources

Air pollutant emission sources associated with thermal solar electric generation are much smaller than for conventional power plants. Operational stationary sources of emissions for the Project will be limited to only one backup diesel internal combustion engine driver for an emergency generator. The fire water pump will be electrically powered; thus no emissions will be associated with this engine. Emission rates to be used in the model for the emergency diesel generator will be based on vendor-supplied or EPA Title 40 CFR 89.112 Tier 3 emission factors, whichever factor is higher. The exclusive fuel for the emergency generator will be ultra-low sulfur diesel containing a maximum of 15 ppm sulfur.

In addition to the stationary source, combustion exhaust and fugitive dust emissions are expected to occur from the operations and maintenance (O&M) equipment and vehicles used during the Project operation. These will consist of wash vehicles that will clean the SunCatchers up to once a month, LRU trucks that will maintain the SunCatchers and Power Conversion Units (PCUs), forklifts to move supplies, security vehicles, commuter vehicles and occasional delivery trucks and waste removal trucks. Estimated daily vehicle quantities and labor requirements presented in the AFC have been revised by the project design engineers since the submittal of the AFC. Emissions for the operational modeling will be estimated based on the revised project operations data. Operational exhaust emissions will be estimated using emission factors from the EMFAC2007 and OFFROAD2007 emissions models for on-road and off-road mobile sources, respectively.

SES has reevaluated activities associated with the operation and maintenance of the Solar One Project in an effort to reduce air emissions. The primary changes are outlined below. All diesel-fueled wash vehicles, other maintenance trucks and vans for commuting will be replaced with new gasoline-fuel vehicles that meet strict California vehicle emissions standards. This will eliminate emissions of toxic diesel particulate from these vehicles and reduce ozone precursor emissions. Propane will be used to fuel the forklifts and man lifts used for maintenance activities. All vehicles used for site inspection and security will be replaced with hybrid vehicles, most likely the Toyota Highlander Hybrid sport utility vehicles or similar vehicle. Hydrogen will now be produced onsite and travel through a closed-cycle system to drive a high-efficiency engine in each SunCatcher, eliminating the need for numerous hydrogen cylinder delivery truck trips. Better travel management will reduce the mileage of each vehicle compared with the data presented in the AFC, thus reducing both exhaust and fugitive dust emissions.

The polymeric sealant, Soiltac™ (or a product with similar or better performance), will be applied to all unpaved roads throughout the Project site to control fugitive dust during both construction and operations. The application of this sealant on the roads will create a surface that will resemble pavement for the purposes of dust reduction. The sealant will be sprayed onto surfaces from a truck not unlike a water truck that would be used for dust control purposes. There will be no unpaved or unsealed roads on the site during operation, and no offroad travel by any equipment. The paved road emission factors and equations from *USEPA Compilation of Emission Factors AP-42* (Fifth edition, EPA 1995) will be applied to estimate the fugitive emissions from travel on sealed or paved roads (Section 13.2.1).

The emission rate and stack parameters for the diesel generator will be the same as presented in the AFC and will be represented as a point source in the model.

Mobile vehicle exhaust emissions will be represented in the AERMOD model as point sources and spread randomly throughout the sections of the site were maintenance activities are anticipated to occur. All point sources will be given generic stack parameters representative of 50, 100, and 200 horsepower engines for forklifts, staff & visitor cars, and the remainder of maintenance & delivery trucks, respectively. The stack parameters for generic engines are provided in the *Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engine* (CARB, October 2000). The assumed stack height will be 0.5, 2, and 3 meters for the point sources of staff cars, off-road equipment, and maintenance trucks, respectively. Since the stack parameters for gasoline and other fuel engines may be different from the diesel ones, appropriate stack parameters for the non-diesel engines will be obtained from the project engineers. However, volume sources will be used as an alternative in the AERMOD model to represent the mobile sources if there are no good stack parameters available at this preliminary design stage. For vehicles with horizontal exhausts, the volume sources will have an initial release height of 2 meters. Emissions of fugitive dust (PM_{10} and $PM_{2.5}$) will be represented as area sources in the operations modeling.

The Solar One facility will operate 24 hours per day, therefore emissions from all sources associated with normal project operations will be modeled over 24 hours per day.

SECTION 3 PRESENTATION OF MODELING RESULTS

3.1 NAAQS AND CAAQS ANALYSIS

For CO, $PM_{10,}$ $PM_{2.5}$, NO_2, and SO_2, the maximum predicted short-term and annual concentrations due to project emissions plus conservatively estimated background levels will be reported and compared with California and National Ambient Air Quality Standards. The results of the AAQS compliance analyses for the proposed Project will be presented in summary tables.

3.2 DATA SUBMITTAL

Electronic copies of the modeling input and output files for all the analyses described in this protocol will be copied to a DVD/CD and provided to the CEC.

SECTION 4 REFERENCES

California Air Resources Board (CARB), 2000. *Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engine*, October 2000.

CEC, 1997. "Regulations Pertaining to the Rules of Practice and Procedure and Plant Site Certification". Title 20, California Code of Regulations. Chapter 1, 2, 5.

CEC, 2006. Rules of Practice and Procedure & Power Plant Site Certification Regulations Revisions, 04-SIT-2, December 14, 2006.

United States Environmental Protection Agency, 1985. *Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)*, EPA-450/4-85-023R, June 1985.

United States Environmental Protection Agency, 1995. *Compilation of Emission Factors AP-42 (Fifth edition, 1995)*.

United States Environmental Protection Agency, 2004. *User's Guide for the AMS/EPA Regulatory Model-AERMOD.* EPA-454/B-03-001, September 2004.

United States Environmental Protection Agency, 2006. *Addendum User's Guide for the AMS/EPA Regulatory Model-AERMOD.* December 2006.

United States Environmental Protection Agency, 2007. *AERMOD Implementation Guide*. October 2007.

United States Environmental Protection Agency, 2008. *AERMOD Implementation Guide*. January 2008.

TECHNICAL AREA: AIR QUALITY

Data Adequacy Request 5. Provide a detailed discussion of the mitigation measures that will be proposed to mitigate the operations maintenance emissions of emissions that currently exceed ambient air quality standards (NOx and VOC as ozone precursors, PM10, and PM2.5), but are not subject to offset requirements under the district's new source review rule.

Response: Currently, the Project Area is located in a federal and state nonattainment area for ozone (O_3) and PM_{10} and state nonattainment area for $PM_{2.5}$ and is unclassified for federal $PM_{2.5}$. The operations maintenance emissions will mainly come from mobile sources that are not subject to offset requirements under the district's NSR rule. The application of the project modifications and mitigation measures detailed in the response to Data Adequacy Request 1 will reduce the operational maintenance mobile source emissions significantly from those presented in the AFC. Emission reductions from the onsite and offsite stationary and mobile sources are anticipated to be between 70% and 90% of those presented in the AFC.

TECHNICAL AREA: ALTERNATIVES

Data Adequacy Request 6. Please provide economic merits of the alternative site locations discussed in subsection (f) (1).

4-6 (Section 4.2.2.1 – 4.2.2.2.) Alternative Engineering Alternatives.
4-25 (Section 4.3.2.1 – 4.3.2.3) Alternative Site Locations. – address this issue only
4-30 (Section 4.5) Alternative Linear Routes
4-30 (Section 4.6) Water Supply

Response: To be economically viable the Solar One Project must be sited close to existing infrastructure (major highways and electrical system that has latent capacity), have reasonable land cost (including consideration of grading cost and drainage costs), fair value water cost, compensatory mitigation requirements, and very good solarity. A site with excellent solarity might be able to afford higher land cost or longer transmission lines for grid interconnection, but there is little leeway since solar projects compete with wind, geothermal, and other renewable technologies in utility solicitations.

In theory, a solar thermal plant can be built anywhere that the sun shines, however internal cost considerations dictate that they be built in areas of high solar radiation – a measure of how much power can be generated in a single square meter of surface area in a typical year. The best solar radiation is found in high desert areas, such as the Mojave Desert in Southern California, where the sun shines reliably 330 to 350 days a year.

Each of the alternative sites discussed in the AFC would require a similar capital investment to develop. When juxtaposed with external costs and long term environmental costs associated with climate change, it effects site selection minimally.

The following factors were considered as part of the siting criteria for the Solar One Project:

- Transmission Line
    - Substation: Existing available capacity will limit the need to add additional capacity to existing substation. This will require less money up front.
    - Availability through utility companies precludes the project from having to fund and construct new lines.
    - Close proximity to the site decreases material costs and land disturbance mitigation.

- Land Jurisdiction and Site Selection
  - Environmental Conditions
    - Less impact to resources on the selected site would require less mitigation, and as such, minimize costs.
    - Relatively constant positive slope from south to north allows for better utilization of available land.
    - Sites with characteristic soils of alluvial floodplain cost less for site preparation and project build-out than those of shallow bedrock.
- Solar Radiation
  - High solar radiation allows for increased output and efficiency which offset development costs.
- Water
  - Availability of appropriate quantity of water within reasonable distance of the site.
- Access to the site
  - Proximity to rail access and freeway access decrease road construction and material transportation costs.

Comparison of some of the alternative site locations has been provided on the following Table ALT-1

TABLE ALT-1
ALTERNATIVE SITE COMPARISONS

SITE	T- LINE	LAND USE	ENVIRONMENTAL CONDITIONS	ACCESS TO SITE	RAILROAD	VISUAL	ECONOMICS
CAMP ROCK ROAD	Mohave-Lugo-El Dorado Transmission Line corridor	Mojave Resource Management Plan (BLM) as limited and moderate	Slope range from 3-6%. Category I for Desert Tortoise habitat	Access through County-maintained road. Lack of major highway access	No railroad within 10 miles	Remote site with low scenic quality	Additional costs for constructing access roads would be incurred due to limited freeway access. To construct a road 24' wide with a 3' shoulder on each side (paved) the cost would be approximately $200/linear foot. No railroad access would also increase costs for delivery of materials.
UPPER JOHNSON	Close proximity to SCE Lugo-El Dorado Transmission Line Corridor	Owned by Southern California Edison (SCE)	Slope range from 3-5%. Category III for Desert Tortoise habitat	Access through County-maintained road. Lack of major highway access	No railroad within 10 miles	Remote site with low scenic quality	This area is the largest designated OHV area in California. There would be significant time and cost to go through the process to eliminate the OHV use.
WEST OF 29 PALMS	Within 3 miles of SCE Lugo-Pisgah No. 2 Transmission Line		Slope range from 3-5%. No critical habitat identified for Desert Tortoise	Existing access on a gravel road 15 miles south of I-40	No railroad within 10 miles	Remote site with low scenic quality	Additional costs for constructing access roads would be incurred due to limited freeway access. To construct a road 24' wide with a 3' shoulder on each side (paved) the cost would be approximately $200/linear foot. No railroad access would also increase costs for delivery of materials. Transmission lines cost would be approximately $1.5 Million per mile that needs to be added.
I-40 SOUTH	Site is traversed by the SCE Lugo-Pisgah No. 2 Transmission Line	Existing mining claims. Twentynine Palms military base (adjacent to the southeast)	Slope range from 3-5% on rocky and vulcanized (lava) soils. No critical Desert Tortoise habitat	Existing access on a gravel road 6 miles southwest of I-40	Railroad is located several miles to the North	Slightly visible from I-40 with low scenic quality	There would be additional costs to buy out the mining claims. Restricted access due to the military base. Additional cost in placing foundations due to soil type.
BROADWELL LAKE	Near existing SCE Lugo-Pisgah No. 2 Transmission Line Corridor	Within an area previously proposed as Sleeping Beauty WSA and is sited north of BLM-designated Pisgah ACEC	Slopes range from 3-5%. Suitable Desert Tortoise habitat has been identified.	Existing access on a gravel road 9 miles north of I-40	Railroad is located approximately 6 miles to the South	Slightly visible from I-40/U.S. Route 66 and would be sited within an area of low to moderate scenic quality	Time and expense would be incurred in going through the process to remove the WSA designation.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Adequacy Request 7. Please provide a table listing those bird species which are covered under the Migratory Bird Act.

Response: All native bird species detected on the project site are covered by the Migratory Bird Treaty Act (MBTA). The list below identifies these species covered under the Migratory Bird Treaty Act and it is from Appendix D of the Biology technical report.

Birds	
Amphilspiza bilineata	black-throated sparrow
Amphispiza belli	sage sparrow
Aquila chrysaetos	golden eagle
Athene cunicularia	burrowing owl
Buteo jamaicensis	red-tailed hawk
Buteo swainsoni	Swainson's hawk
Callipepla californica	California quail
Carpodacus mexicanus	house finch
Cathartes aura	turkey vulture
Chordeiles minor	common nighthawk
Corvis corax	common raven
Dendroica coronata	yellow-rumped warbler
Eremophila alpestris actia	California horned lark
Geococcyx californianus	greater roadrunner
Junco hyemalis	dark-eyed junco
Lanius ludovicianus	loggerhead shrike
Mimus polyglottos	northern mockingbird
Myiarchus cinerascens	ash-throated flycatcher
Phainopepla nitens	phainopepla
Picoides scalaris	ladder-back woodpecker
Poecile gambeli	mountain chickadee
Regulus calendula	ruby-crowned kinglet
Salpinctes obsoletus	rock wren
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Spizella passerina	chipping sparrow
Stelgidopteryx serripennis	northern rough-winged swallow
Sturnella neglecta	western meadowlark
Tachycineta thalassina	violet-green swallow
Throyomanes bewickii	Bewick's wren
Toxostoma bendirei	Bendire's thrasher
Toxostoma redivivum	California thrasher

Turdus migratorius	American robin
Tyrannus verticalis	western kingbird
Zenaida macroura	mourning dove
Zonotrichia leucophrys	white-crowned sparrow

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Adequacy Request 8. Please provide the resumes of the following biologists: Brooke McDonald, Claudia Solorzano, Kelly Sleeth, Sage Jensen, Rick Bailey, Dave Erikson, Jill Seed, and Marc Baker

Response: The requested resumes are provided as attachment BIO-1 and include the following biologists: Brooke McDonald, Claudia Solorzano, Kelly Sleeth, Sage Jensen, Rick Bailey, Dave Erikson, Jill Seed, and Marc Baker

ERIC A. BAILEY
Project Biologist

Areas of Expertise	Endangered Species Surveys Construction Monitoring Biological Assessment
Total Years of Experience URS Other Firms	19 7 12
Education	BA / 1984 / Biological Sciences / California State University California Teaching Credential / 1986 / Life Science / California State University
Publications	Dispersal Capability of the California Gnatcatcher: A Landscape Analysis of Distribution Data. Western Birds 29:351-360, 1998. (P. Mock, coauthor). California Gnatcatcher Territorial Behavior. Western Birds 29:242-257, 1998. (M. Grishaver, K. Preston, P. Mock, and D. King, coauthors).
Endangered Species Recovery Permit	U.S. Fish and Wildlife Service Recovery Permit Number TE-101151-0. California Gnatcatcher; Presence/Absence Surveys, and Nest Monitoring.
Overview	Mr. Bailey has over 19 years of experience as an environmental biologist. His responsibilities include focused surveys for California gnatcatcher, least Bell's vireo, arroyo southwestern toad, and desert tortoise; vegetation mapping; and technical report preparation in conformance with CEQA, NEPA, and ESA.

Project Experience

Endangered/Sensitive Species Surveys

Kinder Morgan Energy Partners Arroyo Toad Exclusion, Camp Pendleton, California
Conducted surveys for arroyo toad in and around pipeline construction area over a two-year period. Maintained pit traps and exclusion fencing to prevent take of arroyo toad. Conducted bullfrog removal from portions of San Mateo Creek.

Wylie Construction Sewage Treatment Facility, Camp Pendleton, California
Conducted focused surveys for arroyo toad in and around construction site. Maintained pit traps and exclusion fencing to prevent take of arroyo toad.

Solar I Desert Tortoise Surveys, Barstow, California
Conducted focused surveys for desert tortoise. Recorded tortoise locations, health indicators, and scat/burrow locations for the project.

San Mateo Lagoon Exotic Predator Control, San Clemente, California
Conducted surveys for arroyo toad, southwestern pond turtle, and tidewater goby. Managed field task to remove non-native predators from the lagoon. Species removed include bullfrog, crayfish, and catfish. Prepared summary report for the project.

State Route 73 Water Quality Basins, Orange County, California
Conducted focused surveys for California gnatcatcher and monitored nest sites. Communicated with construction supervisors to avoid impacts to active nests. Prepared summary report for the project.

Multiple Species Conservation Plan (MSCP) California Gnatcatcher Population Census, San Diego, California
Conducted focused surveys for California gnatcatcher at conservation areas throughout San Diego County. Prepared final report of gnatcatcher population with discussion of the relative quality of the conservation areas.

Solar II Flat-tailed Horned Lizard Surveys, El Centro, California
Conducted focused surveys for flat-tailed horned lizard and desert horned lizard. Recorded horned lizard locations and scat locations for the project.

Saint Michael's School Construction, Poway, California
Conducted focused surveys for California gnatcatcher and delineated territorial boundaries relative to construction. Prepared project report detailing conservation efforts on-site.

Federal Emergency Management Agency (FEMA) Fire Fuel Control, San Bernardino and Glendale, California
Conducted focused surveys for California gnatcatcher at proposed fire fuel management sites. Prepared final report for the project.

Emergency Storage Project, San Diego County Water Authority, San Diego, California
Conducted focused surveys for California gnatcatcher and arroyo southwestern toad. Survey area included vicinity of Lake Hodges and San Vicente Reservoir. Prepared portions of the Environmental Impact Report for the project.

Effects of Aircraft Noise on Least Bell's Vireo at Marine Corps Air Station Camp Pendleton, U.S. Department of the Navy, San Diego, California
Recorded behavioral data of least Bell's vireo biweekly over five months. Behavioral data was compared to onsite noise data to test for possible effects on the species by aircraft noise.

Rancho San Diego California Gnatcatcher Study, Home Capital Corporation
Collected behavioral field data on California gnatcatchers throughout the breeding and non-breeding seasons. Assisted in mist netting and color banding of approximately 114 individuals. Analyzed territory size data for a gnatcatcher population of approximately 25 pairs.

Miramar Landfill General Development Plan, City of San Diego, California
Conducted focused surveys for California gnatcatcher, San Diego fairy shrimp, San Diego mesa mint, San Diego button celery, and willowy monardella. Contributed to the biological technical report and environmental impact statement for the proposed facilities.

South County Landfills, City and County of San Diego, California
Conducted comprehensive field surveys for sensitive species and focused surveys for California gnatcatcher and arroyo southwestern toad in six proposed landfill sites. Prepared constraints level report for each site.

Construction Monitoring

San Elijo Hills Open Space Management, San Marcos, CA
Implemented and managed conservation plan for natural areas of San Elijo Hills. Monitored fire fuel management task, invasive weed removal, habitat restoration, and prevention of unauthorized dumping. Conducted yearly on-site population census of California gnatcatcher to measure success of the conservation effort. Prepared yearly summary report.

Biological Construction Monitoring for Olivenhain Reservoir
Project biologist monitoring California gnatcatcher nesting locations in relation to construction activity. This information allowed client to avoid impacts to Federally-listed Threatened California gnatcatcher.

Biological Construction Monitoring for Dana Point Headlands
Project biologist monitoring California gnatcatcher nesting locations in relation to construction activity, public use areas, and conserved habitat. This information allowed client to avoid impacts to Federally-listed Threatened California gnatcatcher, and to measure the success of the project conservation effort.

Biological Construction Monitoring for VertRep Facility, U.S. Navy/Stronghold Electric
Project biologist monitoring construction of a helicopter landing facility. Vernal pools, coastal sage scrub, and California gnatcatchers were the resources being protected.

Biological Construction Monitoring of San Elijo Hills, San Elijo Hills, LCC
Implemented monitoring of wetlands permit conditions.

California Gnatcatcher Study, Skyline Wesleyan Lutheran Church
Collected field data to assess construction noise impacts on the species over three years. Mist netted and color banded gnatcatchers within the study area. Delineated territories on site and recorded breeding behavior, nesting success, and dispersal of young. Prepared a letter report detailing the breeding home range of each pair onsite prior to construction.

Kramer-Victor Powerline, Southern California Edison
Conducted surveys for desert tortoise, Mojave ground squirrel, and rare plants along the Kramer-Victor power corridor. Additionally, monitored construction crews to prevent take of desert tortoise.

Biological Assessment
Escondido Parks Master Plan, City of Escondido, Escondido, California
Conducted field surveys for sensitive biological resources in proposed park sites and conservation areas.

Upham San Marcos Project, Chester R. Upham, San Marcos, California
Participated in biological resources survey of 35-acre site. Collected vernal pool soil samples for a fairy shrimp re-hydration study. Contributed to biological technical report.

Biological Resource Inventory, City of Poway, California
Conducted focused surveys for California gnatcatcher throughout the city and sphere of influence. Mapped habitats and sensitive resources.

South Santa Fe Avenue Widening and Realignment, San Diego County Department of Public Works, San Diego, California
Conducted field surveys to determine the presence or absence of least Bell's vireo in the project area. Recorded faunal species list and provided photographic documentation of habitat quality.

Rancho Del Rey, City of Chula Vista, California
Participated in a vernal pool study that included floral inventory and soil sample collection for a fairy shrimp re-hydration study.

First San Diego River Improvement Plan, City of San Diego, California
Managed field task to collect data on a 20-acre revegetation site. Data used to determine whether the project met required standards for success.

Client References

San Elijo Partners: Jeff O'Connor, 760.918.8200 (office), 760.420.8307 (mobile)

Dana Point Headlands: Kevin Darnall, 949.488.8800 (office), 949.633.0605 (mobile)

VITAE

MARC A. BAKER, Ph.D.

1217 GRANITE CREEK LANE, CHINO VALLEY, ARIZONA 86323
TEL: (928) 636-0252; (928) 713-7009; e-mail: marcbaker@cableone.net; marc.baker@asu.edu

RESEARCH INTERESTS

Evolution and systematics of Cactaceae; the role of polyploidy, hybridization, asexual reproduction, and geographic isolation in evolution. Flora, plant community dynamics, and ecology of the Southwestern United States, especially within the Sonoran Desert Biome; rare plant biology; currently working on the Cactaceae for the Intermountain Flora.

RESEARCH SKILLS

Transmission electron microscopy, scanning electron microscopy, thin-layer chromatography, high-performance liquid chromatography, cytological analysis of chromosomes of root-tips and microsporogenesis, herbarium techniques, ethnographic techniques, GPS, vegetation sampling and plant identification, especially for Arizona, Baja California, California, and New Mexico, computer data base systems, GIS, and graphics.

INSTITUTIONAL AFFILIATIONS

Southwest Botanical Research (duns no. 80-367-5776), Chino Valley, AZ: sole proprietor
Graduate Advisor, Prescott College, Prescott, Arizona
Adjunct Professor, Arizona State University, Tempe, Arizona
Native Plant Law Technical Advisory Board, Phoenix, AZ: member

ORGANIZATIONAL MEMBERSHIPS

Botanical Society of America
International Association of Plant Taxonomists
Arizona-Nevada Academy of Sciences
Arizona Riparian Council
California Botanical Society
California Native Plant Society

EDUCATION

Ph.D., Botany (Systematic Botany), May, 1985, Arizona State University Tempe, Arizona. **Dissertation:** Evolution of a hybrid polyploid complex in *Opuntia*, subgenus *Cylindropuntia* (Cactaceae).

M.A., Biology (Systematic Botany and Ethnobotany), June, 1980, Humboldt State University, Arcata, California. **Thesis:** Ethnobotany of the Yurok, Karok, and Tolowa Indians of Northwest California.

B.A., Botany, June, 1975, San Jose State University, San Jose, California.

A.A., Forestry, June, 1972, Bakersfield Community College, Bakersfield, California.

Foreign Languages: Spanish

BOTANICAL EXPERIENCE

2008.Botanical consultant for URS, Santa Barbara and San Diego Offices. Projects included rare plant surveys and Johnson Valley USFWS protocol 100% coverage desert tortoise surveys.

1988 to present. Owner of Southwest Botanical Research. Consulting services that include Biological Assessments and Evaluations and the collection, identification, survey, and other types of research on vascular plants of Arizona, California, Nevada, and New Mexico.

1993-present. Botanical consultant for Kiva Biological Consulting. August 1993-2007: Arizona Game & Fish Desert Tortoise Survey (contract # G30061-B). Study included plant identification and vegetation sampling. 2008: Fort Irwin Desert tortoise surveys. Primary contact: Pete Woodman.

2005-2008. Botanical consultant for Jones and Stokes, Sacramento, California. Including rare plant surveys in the Spring and Las Vegas Mtns., Clark County, Nevada, and wetland delineation in the Barstow, San Bernardino, California area.

1997-2007. Botanical consultant for Ecosystems Management, Inc. Projects include sensitive plant surveys for the Navajo Transmission line, Arizona/ New Mexico; sensitive plant survey for the Pittsburgh & Midway Coal Mine expansion near Ratón, New Mexico; and B.I.A. range surveys for the Navajo Partition Land, east of Flagstaff, AZ; range analysis for the Roswell BLM District, Roswell, NM. Principle contact: Bill Hevron, tel: (505) 884-8300.

1995-2006. Botanical consultant for Environet, Inc., Phoenix, Arizona. Projects include surveys for special status species, and Biological Assessment and Evaluations. Principle contact: Jill Himes, tel: (602) 438-0318.

1997 to 2002. Botanical consultant for Biozone, Inc., Prescott, Arizona. Projects include Vegetation characterization of the Watson Woods Riparian Preserve, Vegetation Characterization of the Walnut Creek Research and Learning Center, Survey for T&E species for the Hopi Reservation, and surveys.

1998. Biological consultant for Mojave Engineering Associates, Inc. Projects include Biological Assessment and Evaluations.

1994-1999. Botanical consultant for Johnson Associates Inc. Owner: Robert Johnson, tel: (408) 897-2473; projects have included biological surveys for housing developments and land fills.

1995. Botanical consultant for Hughes Environmental Consultants. Project included pipeline right-of-way Desert tortoise and botanical survey near Bullhead City, AZ and pipeline right-of-way botanical survey near Farmington, NM.

Aug 1990-1996. Botanical consultant for SWCA Associates. Subcontract duties included plant identification, vegetation mapping and vegetation volume sampling for ASARCO, Kearny, Arizona; vegetation sampling for the San Tan Tortoise Survey, Maricopa County, Arizona; sensitive plant survey for the Wickieup-Bagdad gas pipeline, vegetation mapping for the Phelps Dodge Mine Expansion Project, Morenci and Safford, AZ, the distribution and taxonomy of *Echinocereus arizonicus* and related taxa in Arizona and New Mexico; Project coordinators: Jim Tress, Tina Lee, Scott Mills, tel: 602-325-9141.

1993-1994. Botanical consultant for Resources Management International (RMI), including a plant survey for the Wickieup-Bagdad proposed Citizens' gas pipeline, project coordinator: Catherine LeBlanc.

Jan 1991-January 1995. Botanical consultant for the Department of Anthropology, Contract Archeology, Arizona State University. Research included vegetation mapping and floristic analysis of the Tonto Basin, Arizona. Project coordinator: Glen Rice, tel: 602-479-2406, 965-7181.

1991-1992. Botanical consultant for the Army Corps of Engineers. Duties include plant collection and identification for the construction of an herbarium of Arizona wetlands plants. Project coordinator: Karen Reichhardt.

1988-1991. Botanical consultant for Ruffner Associates. Subcontracts included a three year study of the sensitive plant species of Organ Pipe Cactus National Monument; *Tumamoca* surveys for private firms; and Vegetation mapping in southern California for the Riverside Water District.

1985-1987. New York Botanical Garden, Chief Investigator, *Plant Resources of the Ecuadorean Amazon* Project. Duties included creating an integrated program of teaching and ethnography with the Shuar (Jivaro) culture.

SELECTED CONTRACTS AND RESEARCH AWARDS

2008. Botanical Survey 2008 Season- Kuenzler's cactus surveys, Guadalupe Ranger District, Lincoln National Forest (contract no. AG-7512-P-07-0066). Contact: Larry Paul (505-887-9296).

2007. Rare plant surveys for the Turkey-Gavilon Fuel Units Project, Lincoln National Forest, Alamogordo, New Mexico (Contract no. AG-7512-P-07-0017, $12,130).

2007. Rare plant consultation for the Prescott National Forest, Prescott, Arizona (Contract no. AG-8191-P-0009, $5,000).

2006-7. Geographic Distribution of *Coryphantha robustispina* ssp. *robustispina* (Pima Pineapple Cactus) and *Echinomastus erectocentrus* var. *erectocentrus* (Needle-spined Pineapple Cactus) within the extended City of Tucson HCP Southlands planning area. Contract with the City of Tucson ($23,535).

2006. Morphological analysis of *Echinocactus horizonthalonius*. State of Arizona, Tucson.

2006. Geographical and morphological analysis of *Echinocereus fendleri*. Lincoln National Forest, Alamogordo, New Mexico.

2005-2012. Monitoring of *Coryphantha robustispina* var. *robustispina* in the Alter Valley, Pima County, Arizona. Grant from the Bureau of Reclamation, Phoenix, Arizona.

2005-6. Plant surveys for the Lincoln National Forest. Alamogordo, New Mexico (contract no. AG-7512-06-0016, $8,400).

2005-7. Floristic study of Rancho del Cielo, Pima County, Arizona. U. S. Bureau of Reclamation. Phoenix, Arizona. (Order no. 05PG321037).

2001-2006. Riparian vegetation monitoring for the Hubbell Trading Post National Historic Site, Ganado, Arizona.

2005. A phenetic analysis of the Acuña cactus, *Echinomastus erectocentra* var. *acunensis* and its relatives: *E. erectocentrus* var. *erectocentrus*, and *E. johnsonii* . State of Arizona, Tucson, (Order no.432672).

2004. Geographic distribution and DNA analysis of *Coryphantha robustispina* ssp. *robustispina*. Arizona Department of Game & Fish, Phoenix, Arizona.

2004. Five-year monitoring study for the Pima pineapple cactus (Coryphantha robustispina ssp. robustispina). U. S. Bureau of Reclamation. Phoenix, Arizona.

2003. Rare plant surveys for the Coronado National Forest, Tucson, Arizona. (Order no. 43-8197-3-0038, $12,200)

2003. Botanical survey of the Timberon/Culp Peak Fuel Reduction Project. Lincoln National Forest, Alamogordo, New Mexico. (Order No. 0308-03-10).

2003. Elucidation of the intraspecific taxonomy of *Coryphantha scheeri* using multivariate techniques. A study in cooperation with the U. S. Fish and Wildlife Service, Tucson, Arizona.

2003. Re-measurement of riparian transects along the lower Verde River. Rocky Mountain Forest and Range Experimental Station.

2002-3. Status report of *Cylindropuntia multigeniculata*, including further morphometric studies. U. S. Fish and Wildlife Service, Las Vegas, Nevada.

2002-3. Monitoring of *Coryphantha robustispina* var. *robustispina* for the Arizona-Sonora Desert Museum, Tucson, Arizona.

2001. Rare Plant and noxious weed survey of the Bradshaw Ranger District. Prescott National Forest. (order no. 43-94TZ-1-0164; $15,800)

2002. Survey and documentation of noxious weeds for the Coconino County Department of Public Works, Flagstaff, Arizona. ($6,100).

2002. Range analysis for the Chino Valley Ranger District (Prescott National Forest), Chino Valley, Arizona.

2001. Botanical surveys and monitoring for the Scott Able Fire, Sacramento Ranger District, Lincoln National Forest, New Mexico. ($54,000).

2001. Geographic survey of the a new species of *Leptodactylon* from Arizona. Prescott National Forest. ($2,500).

2001. Re-measurement of riparian transects along the upper Verde River and its tributaries. Rocky Mountain Forest and Range Experimental Station ($18,000).

2000. Re-measurement of riparian transects along the upper Verde River. Rocky Mountain Forest and Range Experimental Station (REC206, $5,000).

2000. Surveys and autecology of the Pima Pineapple Cactus (*Coryphantha scheeri*). Bureau of Reclamation. (00PG321054; $14,123.23).

2000. Vegetation mapping of the Peoria Planning Area. Maricopa County Water Conservation District, Phoenix, Arizona

($18,000). [study included mapping 40,000 acres of Sonoran Desert vegetation).

1999. Plant Status Reports for five plant species (Conioselinum mexicanum, *Erigeron arisolius, Eupatorium bigelovii, Lupinus huachucanus,* and *Stellaria porsildii*). Coronado National Forest (43-8197-9-0099, $2,500).

1999. Vegetation mapping of the greater Phoenix and Tucson Metropolitan Planning Areas as a part of the CAP water reallocation EA. Bureau of Reclamation, Phoenix, Arizona ($55,000). [study includes mapping 1.2 million acres of Sonoran Desert vegetation]

1999. Vegetation mapping of the Santa Cruz River Flood Plain, Pima Co., Arizona. Bureau of Reclamation, Phoenix. (Contract no. 99320500061, $9,750).

1999. Weed survey for the Coronado National Forest, Tucson, Arizona. (contact nos. 43-8167-8-0089, 43-8197-9-0077, $21,350, $4,600).

1999. Rare plant survey for the Lincoln National Forest. Alamogordo, New Mexico. (Contract no. 443-7512-8-0081, $1,850).

1998. Multivariate analysis and DNA study of the Blue Diamond Cholla and related taxa. U.S.F.W.S., Reno, Nevada.

1998. Riparian vegetation inventory for the middle Verde River, Rocky Mountain Research Station (contract no. 43-8167-8-0069, $5,000).

1998. Range analysis for the Prescott National Forest (contract no. 43-8167-8-0089, $23,000).

1998. Riparian vegetation baseline for the Hubbell Trading Post National Historic Site ($2,900).

1998. Floristic analysis of the Walnut Creek Riparian Preserve.

1998. Cactus research at Carlsbad National Park (contract no. 1443-cx-7170-98-001, $10.000).

1997. Range analysis for the Prescott National Forest (contract no. 43-8191-7-0106, $8,600).

1997. Riparian vegetation inventory for the upper Verde River, Prescott National Forest. (contract no. 43-8191-7-0104, $5,000).

1996. Vegetation characterization of the Watson Woods Riparian Preserve, Prescott, Arizona ($12,761).

1996. Identification and annotation of the Yavapai College Herbarium (YCH). Yavapai College, Prescott, Arizona ($6,270).

1996. Plant identification for the USDA, Forest Service Intermountain Research Station, Ogdon, Utah.

1995. Plant inventory in the Wet Beaver Creek Wilderness, Arizona. Coconino National Forest, U. S. Forest Service P. O. 43-8167-5-033 (6,800).

1995. Vegetation characterization of Cooks Lake, Arizona. U. S. Bureau of Reclamation contract No. 1425-5-PG-32-03630 (14,400).

1995. Botanical survey of the China Dam Grazing Allotment, Chino Valley Ranger District, Prescott National Forest, Chino Valley, Arizona. Share-Cost Agreement No. CCS-09-01-95-0127-MC-26801 ($37,616).

1995. Survey for endangered or candidate plant taxa of proposed National Forest land exchanges within the Verde Valley, Yavapai County, Arizona. Coconino National Forest contract No. 43-8167-5-0171 ($2,450).

1994. Botanical survey of the Limestone Grazing Allotment, Chino Valley Ranger District, Prescott National Forest, Chino Valley, Arizona. Share Cost Agreement No. CCS-09-94-076-26201 ($36,810)

1994. Reproductive status of *Vauquelinia californica* ssp. *pauciflora*. Contract from the Arizona Department of Agriculture, Phoenix, Arizona through the Arizona State University Department of Botany, ASU No. 94-0925 (4,000).

1994. Nutrioso milk-vetch (*Astragalus nutriosensis*) status survey. Contract from the Arizona Department of Agriculture, Phoenix, Arizona ($4,000).

1993. Botanical survey of the Camp Wood, Williamson Valley, Yolo North, and Yolo South grazing allotment of the Chino Valley Ranger District, U. S. Forest Service, Chino Valley, Arizona. Contact No. 43-8191-3-0132 ($22,292).

1992. Prescott National Forest. Botanical Survey of the Woodchute, Juniper Mesa, Sycamore Canyon and Apache Creek Wilderness Areas. Contact No. 43-8191-2-0221 ($17,797).

1992. U. S. Army Corps of Engineers. Construction of a Arizona Riparian plant reference collection. Contract No. DACW09-92-M-0103 ($2,500).

1991. U. S. Army Corps of Engineers. Construction of a Arizona Riparian plant reference collection. Contract No. DACW09-91-M-0342 ($2,500).

1982. Research assistantship, cytogenetic analysis of *Cowania* and *Fallugia* (Rosaceae). The feasibility of host range expansion in nitrogen_fixing non_legumes. Arizona State University Research Fund 521475, and National Science Foundation grant # TCM_8204885. Tempe, Arizona.

1981. Research assistantship, alkaloid analysis of *Opuntia* (Cactaceae). Arizona State University, Tempe, Arizona.

1980. Inventory of the rare and endangered species of Six Rivers National Forest. United States Forest Service contact, Eureka, California.

1979. Distribution of the rare and endangered plant species, *Arabis mcdonaldiana*. United States Forest Service contract, Eureka, California.

1978-1979. Sensitive species inventories for proposed timber sales. Bureau of Indian Affairs; Eureka, California.

1978. Autecology of the rare plant species, *Pityopus californicus*. United States Forest Service contact. Eureka, California.

TEACHING AND RELATED EXPERIENCE

1996 to present. Graduate advisor for Prescott College, Prescott, Arizona.

1996. Short courses in plant identification for the U. S. Forest Service Intermountain Research Station and the Prescott National Forest.

1987-1997. Independent study advisor for Prescott College, Prescott, Arizona.

1986. Lecturer. Plant systematics and tropical dendrology. Ministry of Agriculture and Instituto Normal Bilingue Intercultural Shuar, Ecuador.

1980-1982. Lab instructor. Cytogenetics, one semester; Arizona Flora, three semesters; Plants, Pleasures, and Poisons, one semester. Arizona State University.

1976_1978. Lab instructor. General Botany, three quarters; Plant Systematics; Plants and Man. Humboldt State University.

1973-1975. Technical assistant. Plant Anatomy; Plant Morphology; Plant Taxonomy. San Jose State University.

ABSTRACTS AND NOTES (*also presented as conference papers)

Coleman, R. A. and M. A. Baker. 2006. *Microthelys rubricallosa*, a new addition to the orchid flora of the United States. Orchids 75:56-57.

*Baker, M. A. 2005. Morphological and cytological analyses in *Cylindropuntia* (Cactaceae) the circumscription of *C. multigeniculata, C. echinocarpa*, and *C. whipplei*; including the resurrection of *C. whipplei* var. *enodis*. Paper presented at the annual meetings of the Society of Plant taxonomists. Austin, Texas.

*Baker, M. A. 2004. Pros and cons of using phenetic analysis of morphological data for the circumscription of problematic taxonomic groups; examples from the Cactaceae of the Chihuahuan desert Region. 6th Symposium on the Natural Resources of the Chihuahuan Desert. Alpine, Texas.

*Baker, M. A. 2003. Further elucidation of the taxonomic relationships and geographic distribution of *Escobaria sneedii* var. *sneedii*, *E. sneedii* var. *leei*, and *E. guadalupensis* (Cactaceae). Fourth Southwestern Rare and Endangered Plant Conference; Las Cruces, New Mexico.

*Baker, M. A. 1996. Recommendations for the preservation of rare plants and unique habitats within the Chino Valley Ranger District, central Arizona. Second Southwestern Rare and Endangered Plant Conference; Flagstaff, Arizona.

*Baker, M. A. 1996. Reproductive status of Arizona rosewood (*Vauquelinia californica* ssp. *pauciflora*). Arizona-Nevada Academy of Science 30(Proc. Suppl.).

*Baker, M. A. & D. J. Pinkava. 1994. Interspecific hybridization in *Opuntia* (Cactaceae) in Arizona and adjacent states. Arizona-

Nevada Academy of Science 29(Proc. Suppl.):20.

*Johnson, R. A., M. A. Baker, D. Pinkava, and G. A. Ruffner. 1992. Population dynamics and demography of Acuña Cactus (*Echinomastus erectrocentrus* var. *acunensis*). First Southwestern Rare & Endangered Plant Congress, US F&WS, Santa Fe, NM, 30 Mar-Apr 2.

Nesom, G. L. & M. A. Baker. 1991. First report of *Erigeron velutipes* (Asteraceae) from the United States. Phytologia 71(5):414-415.

Pinkava, D. J., B. D. Parfitt, and M. A. Baker. 1989. The *Opuntia standlyi* complex (Cactaceae). Arizona-Nevada Academy of Science 24(Proc. Suppl.):13

Baker, M. A. and B. D. Parfitt. 1986. Reports. In: A. Love (ed.), IOPB chromosome number reports XCI. Taxon 35:405-406.

*Baker, M. A. 1986. On the distribution and evolution of *Opuntia* of mainland Ecuador. Amer. J. Bot. 73 (5):750.

*Baker, M. A. 1986. Botanical Knowledge of the Shuar of Eastern Ecuador. Paper given at the annual meeting of the Society for Economic Botany, The New York Botanical Garden, Bronx, NY.

Parfit, B. D., M. A.Baker, and M. L. Gallagher. 1985. Reports. In: A. Love (ed.), IOPB chromosome number reports LXXXVI. Taxon 34:162-163.

*Baker, M. A. 1984. Triploidy: an isolation mechanism possibly leading to "speciation" in *Opuntia*, subgenus *Cylindropuntia* (Cactaceae). Amer. J. Bot. 71(5, part 2):155.

*Wallace, R. S., E. Fairbrothers, M. A. Baker, and D. J. Pinkava. 1984. Seed enzyme iso-electric-focusing as an aid toward classification in the genus *Opuntia* (Cactaceae). Amer. J. Bot. 71(5, part 2):197-198.

*Baker, M. A. 1983. The evolution, ecology, and distribution of *Pityopus*. J. Ariz._Nev. Acad. Sci. 18(Suppl.):30.

*Baker, M. A. and D. J. Pinkava. 1983. Megasporogenesis and megagametogenisis in *Opuntia fulgida*, *O*. *spinosior*, and their triploid hybrids. Amer. J. Bot. 70(5, part 2):104.

*Trushell, M. N., M. A. Baker, and D. J. Pinkava. 1983. Hybridization among *Opuntia whipplei*, *O*. *acanthocarpa*, and *O*. *leptocaulis* (Cactaceae). J. Arizona_Nevada Academy of Science (Suppl.):28.

Trushell, N., D. J. Pinkava, and *M. A. Baker. 1983. A taxonomic revision of the *Opuntia whipplei* complex (Cactaceae). Amer. J. Bot. 70(5, part 2):133.

*Baker, M. A. 1982. Preliminary studies of a hybrid polyploid complex of cholla. J. Ariz._Nev. Acad. Sci. 17(Suppl.):17.

*Baker, M. A. 1982. The ethnobotany of the Karok, Tolowa, and Yurok Indians of Northwest California. Bot. Soc. Amer. Misc. Pub. No. 162:83. Baker, M. A. 1982.

*Baker, M. A. 1982. Alkaloids of a clonal hybrid complex in *Opuntia* (Cactaceae). Bot. Soc. Amer. Misc. Pub. No. 162:83.

Baker, M. A. and Parfitt, B. D. 1982. Reports. In: A. Love (ed.),IOPB chromosome number reports LXXVII. Taxon 31:764-765.

Baker, M. A. 1982. Scanning electron micrographs of seeds. In: L. Bremer. *Coryphantha pusilliflora* sp. nov. A new species from Coahuila, Mexico. Cact. Succ. J. (US) 54:133_134.

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Baker, M. A. 1981. Scanning electron micrographs of seeds. In: L. Bremer. *Coryphantha grata* sp. nov. A new species from Tamaulipas, Mexico. Cact. Succ. J. (US) 53:276_277.

SELECTED REPORTS

Baker, M. A. 2007. Geographic Distribution of *Coryphantha robustispina* ssp. *robustispina* (Pima Pineapple Cactus) and *Echinomastus erectocentrus* var. *erectocentrus* (Needle-spined Pineapple Cactus) within the extended City of Tucson HCP Southlands planning area. Prepared for the City of Tucson.

Baker, M. A. 2005. Geographic Distribution of *Coryphantha robustispina* ssp. *robustispina* (Pima Pineapple Cactus) and *Echinomastus erectocentrus* var. *erectocentrus* (Needle-spined Pineapple Cactus) within the City of Tucson HCP planning area. Prepared for the City of Tucson.

Baker, M. A. 2005. Vegetation of the Scott-Able Fire and its immediate buffer area, a four-year study. Report to the Lincoln National Forest, Alamogordo, New Mexico.

Baker, M. A. 2004. Phenetic analysis of *Coryphantha*, section *Robustispina* (Cactaceae), part 1: stem characters. Report to the Arizona Department of Game & Fish, Phoenix, Arizona.

Baker, M. A. 2002. Phenetic analysis of *Cylindropuntia multigeniculata* (Clokey) Backb. (Cactaceae) and its relatives. A report prepared for the U.S. Fish and Wildlife Service, Reno, Arizona.

Baker, M. A. 2001. Morphometric analysis of *Echinocereus arizonicus* and its allies (section *Triglochidiatus*, Cactaceae). A report prepared for the U.S. Fish and Wildlife Service, Tucson, Arizona.

Baker, M. A. 2000. Vegetation along the Lower Santa Cruz River, Tucson, Arizona. Prepared for the U. S. Bureau of Reclamation, Phoenix, Arizona. 40pp. illust.

Baker, M. A. 1999. The status of known distributions within Coronado National Forest of *Allium glandulosum, Conioselinum scopulorum*, *Eriogonum arisolius*, *Eupatorium bigelovii*, *Lupinus huachucanus* and *Stellaria porsildii*. Prepared for the Coronado National Forest, Tucson, Arizona. 16pp,, illust.

Baker, M. A. 1996. A Botanical Survey of the Antelope Hills, Horseshoe, China Dam, and Perkinsville Grazing Allotments of the Chino Valley Ranger District, Prescott National Forest, Arizona. 105pp. illust.

Baker, M. A. 1996. Vegetation Characterization of the Cooks Lake Conservation Area and its associated buffer zones, Pinal County, Arizona. Prepared for the U. S. Bureau of Reclamation, Phoenix, Arizona. 109pp. illust.

Baker, M. A. & T. M. Wright. 1995. Survey for endangered or candidate plant taxa of proposed National Forest land exchanges within the Verde Valley, Yavapai County, Arizona. 20pp., illust.

Baker, M. A. & T. M. Wright. 1995. Botanical survey of the Limestone Grazing Allotment, Chino Valley Ranger District, Prescott National Forest, Arizona. 89pp., illust.

Baker, M. A. 1994. Reproductive status of Arizona rosewood (*Vauquelinia californica* ssp. *pauciflora*). Report to the Arizona Department of Agriculture, Phoenix, Arizona.

Baker, M. A. & T. M. Wright. 1994. Nutrioso milk-vetch (*Astragalus nutriosensis*) status report. Report to the Arizona Department of Agriculture, Phoenix, Arizona.

Baker, M. A. & T. M. Wright. 1994. Botanical survey of the Camp Wood, Williamson Valley, Yolo North, and Yolo South grazing allotment of the Chino Valley Ranger District, U. S. Forest Service, Chino Valley, Arizona. 120pp., illust.

Baker, M. A. and T. Wright. 1993. Botanical survey of the Apache Creek, Juniper Mesa, Sycamore Canyon, and Woodchute Wilderness areas of the Prescott National Forest, Arizona. 188pp., illust.

Johnson, R. A., M. A. Baker, D. J. Pinkava, N. Trushell, and G. A. Ruffner. 1990. Special status plants of Organ Pipe Cactus National Monument, Arizona: Sensitive Ecosystems Project. Final Report to National Park Service, Organ Pipe Cactus National Monument, Ajo, Arizona. xi + 223 pp.

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Baker, M. A., D. J. Pinkava, J. R., Rebman, B. D. Parfitt, and A. D. Zimmerman. Chromosome numbers in some cacti of western North America. VIII. Haseltonia (in prep.).

Baker, M. A. 2006. Circumscription of *Echinocereus arizonicus* subsp. *arizonicus*. Phenetic analysis of morphological characters in section *Triglochidiatus* (Cactaceae), part II. Madroño 53:388-399.

Baker, M. A. 2006. A new florally dimorphic hexaploid, *Echinocereus yavapaiensis* sp. nov. (section *Triglochidiatus*, Cactaceae) from central Arizona. Plant Systematics and Evolution. 258:63-83

Baker, M. A. 2003. Progress on the taxonomy of the claret-cup cacti (Echinocereus, section Triglochidiatus) of the United States. Cactus and Succulent Journal (US) 75 (5):217-223.

Baker, M. A. 2002. Chromosome numbers and their significance in some Opuntioideae and Cactoideae (Cactaceae) of mainland Ecuador and Peru. Haseltonia (9): 69-77.

Bennett, B. C., M. A. Baker, and P. Gómez A. 2002. Ethnobotany of the Shuar of Eastern Ecuador. Advances in Economic Botany 14:1-299.

Pinkava, D. J., J. P. Rebman, and M. A. Baker. 2001. Nomenclatural changes in *Cylindropuntia* and *Opuntia* (Cactaceae) and notes on interspecific hybridization. Journal of the Arizona-Nevada Academy of Science 33(2):150.

Baker, M. A. And R. Johnson. 2000. A morphometric study of *Escobaria sneedii* var. *sneedii*, *E. sneedii* var. *leei* and *E. guadalupensis*. Systematic Botany 24 (4): 577-587.

Baker, M. A. And D. J. Pinkava. 1999. A new Arizona hybrid cholla, *Opuntia ×campii* (Cactaceae). Cactus and Succulent Society of America 71:320-322.

D. J. Pinkava, J. P. Rebman, and M. A. Baker. 1999. Chromosome numbers for some cacti of Western North America VII. Haseltonia no. 6:32-41.

Baker, M. A. 1999. Vegetation and plant communities of the Tonto Basin in the vicinity of Theodore Roosevelt Lake, Arizona. Arizona State University, Tempe, Arizona.

Baker, M. A. 1996. Recommendations for the preservation of rare plants and unique habitats within the Chino Valley Ranger

District, Central Arizona. Pp. 237-242. In: Maschinski, J. H. D. Hammond, and L. Holer, eds. Southwestern Rare and Endangered Plants.: Proceedings of the Second Conference; 1995 September 11-14, Flagstaff, Arizona. General Technical Report RM-GTR-283. Fort Collins, Co: U. S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experimental Station.

Pinkava, D. J. B. D. Parfitt, M. A. Baker, and R. D. Worthington. 1992. Chromosome numbers in some cacti of western North America-VI. Madroño 39(2):98-113.

Baker, M. A. 1993. Subgenus *Cylindropuntia* (Cactaceae). *In*: Hickman, J. (ed.) The Jepson Manual. University of California Press. Berkeley.

Pinkava, D. J., M. A. Baker, R. A. Johnson, N. Trushell, G. A. Ruffner, R. S. Felger & R. K. Van Devender. 1992. Additions, notes and chromosome numbers for the vascular flora of Organ Pipe Cactus National Monument, Arizona. Journal of the Arizona-Nevada Academy of Science 24-25:13-18.

Daniel, T., T. Chuang, and M. A. Baker. 1990. Chromosome numbers of American Acanthaceae. Systematic Botany 15(1):13-25.

Baker, M. A. and D. J. Pinkava. 1987. Cytological and morphometric analyses of a triploid apomict, *Opuntia* □*kelvinensis* (subgenus *Cylindropuntia*, Cactaceae). Brittonia 39(3):387-401.

Pinkava, D. J. and M. A. Baker. 1985. Chromosome and hybridization studies of *Agave*. Desert Plants 7(2):93-100.

Baker, M. A., M. W. Mohlenbrock, and D. J. Pinkava. 1985. A comparison of two methods of preparing cacti and other succulents for standard herbarium mounting. Taxon 34(1):118-120.

Pinkava, D. J., M. A. Baker, B. D. Parfitt, M. W. Mohlenbrock, and R. T. Worthington. 1985. Chromosome numbers in some cacti of western North America.- V. Systematic Botany 10(4):471-483.

Baker, M. A., D. J. Pinkava, and B. D. Parfitt. 1983. On *Cowania* and its intergeneric hybrids in Arizona. Great Basin Nat. 44(3):484_486.

Daniel, T., B. D. Parfitt, B. D. and M. A. Baker. 1983. Chromosome numbers and their systematic implications in the Acanthaceae. Syst. Bot. (3):346_355.

PROFESSIONAL REFERENCES

Dr. Donald J. Pinkava, Professor of Botany. Director of the herbarium. Department of Botany and Microbiology, Arizona State University, Tempe, Arizona, 85287. (602) 965-3179.

Dr. Richard Felger. Director. Drylands Institute. 2509 N Camble, No 176, Tucson, Arizona 85719. (602)-321-1825.

Dr. Tom Van Devender, Research Associate. Arizona-Sonora Desert Museum, Tucson, Arizona. (520) 883-1380.

Dr. Glen Rice, Professor of Anthropology. Department of Anthropology, Arizona state University. Tempe, Arizona 85287. (602) 965-7181, 479-2406.

Barbara Phillips, Botanist, U. S. Forest Service. 2323 East Greenlaw Lane, Flagstaff, Arizona 86004. (520) 527-3600.

Sue Schuhardt, Biologist, Chino Valley Ranger District, Prescott National Forest, Chino Valley, Arizona, 866323. (520) 636-2304.

Mima Falk., Biologist. U. S. Fish and Wildlife Service, 300 West Congress, Room 4D, Tucson, Arizona 85701. (520) 670-4550.

Linda Barker, Botanist. U. S. Forest Service, Lincoln National Forest, Federal Building, 1101 New York Avenue, Alamogordo, NM 88310-6992. (505) 434-7263.

Diane Dobos-Bubno, Biologist, 3225 National Parks Highway, Carlsbad NM 88220. (505) 785-2232, ext 377.

Diane Laush, Biologist, Bureau of Reclamation, PXAO-1500, Phoenix Area Office, 6150 W. Thunderbird Road Glendale, AZ 85306-4001; 623-773-6255

David E. Erikson

Senior Biologist

Areas of Expertise

Vegetation and Wetlands
NEPA Impact Assessments
Wildlife Ecology
Environmental Permitting

Years of Experience

With URS: 31Years
With Other Firms: 4 Years

Education

M.S., 1972, Biology, University of Nevada, Reno, Nevada
B.S., 1971, Wildlife Biology, University of Nevada, Reno, Nevada

Certifications

HAZWOPER 40-hour OSHA Training (1995)
HAZWOPER 8-hour OSHA Supervisor Training (1995)
OSHA 24-hr Hazardous Materials Training Course (1984)
HAZWOPER 8-hour OSHA Refresher Training (2008)
Department of Transportation – Hazards Materials Shipping (1990)
First Aid and Adult CPR (2007)
Learn to Return - Aircraft Survival (2001)
Alaska Native Cultural Awareness Training (2001)

Overview

Mr. Erikson is a Senior Biologist with more than 35 years of professional experience in the environmental sciences. Mr. Erikson manages and performs range of environmental investigations for resource development projects including vegetation mapping, wetlands delineation, bird and mammal surveys, environmental permitting and compliance monitoring. Mr. Erikson also specializes in NEPA impact analysis for both terrestrial and marine systems for EAs and EISs. Mr. Erikson has been a principle author of impact assessments and cumulative effects sections in numerous large NEPA documents. He joined the firm in 1977. Representative projects are provided below.

Project Specific Experience

Sterling Energy Systems, Solar One and Solar Six, Sensitive Plant Surveys - Field Biologist: Responsible for documenting the occurrence of listed sensitive plant species, along with all desert plant species, within the project boundaries and transmission line corridors in the Mojave Desert. Plants of special interest were *Androstephium breviflorium* and *Penstemon albomarginata.* Observations of all wildlife species, including the endangered desert tortoise, were also recorded during the vegetation surveys.

Kinder Morgan, Cal Nev Pipeline Expansion Project, Colton California to Las Vegas, Sensitive Plant Surveys - Field Biologist: Responsible for documenting the occurrence of listed sensitive plant species, along with all desert plant species, within the pipeline corridor. Observations of all wildlife species, including the endangered desert tortoise, were also recorded during the vegetation surveys.

Wind Energy Alaska, Inc., Fire Island Wind Power Project, Anchorage, Alaska. Senior Biologist: Responsible for environmental studied for the 30 MW Fire Island Wind Power Project including agency coordination, developing environmental permitting matrix, initiating environmental permitting, field delineation of wetlands, an Environmental Site Assessment (ESA), Essential Fish Habitat Assessment (EFH), and developing an Environmental Assessment for the U.S. Army Corps of Engineers 404 and Section 10 permits..

OESI Power Corporation - Makushin Geothermal Project. Senior Biologist/Task Manager. Responsible for baseline environmental studies at the proposed port site and access road to a proposed 12 MW geothermal facility near Unalaska, Alaska. The Project included delineation of wetlands, wildlife survey, and investigations of fish stream crossings.

BHP Billiton, Western Arctic Coal Project. Pt. Lay Alaska. Senior Biologist. Responsible for tundra vegetation studies and initial vegetation mapping efforts. The project also included conducting observations of disturbance to local caribou from the helicopter over-flights associated the exploratory drilling operation.

FHWA/ADOT&PF - Juneau Access Road Project, Supplemental EIS. Senior Field Biologist/Task Lead. Responsible for wetlands field delineations and vegetation mapping for 90 miles of new road between Skagway and Haines, Alaska to Juneau, Alaska. Responsibilities also development of the affected environment, environmental consequences and cumulative effects for the terrestrial environment.

U.S.D.A. Forest Service, Swan Lake/Lake Tyee Hydrolectric Project. Project Manger: Responsible for evaluating the possible use of a direct current submarine cable between Ketchikan and Wrangle, Alaska to avoid constructing an overhead transmission line through a wilderness area in the Tongass National Forest.

U.S. Bureau of Land Management (BLM), Anchorage Field Office, Mineral Potential Report, and Resource Management Plan (RMP)/EIS, Ring of Fire Planning Area, Alaska. Senior Biologist: Responsible for evaluation of wetlands, terrestrial habitat, and wildlife on BLM-managed lands in the Aleutian Chain, on the Alaska Peninsula, Kodiak Island, southcentral Alaska, and southeast Alaska. Project involved the analysis of environmental effects of a range of management alternatives on these resources.

Chugach Electric Association, Inc., Southern Intertie Transmission Line Project EIS, Anchorage, Alaska. Senior Biologist/Task Manager. Responsible for affected environment sections and impact analysis for the EA and EIS for wetlands, terrestrial vegetation, brown bears and other wildlife, waterfowl and raptors. The preferred alternative for the project crossed the Kenai National Wildlife Refuge.

U.S. Bureau of Land Management, Fairbanks Field Office. Northern Intertie Transmission Line EIS. Senior Biologist/Task Lead. Responsible for impact analysis for wetlands, terrestrial habitat, and wildlife. Key issues including impact to trumpeter swan habitat, nesting peregrine falcons, and avian collisions. The project also involved assisting the State of Alaska on the Best Interest Finding for the lease of State right-of-ways.

National Park Service, South Denali Implementation Plan EIS. Senior Biologist: Responsible for wetland delineation, soils mapping and terrestrial impacts analysis for two alternative sites for a new visitor center on the south of Denali National Park.

Knik Arm Bridge and Toll Authority (KABATA), Knik Arm Crossing DEIS - Senior Biologist/Task Manager: Responsible for field investigations of shorebird and waterfowl migrations and habitat use in Knik Arm. Tasks also including developing the affected environment and environmental consequences for marine and terrestrial birds and cumulative effects analysis sections for wetlands, vegetation and birds.

Alaska Gas Producers Pipeline Team (AGPPT), Alaska Gas Pipeline Project, Environmental Lead: Responsible for oversight of environmental field studies, including wetlands and fish streams crossings to obtain FERC Certification and permits for the U.S. segments of a proposed 3.300 mile natural gas pipeline from Prudhoe Bay, Alaska, to Chicago, Ill.. The project also looked at a submarine pipeline route from Prudhoe Bay to the McKenzie Delta, Northwest Territories, Canada.

Anchorage Water and Wastewater Utility (AWWU) - Sand Lake Wetland Assessment, Senior Biologist for delineation of wetlands and other waters of the U.S. on AWWU's proposed project to update a water transmission main in an area east of Sand Lake. Responsible for senior review and assisted with wetland field delineation and data collection.

Anchorage Water and Wastewater Utility (AWWU) - Girdwood Wetland Assessment, Senior Biologist for delineation of wetlands and other waters of the U.S. for AWWU's proposed project to install a water transmission main in a potential subdivision area east of Crow Creek Road, west of Glacier Creek., and north of Girdwood Elementary School.

Anchorage Water and Wastewater Utility (AWWU) Hiland Road EA, Project Manager/Biologist/GIS Specialist. Senior Biologist. Responsible for delineation of wetlands and other waters of the U.S. for AWWU's proposed project to install a water transmission main from the Eklutna Transmission Main to the Glenn Highway right-of-way.

Integrated Concepts & Research Corporation (ICRC) - Port of Anchorage Expansion Project- Haul Road Wetlands. Senior Biologist/Project Manager. Responsible for delineating jurisdictional wetlands for a haul road expansion between Cherry Hill Material Pit and the North End Material Pit on Elmendorf Air Force Base.

Alaska Railroad Corporation Track Realignment – Military Segments through Elmendorf Air Force Base and Fort Richardson. Senior Biologist. Responsible for preliminary jurisdictional determinations of wetlands and waters of the U.S for several sections of the proposed corridor right-of-way realignment and responsible for developing mitigation plans for the Corps 404 permits.

References:

Laurie Butler, Environmental Lead. Integrated Concepts and Resource Commission, Anchorage, Alaska (907) 561-4272;

Steve Davis, NEPA Coordinator, NOAA Fisheries, Anchorage, Alaska (907) 271-3523;

Teresa Zimmerman, DOT&PF, Anchorage, AK, 907 269-0551;

URS

Sage F. Jensen

Habitat Ecologist/Botanist

Areas of Expertise

Riparian/Wetland Restoration Design and Implementation

Programmatic and Individual ESA Compliance for fish and wildlife resources

Pacific and Inland Northwest Botanical Surveys; Plant Identification & Monitoring

Fish, Bird, and Mammal Survey and Habitat Assessments

Years of Experience

With URS: 6 Years

With Other Firms: 2 Years

Education

BS/Botany & Freshwater Ecology/1999/Evergreen State College

Environmental Restoration Technician Certificate/1996/ Peninsula College

Overview

Sage Jensen is a Habitat Ecologist/Botanist with seven years of experience conducting riparian/wetland restoration and biological surveys and assessments throughout Oregon and Washington. Her expertise includes ecologically based restoration techniques and construction oversight, vegetation identification, and fisheries habitat assessments. She is familiar with programmatic and individual ESA compliance for fisheries and wildlife resources.

Project Specific Experience

NEPA & ESA Compliance

Staff Biologist, ODOT OTIA III State Bridge Delivery Program, OBDP, Wheeler County, OR, 2005: Assisted in the preparation of programmatic ESA compliance documentation for several bridge replacement projects in eastern OR.

Staff Biologist, Columbia River Boat Launch, Port of Camas-Washougal, Clark County, WA, 2005: Prepared ESA compliance documentation for USFWS.

Staff Biologist, South Corridor Light Rail Biological Assessment, Metro/TriMet, Multnomah/Clackamas County, OR, 2004: Assisted in the preparation of a BA for ESA listed fish species for the proposed light rail project.

Staff Biologist, Camas Slough Maintenance Dredging, Fort James Camas LLC, Camas, WA, 2004: Prepared a SLOPES II compliance memo for submittal to the Corps.

Project Biologist, The Resort at Pronghorn Environmental Assessment, Ball Janik LLC, Deschutes County, OR, 2003: Prepared an Environmental Assessment for the siting of utility lines across public lands for the BLM Prineville District Office.

Habitat Restoration & Monitoring

Project Botanist, Bear Creek Relocation, ODOT, Zigzag, OR, 2001-2004: Designed and implemented extensive riparian and wetland restoration plan, construction specifications, and monitoring plan. Exceeded vegetation survival requirements.

Project Botanist, Northwest Pipe and Casing Superfund Site, USEPA, Clackamas, OR, 2003-2004: Designed upland restoration and wetland mitigation/monitoring plan.

Project Botanist, Lolo Pass Road Culvert Replacement, Clackamas County, OR, 2003-2004: Designed riparian restoration plan, surveyed for Survey and Manage Species, noxious weeds, and rare plant and wildlife species.

Project Botanist, Phase 3 Natural Gas Pipeline, Northwest Natural Gas, Columbia County, OR, 2003-2004: Designed and implemented vegetation mitigation plan.

Project Botanist, Swan Island Restoration, Port of Portland, Multnomah County, OR, 2003: Designed riparian restoration plan.

Project Botanist, North Santiam Hwy Mill Creek Fish Mitigation, ODOT, Salem, OR, 2003: Designed riparian restoration plan.

Staff Botanist, Sylvan Creek Stream Restoration, Clean Water Services, Washington County, OR, 2002: Assisted in the design of riparian restoration plan.

Wetland Biologist, Wetland Monitoring, WADOT, Western WA, 1999: Surveyed and monitored over 30 wetland mitigation sites Collection and identification of vegetation and aquatic invertebrates, documentation of soils and hydrology, and point count surveys for birds and other wildlife.

Field Crew (Americorps), King Co. Water & Land Resources Dept. King Co., WA, 1995-1996: Implemented stream restoration projects in rural and urban stream reaches in King County, Washington. Conducted water quality sampling in rural, salmonid bearing streams (King County Environmental Lab methods); constructed in-stream LWD structures using hand and power tools to provide increased cover, bank stabilization, and hydrologic diversity; completed baseline data surveys for native plant distribution, stream morphology, soils, stream gradient, and stream bank characteristics; assisted in designing restoration planting and habitat structure plans; identified northwest native plants, followed detailed landscape architecture plans to enhance degraded wetland and riparian areas; maintained King County nursery for native plants and salvaged native plants from forest harvest and construction areas; constructed interpretive trails, bridges, and over one mile of animal exclusion fence

Botanical / Ecological Surveys

Staff Biologist, Bald Eagle Monitoring, Port of Vancouver, Vancouver, WA, 2003-2004: Monitored behavior and area of use of resident bald eagles on POV property.

Project Biologist, Bear Creek Relocation, ODOT, Zigzag, OR, 2001-2004: Conducted rare plant and noxious weed surveys and plant community analysis, and a noxious weed analysis. Prepared Biological Evaluation for USFS.

Project Biologist, Northeast Lands Inventory Project, BLM Spokane District, Stevens and Ferry County, WA, 2002: Field manager of biological survey team. Collected forest stand data including tree measurements, plant community associations, rare plant and wildlife presence in 20,000 acres of remote BLM parcels.

Project Biologist, Pendleton Wind, Florida Power and Light, Umatilla County, OR, 2001: Conducted population and occurrence surveys for ESA listed plants, mammals, birds and raptors, and fish in remote areas of Umatilla County. Trained in ODFW survey protocols for the Washington ground squirrel.

Project Biologist, Umatilla Chemical Depot, Incineration Baseline Monitoring – Umatilla County, OR, 2001: Conducted surveys and sampling of mammals, insects, soil, water, and vegetation for baseline monitoring report.

Fisheries / Stream / Wetland Surveys

Surveyed existing conditions and fish distribution for numerous projects involving streams and wetlands in Oregon and Washington, including:

Staff Biologist, Key Peninsula/Islands Basin Plan, Pierce County, Pierce County, WA, 2003: Stream condition assessment and salmonid habitat inventory of western Pierce County streams using USBEM methodology

Staff Biologist, South Corridor Light Rail DEIS, Metro, Multnomah/Clackamas County, OR, 2002: Stream assessments and impact analysis for light rail extensions.

Staff Biologist, Newberg-Dundee Transportation Improvement Project, ODOT, Washington County, OR, 2001: Provided habitat mapping and assessment of wildlife crossings.

Mapping Assistant, Salmon and Steelhead Habitat inventory Assessment Project, Northwest Indian Fisheries Commission, Olympia, WA, 1998-1999: Conducted stream segment assessment in the mid Puget Sound WA basins using TFW Stream Segment Identification Method to determine baseline conditions. Assessed salmonid distribution and habitat suitability including barriers to fish passage and other modifications to hydrology within mid Puget Sound WA basins.

Professional Societies/Affiliates

Society of Ecological Restoration, 2002

Specialized Training/ Certifications

Applied Electrofishing (NOAA Fisheries Certification), NETC 2004

ESA Project Compliance, Portland State University 2003.

Wetland Delineation Certificate, Wetland Training Institute 2001

Chronology

2000-Present: URS Corporation,

2000: WA Dept of Fish and Wildlife

1999: WA Dept of Transportation

1999: Sound Native Plants Nursery

1998-1999: Northwest Indian Fisheries Commission

1995-1996: WA Dept of Ecology/King County Water and Land Resources

Contact Information

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URS

Rich Kleinleder

Senior Biologist/Certified Ecologist

Areas of Expertise

Terrestrial and Marine Ecology
Ornithology
Environmental Impact Analysis

Years of Experience

With URS: 7 Years
With Other Firms: 20 Years

Education

M.S., Biology, University of Alaska, Fairbanks, 1985
B.S., Biological Science and Environmental Studies, Indiana University, 1979

Registration/Certification

Professional Ecologist Certification, Ecological Society of America
First aid/CPR
"Bears to Bugs" wilderness survival
Aviation safety/survival

Publications

Co-author, Kenai Peninsula chapter *in* "A Birder's Guide to Alaska", G.C.West, 2008. American Birding Association, Asheville, NC. pp. 301-346.

Overview

Mr. Kleinleder's professional career has included a wide variety of research and teaching jobs with over 25 years of experience throughout Alaska. Research jobs included fieldwork, data analysis, and report writing for ABR, Inc., and the Institute of Arctic Biology on North Slope caribou/oilfield development interactions, bird migration and breeding in Interior Alaska, seabird populations in the Bering Sea, and Dall sheep energetics in the Brooks Range. He has taught bird biology classes for Kenai Peninsula College and had teaching assistant positions at the University of Alaska, Fairbanks. He is the author of a birding website and "hotspots" map for Homer and conducts local breeding bird surveys for a national program. Mr. Kleinleder also co-founded an innovative technology company, SeeMore Wildlife Systems, which designed, constructed, and installed remotely controllable video camera systems for real-time wildlife viewing and research.

Mr. Kleinleder joined the URS Environmental Services team in the spring of 2001 and has since worked on a variety of projects for state and federal agencies. His writing provides a clear and objective presentation of scientific subjects within the context of what is required by pertinent natural resource laws, including the National Environmental Policy Act, Endangered Species Act, Migratory Bird Treaty Act, and the Marine Mammal Protection Act. He is a senior author for effects on threatened and endangered species as well as non-ESA-listed birds and mammals. Examples of his relevant project experience with URS are provided below:

Professional Presentations

Society for Marine Mammalogy 17th Biennial Conference, Cape Town, South Africa, December 2007. Mr. Kleinleder gave an oral presentation titled, "Assessment of injury and mortality due to research activities: the Steller sea lion example". This paper described the risk assessment model developed for the EIS on the effects of research activities on Steller sea lions and northern fur seals (see below). This model is currently used in the permitting process to authorize research on this endangered species.

Pacific Seabird Group Annual Meeting, Girdwood, Alaska, February 2006. Mr. Kleinleder gave an oral presentation titled, "Assessment of Impacts on Seabirds in the Alaska Groundfish Fisheries". This paper explained the NEPA methodology and organization of the direct, indirect, and cumulative effects analysis for seabirds in the Alaska Groundfish Programmatic EIS (see below).

American Fisheries Society Annual Meeting, Anchorage, Alaska, September 2005. Mr. Kleinleder gave an oral presentation titled, "Evaluating fishery management tools for protecting seabird populations". This paper discussed ideas for using seabirds as indicator species in an ecosystem management context that arose from his work on the Alaska Groundfish Programmatic EIS (see below).

Project Specific Experience

BHP Billiton – Monitoring disturbance of caribou by helicopters and coal exploration activities, in progress. Mr. Kleinleder is the technical and field team leader for this survey and mitigation project driven by concerns of the Alaska Native landowners from Point Lay, Alaska. Field crews work out of a construction camp in the northern foothills of the Brooks Range and deploy by helicopter to remote camps for several days at a time.

SEC – Solar power generation project, plant and wildlife surveys, Spring 2008. Mr. Kleinleder worked with a large team of biologists and botanists from several URS offices and other consulting firms to survey a large tract of the Mojave desert outside Barstow, CA. Surveys focused on rare plants, general vegetation and habitat types, birds and other wildlife, and the endangered desert tortoise. Mr. Kleinleder also helped conduct surveys for the endangered blunt-nosed leopard lizard at a site outside Paso Robles, CA.

Kinder-Morgan – Cal-Nev pipeline expansion project, vegetation and rare plant surveys, Spring 2008. Mr. Kleinleder worked with a large team of biologists and botanists from several URS offices and other consulting firms to survey the entire length of a petroleum products pipeline corridor from Las Vegas, NV, to Colton, CA. Surveys were conducted on foot with emphasis on California listed plant species. General vegetation and habitat characteristics were also mapped and bird/wildlife species noted.

National Marine Fisheries Service – Final Environmental Impact Statement (EIS) on Subsistence Harvest of Cook Inlet Beluga Whales. Mr. Kleinleder developed impact assessment criteria based on an Administrative Law Judge ruling that seeks to balance the needs for recovery of the population and preservation of Alaska Native subsistence culture. The effects analysis utilizes two population models that focus on different harvest levels and the extinction risk from cumulative effects.

National Marine Fisheries Service – Proposed Listing of the Cook Inlet Beluga Whale under the Endangered Species Act. Mr. Kleinleder participated in a team effort to analyze over 180,000 public comments on the proposed rule.

National Marine Fisheries Service – Final EIS for the Alaska Bowhead Whale Subsistence Hunt, 2008. Mr. Kleinleder helped develop the cumulative effects analysis methodology and contributed to the cumulative effects analysis on bowheads with respect to climate change and oil and gas development in marine environments.

National Marine Fisheries Service – Programmatic EIS on the Effects of Authorized Research on Steller Sea Lions and Northern Fur Seals, 2007. Mr. Kleinleder was the Technical Lead for this project and worked closely with staff from NMFS Permitting Office and the National Marine Mammal Laboratory to identify and analyze the effects of research on these species. This project was driven by Endangered Species Act and Marine Mammal Protection Act considerations as well as NEPA compliance issues.

Knik Arm Bridge and Toll Authority – Draft EIS for the Knik Arm Crossing, 2006. URS was responsible for the cumulative effects sections of this ongoing project. Mr. Kleinleder helped establish the methodology used by URS authors and was responsible for writing the sections on terrestrial and marine wildlife for the DEIS and Technical Reports. This work includes analysis of cumulative effects on the Cook Inlet beluga whale, a stock that has experienced substantial declines in recent years and is currently under review for listing under the Endangered Species Act.

Alaska Railroad Corp. – Environmental Assessment (EA) for Eielson Branch Realignment Project, 2005. Mr. Kleinleder authored the fish and wildlife affected environment and impacts and mitigation sections for this project near Fairbanks.

U.S. Fish and Wildlife Service – Steller's Eider Nest Monitoring, 2005 and 2003. Mr. Kleinleder installed several remote video camera systems to monitor nesting success of this threatened species in Barrow, Alaska**.** This system included microwave transmission of the video signal from nest sites to a research facility where the images were digitally recorded. In 2005 the work documented nest predation from jaegers and nest abandonment after disturbance.

Bureau of Land Management - EIS for the Ring of Fire Resource Management Plan, 2005. This project covered BLM lands in an extensive area from Southeast Alaska to the western Aleutians. Mr. Kleinleder wrote the Biological Assessment for threatened and endangered birds and marine mammals as well as the wildlife sections of the DEIS.

National Park Service - EIS for the South Denali Visitor Center, 2005. Following the directives in the National Park Service's revised DO-12 NEPA Handbook, Mr. Kleinleder authored the affected environment, direct, indirect, and cumulative effects sections for birds and mammals.

Bureau of Indian Affairs – EIS for an Oil Spill Response Facility in Cordova, Alaska, 2004. Mr. Kleinleder authored the wildlife technical report as well as the EIS sections for terrestrial and marine bird and mammal species. This work included field surveys for bald eagle nests and intertidal life. One alternative included construction of a new road and followed basic FHWA procedures for environmental impact assessment.

National Marine Fisheries Service – Programmatic Supplemental EIS for the Bering Sea/Aleutian Islands/Gulf of Alaska Groundfish

Fisheries, 2001-2004. Mr. Kleinleder made extensive contributions to this ground-breaking project. He is the primary author for all sections pertaining to seabirds and co-authored the marine mammal sections, including past and present effects on each species, analysis of the alternatives, and the cumulative effects analysis.

Alaska Department of Transportation and Public Facilities – Juneau Access Improvements Supplemental EIS, 2003-2004. Mr. Kleinleder was the lead author for three technical reports regarding the direct effects of the highway/marine ferry alternatives on Steller sea lions, bald eagles, and wildlife. These reports discuss relevant research, consultation, and jurisdictional responsibilities of federal and state wildlife and land management agencies. Mr. Kleinleder was also the lead author for the Indirect and Cumulative Effects analyses for these species.

National Marine Fisheries Service – Bering Sea/Aleutian Islands King and Tanner Crab Fisheries Rationalization Plan EIS, 2003. Mr. Kleinleder wrote the cumulative effects sections of this EIS involving seabirds, marine mammals, water quality, the ecosystem, and benthic communities.

Alaska Department of Transportation – Kenai River Bridge Access Road Pedestrian Pathway EA, 2002. Mr. Kleinleder designed and conducted a field survey to measure bird disturbance in relation to potential pedestrian traffic across the Kenai River Flats during spring migration. He also analyzed the data and authored the report for this topic that was a matter of public and wildlife agency concern.

British Petroleum, Inc. – Environmental Impact Field Study Design, Shah Deniz Pipeline, 2001. Mr. Kleinleder designed bird survey methodology for the Shah Deniz Gas/Oil Pipeline project in the Republic of Georgia. The methodology was designed to measure bird use of a particularly sensitive wetland and surrounding areas. He also drafted a proposal to use satellite telemetry to study brown bear movement patterns in relation to the pipeline right-of-way.

U.S. Department of Agriculture, Rural Utility Service - Southern Intertie EIS, 2001. Mr. Kleinleder co-authored the wildlife cumulative effects section for the Southern Intertie Project EIS on the Kenai Peninsula.

Alaska Gas Pipeline Project Team – Federal Energy Regulatory Commission Application for a Natural Gas Pipeline, Alaska Highway Route, 2001. Mr. Kleinleder served as field team leader and report author for a study on Dall sheep lambing and mineral lick use in the Atigun Pass area, Brooks Range, Alaska.

U.S. Forest Service – Resource Reports for Kosciusko and Tuxekan Timber Sales, 2001. Mr. Kleinleder compiled pertinent information on local wildlife resources and applicable restrictions on logging activities based on the Tongass National Forest Land and Resource Management Plan.

Brooke McDonald

Biologist

Overview

Ms. McDonald has a broad background in different aspects of natural history. Ms. McDonald has worked with many rare and endangered birds and other animals throughout California, and can identify most California birds by sight and sound. She has an academic background in soil science and watershed management, and has extensive knowledge of wetland soils and hydrology. Finally, she has excellent writing skills.

Areas of Expertise

Wildlife ecology
Birds of the Western United States
Avian surveys
Surveys for special-status species such as marbled murrelet, snowy plover, willow flycatcher, burrowing owl, and red-legged frog
General wildlife surveys
Habitat assessment
Construction monitoring
Soil science
Wetland delineation, including extensive experience with vernal pools
Watershed management

Years of Experience

With URS: 1 Year
With Other Firms: 2 Years

Education

BS/Wildland Soil Science/ Humboldt State University/2003

Examples of Project Specific Experience

Special-Status Species Surveys

- Pacific Lumber Company Habitat Conservation Plan compliance. Performed protocol surveys for marbled murrelets and potential predators in redwood forests in Humboldt County, California.

- Mercer/Fraser Co. snowy plover surveys. Surveyed for snowy plover individuals and nests along the Eel and Van Duzen Rivers in Humboldt County, California.

- Kaweah Water District burrowing owl surveys and passive relocation. Surveyed for burrowing owls, located and excavated burrowing owl burrows, installed one-way doors, and monitored construction on a 1,300 acre site in Kings County, California.

General Bird Surveys, Wildlife Surveys, and Habitat Assessments

- Arroyo Burro Restoration Project. Performed two years of surveys for breeding birds at a creek restoration site in Santa Barbara County, California. Located bird nests and supervised vegetation clearing. Also assisted with tidewater goby relocation.

- Santa Barbara Airport Breeding Bird Surveys. Searched for nests and evidence of breeding birds in grassland and coastal sage scrub habitat prior to construction and vegetation clearing. Supervised vegetation clearing.

- Angeles National Forest fire prevention activities. Assessed habitat suitability for various special-status birds, mammals, fish, reptiles, and amphibians on proposed firebreaks throughout the Angeles National Forest in Los Angeles County, California.

- Yosemite West planned development. Assessed habitat suitability for willow flycatcher, northern goshawk, great gray owl, Sierra Nevada red fox, and other special-status species on private lands near Yosemite National Park in Mariposa County, California.

- Klamath Bird Observatory long-term monitoring. Performed point counts in forests burned during the Biscuit Fire in Douglas and Josephine counties in Oregon.

- Cal Poly San Luis Obispo structure relocation. Performed day and night surveys for red-legged frogs on the creeks and ponds of the Cal Poly San Luis Obispo campus in San Luis Obispo County, California.

Wetlands and Waters of the United States

- Redington Ranch wetland delineation. Located and mapped vernal pools with a hand-held GPS unit on a 15,000 acre site in grassland habitat in Merced and Mariposa counties in California. Over 4,000 vernal pools and other wetlands were identified during the delineation.

- Millerton New Town. Delineated and mapped many seasonal streams, upland channels, and vernal pools in grassland and mixed oak habitat near the San Joaquin River in Fresno and Madera counties in California.

General Document Writing Experience

- Tepusquet Bridge Natural Environment Study and Wetland Delineation Report. Assessed habitat suitability for threatened and endangered species, performed a wetland delineation, and wrote environmental documents analyzing findings on a site in Santa Barbara County, California.

Specialized Training

OSHA 40-Hour HAZWOPER, 2006

First Aid, AED, and CPR Training, 2006

Habitat Restoration Workshop, UC Davis Extension, 2005

CEQA Workshop, Association of Environmental Professionals, 2004

Richard Chinn Wetland Delineation Class, 2004

Contact Information

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Jill Seed
Senior Biologist

Education

B.S Biology, 1997, Lakehead University, Thunder Bay, Ontario

Areas of Expertise

- Railroad Projects
- Natural Gas and LNG Pipeline Projects
- Endangered Species
- Environmental Assessment
- Environmental Impact Statement
- USACE Nationwide Permitting System
- Focused Avian Surveys
- NEPA and ESA
- Wetland Delineations
- Section 404 Compliance
- ESA Section 7 and Section 10 Consultation

Certifications and Training

2007 Texas Chapter of the American Public Works Association 24 Hour Streambank Soil Bioengineering Technical Training

2005 United States Army Corps of Engineers Wetland Delineation and Management Training Certification.

2005 Black-capped vireo and golden-cheeked warbler habitat assessment and surveys.

Qualifications

Ms. Seed has over eight years of experience in the environmental consulting industry. Ms. Seed is permitted by the United States Fish and Wildlife Service (USFWS) to conduct threatened, endangered and sensitive species surveys as per the federal Endangered Species Act (ESA). She has extensive experience conducting field surveys, preparing environmental assessments, environmental impact reports, biological assessments, habitat assessments, and fatal flaw/constraints analysis. Ms. Seed is trained in United States Army Corps of Engineers (USACE) wetland delineation, best management practices, storm water pollution prevention plans (SWPPP), and spill prevention control and countermeasures plans (SPCC).

Ms. Seed's acts as the primary liaison between clients and state/federal agencies for the negotiation of environmental permitting requirements. She has specific experience coordinating directly with USFWS, FERC and the USACE on the nationwide permitting system (NWP) and preparing the necessary permitting application packages. Ms. Seed most recently attended the Texas Chapter of the American Public Works Association 24 Hour Streambank Soil Bioengineering Technical Training presented by the Environmental Protection Agency and the Natural Resource Conservation Service.

Professional Experience

Surface Transportation Board Draft Supplemental EIS for Southwest Gulf Railroad Company, Medina County, Texas (2006-2008). Task leader for ArcGIS evaluation, data acquisition and map preparation. Delegated assignments to project team colleagues, created detailed maps for field investigations and prepared final deliverables for technical documents. Authored the transportation, hazardous materials, land use, recreational/visual resources, socioeconomics, and environmental justice sections of the Draft Supplemental EIS. Assisted with biological and habitat assessments, Waters of the U.S determinations, wetland delineations, and threatened and endangered species surveys for black-capped vireo, golden-cheeked warbler, Texas horned lizard and Texas tortoise.

Union Pacific Railroad, Orange to Francis Track Connection Project, Orange, TX (2006). Conducted wetland determinations and habitat assessments for Union Pacific Railroad in Orange, Texas. Performed wetland delineations, collected GPS data and prepared final GIS maps. Produced the wetland delineation report for the USACE.

Mississippi-Arkansas Lateral Extension, Mississippi and Arkansas, Federal Energy Regulatory Commission (FERC) 7c Application, Texas Gas Transmission LLC, (2007). Project involved preparation of Land Use and Resource Reports for use in FERC filing. Responsible for conducting site reconnaissance and data collection on a 90-mile pipeline project in northwestern Mississippi, and collecting data on a 170-mile pipeline project in northern Arkansas, for use in resource reports. Prepared Land Use Resource Reports #5 and #8.

Brownsville/South Padre Island International Airport Environmental Assessment, Brownsville, TX (February 2007). Project biologist for environmental assessment including data review and analysis, field surveys for threatened and endangered species as appropriate and wetland delineations. Project involved rehabilitation and reconstruction of Taxiway G and the development of a major maintenance/repair/overhaul (MRO) facility on the airport.

Burgos International Pipeline Project, Valero Logistics Operations LP, Edinburg County, TX (February-April 2005). Project biologist for the environmental assessment of the 34-mile international pipeline route. Coordination with United States Department of State, Bureau of Economic and Business Affairs, Office of International Energy and Commodity Policy, and Division of Energy Producing Countries to obtain a Presidential Permit. Conducted field surveys, authored the biological resources and impacts section of the environmental assessment, prepared correspondence to state agencies, attended public meetings, and fielded questions from regulatory agencies and community citizens.

Enbridge Pipeline Project Clarity, Wetland Delineations and Threatened & Endangered Species Habitat Assessment in Houston, Anderson, Polk, Hardin, and Orange Counties, Texas (2006-2007). Conducted biological and habitat assessments on approximately 105 miles of pipeline right-of-way, which included Waters of the U.S determinations, wetland delineations, and threatened and endangered species surveys for bald eagle, red-cockaded woodpecker, interior least tern, Louisiana black bear, tinytim, Texas trailing phlox, and Neches River rose-mallow. Collected GPS data points for wetland delineations. Produced associated materials to aid in preparation of U.SACE permits and USFWS biological technical reports. Prepared FERC documentation, including biological resource reports.

Kinder Morgan Energy Partners Pipeline Integrity Project, USACE Permitting in TX, KS, NM, and OK (2005-2007). Assistant project manager and project biologist for the Kinder Morgan Energy Partners office based in Houston, TX. Primary contact and regulatory liaison for pipeline integrity inspections and associated pipeline maintenance. Conduct desktop research and prepare all required environmental documents and permits to facilitate pipeline inspection and repair. Coordinate with various federal and state agencies on environmental permitting issues. Prepared NWP applications and Pre-Construction Notifications as required. Conducted fieldwork to determine the presence or absence of endangered species, wetland, waters of the US and other sensitive biological resources.

Babcock-Eagleton Pipeline Inc., Harris County, TX (February 2005). Project biologist for the environmental and regulatory constraints analysis for the proposed 37-mile natural gas pipeline from Texas City, TX to Deer Park, TX. Duties included conducting wetland delineations, consulting with federal and state regulatory agencies on potential concerns with biological and water resources, desktop research and field survey analysis on land use and the potential habitat supporting threatened and endangered species along the pipeline right-of-way, and report preparation.

URS

Kelly Jean Sleeth

Staff Biologist

Areas of Expertise

Biology

Years of Experience

With URS: 1 Year

Education

BS/Forestry and Natural Resources/June 2006/California Polytechnic State University

Project Specific Experience

Oceano Dunes State Vehicular Recreation Area, Resource Ecologist, March 2005-present, Oceano, CA.

- **Western Snowy Plover.** Trained and federally permitted (permit TE-815214-3) to enter and search federally closed areas to watch behavior of the endangered Lest Tern and threatened Western Snowy Plover. Helped to write part of the end of season report on the success of endangered Lest Tern and threatened Western Snowy Plover. This report is given to federal agencies and the public. Used GPS to locate and mark nests of endangered Lest Tern and threatened Western Snowy Plover. Collected and entered data into excel from field work. Used scopes and binoculars to identify key predatory birds and species of concern. Conducted vegetation transects in dune areas.

  Trained in marine mammal rescue and care of sick and injured wildlife. Conducted driving transects of the beach to search for possible nests. Trained in 4x4 driving, ATV, and helicopter rescue.

- **Oceano Campground, Vegetation Management Plan.** Located plant species of concern within the campground, and created and designed a Vegetation Management Plan. Made recommendations of preferred management for each species and the campground in its entirety based on the capabilities and budget of the park. Used GPS to locate all points of these species and then used GIS to create maps to help with management. The manual was handed out to Maintenance staff, and was used in the park's planning for the CEQA process.

- **Palos Verdes Land Conservancy, June-September 2004, Palos Verdes, CA.** Created maps and modified aerial photographs to: make presentations, map out restoration projects and identify important ecological areas. Created photopoint locations on multiple PVPLC nature preserves to track progress of restoration projects. Created a tree report for White Point Nature Preserve tracking the growth of native trees and shrubs that had been planted the previous fall. The report also included sections on neighbor relations with regard to the trees, and recommendations to increase the health and vigor of all tree species presently on the preserve. Attended Department of Defense meetings on the preservation of the Palos Verdes Blue Butterfly, which is native to one of the PVPLC's preserves. Responsible for keying out, and identifying native California flora. Worked at the Land Conservancy nursery sorting native seeds, and transplanting plants. Collected seeds for many native California flora.

- **Cal Poly NRM Department Lab Monitor, September 2004-present, San Luis Obispo, CA.** Responsible for opening the computer lab for students. In charge of expensive equipment. Help students with computer questions, and clean up lab.

- **Friends of Madrona Marsh, Volunteer, 2001, Torrance, CA.** Responsible for teaching volunteers how to clear non-native plants from the marsh. Collected and sorted native seeds. Sorted and mailed Friends of the Madrona Marsh newsletter. Planted seedlings and grown native species, cleared non-native plants from growing native plants.

Professional Societies/Affiliates

- Xi Sigma Pi (National Forestry Honor Society)
- 2005-2006/Xi Sigma Pi Associate Forester
- 2003-2005/Cal Poly Logging team member
- 2004-2005/Logging Team Secretary

Awards

- Fall 2004/Deans List
- 2004/3rd place at Cal Poly Conclave in Dendrology
- 2002-2003 (Fall and Winter Quarters)/Yosemite Hall Honor Society at Cal Poly (3.4+ GPA)
- 2001-2002/National Honor Society Member

Specialized Training

- Minor in Land Rehabilitation

Contact Information

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Lorena Solórzano-Vincent

Biologist III – Vernal Pool Fairy Shrimp

Areas of Expertise

Endangered Species Act
Wildlife Biological Surveys
Environmental Impact Analysis
Project Management

Years of Experience

With URS: 7 Years
With Other Firms: 4 Years

Education

MS/Biology/2001/Stanford University
BA/Biology/1994/ University of Virginia

Registration/Certification

2005/USFWS Permit to Conduct Branchiopod Surveys/CA

Overview

Ms. Solórzano-Vincent has approximately 11 years of experience preparing biological studies, Endangered Species Act (ESA) consultations, and environmental impact assessments. Her experience involves conducting biological surveys for sensitive wildlife species in California, Section 7 consultations under the federal Endangered Species Act, and the preparation of biological resources sections for Environmental Impact Statements (EIS), Environmental Assessments (EA), Environmental Impact Reports (EIR). Her field experience includes protocol surveys for listed vernal pool branchiopods (i.e., commonly addressed as fairy shrimp species), burrowing owl, raptors, red-legged frog, blunt-nosed leopard lizard, and vernal pool rare plants. Her project experience includes the following:

Project Specific Experience

Lead Biologist, ESA Consultations on FEMA Projects, Multiple Counties, CA, FEMA, 2002 – Present, $10M: Prepared impact analysis on endangered species in 36 counties in California for approximately 400 projects funded by the Federal Emergency Management Agency (FEMA). Consulted formally and informally with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) under the federal Endangered Species Act. The projects vary from flood control, vegetation management, fire prevention, and highway and infrastructure improvement throughout California.

Lead Biologist, Cottonwood Road Mitigation Bank, Butte County, CA, Caltrans, 2005 and 2006, $300K: Conducted protocol surveys for listed vernal pool fairy shrimp, nesting Swainson's hawks for two consecutive years on a 580-acre project area and conducted the delineation of wetlands and other jurisdictional waters in the project area. Lead a crew of 7 biologists in the field to conduct the surveys. Drafted a biological survey report describing all the sensitive wildlife species in the project area. The project area was a proposed mitigation site for Caltrans projects. The baseline survey data was used to demonstrate the conservation value of the property for future mitigation. Worked closely with Caltrans and the resource agencies to identify the appropriate survey work plan to evaluate the baseline conditions. Developed a comprehensive biological and land use baseline report that included recommendations for future monitoring and management of the mitigation site. This report was approved by the ACOE, the USFWS, and CDFG. Presented the survey results and fairy shrimp vouchers to the California Academy of Sciences.

Senior Biologist, San Antonio Reservoir Pipeline Relocation Project, Alameda County, CA, Chevron, 2005-present, $300K: Conducted surveys for burrowing owls and tree-nesting raptors for three consecutive years on a 6-mile pipeline alignment and a ½ mile buffer study area. Lead a crew of 6 biologists in the field. Mapped the vegetation communities and habitat types in the project area. Drafted a raptor survey report describing the findings and conducted the negotiations on avoidance measures with the California Department of Fish and Game (CDFG). Also, conducted a Section 7 ESA consultation with the USFWS for this project. Functioned as the Assistant Project Manager.

Senior Biologist, Chevron San Ardo To Coalinga Crude Oil Pipeline Alignment, Monterey and Fresno County, CA, Chevron, 2006-2008, $1M: Conducted surveys for burrowing owls and tree-nesting raptors for three consecutive years for burrowing owls and other raptors on a 57-mile pipeline alignment. Lead a crew of 7 biologists in the field. Drafted a raptor survey report describing the findings and the avoidance measures with CDFG. Coordinated efforts with the agencies.

Senior Biologist, Los Vaqueros Mitigation Site for Chevron San Ardo To Coalinga Crude Oil Pipeline Alignment, Monterey and Fresno County, CA, Chevron, 2008, $1M: Mapped the habitat of a 2,000-acre site proposed as a mitigation site. Reviewed the report presenting the biological results. The proposed site was reviewed for habitat to support the California red-legged frog, California tiger salamander, other amphibians, nesting raptors, and rare plants.

Lead Biologist, Red-legged frog Surveys, California Polytechnic State University, San Luis Obispo, CA, FEMA, 2006, $500K: Conducted protocol surveys for California red-legged frogs in the project area and all aquatic habitats within a 1-mile radius. Drafted a Site Assessment and Survey Report summarizing the findings. Also, prepared a Biological Assessment under ESA for consultation with the USFWS.

Lead Biologist, Red-legged frog Surveys, Sulphur Spring Damage, Paso Robles, CA, FEMA, 2005, $500K: Conducted protocol surveys for California red-legged frogs in the project area and all aquatic habitats within a 1-mile radius. Drafted a Site Assessment and Survey Report summarizing the findings. Also, prepared a Biological Assessment under ESA for consultation with the USFWS.

Biologist, Willits Bypass Project, Willits, CA, Caltrans, 2004-2006, [Cost]: Prepared the wildlife section of the Biological Assessment for USFWS. The project included the expansion of Highway 1. Drafted an impact analysis for endangered species. Conducted rare plant surveys and verified the wetland delineation along the proposed alignments.

Senior Biologist, Burrowing Owl Surveys at the Oakland International Airport, Alameda, CA, Port of Oakland, 2002 – 2007, [Cost]: Conducted routine burrowing owl surveys for 5 years during the breeding and non-breeding season in the North Field. Addressed client environmental questions as needed. Drafted the biological resources section an EIR for the Materials Management Program at the Airport. Has approval and badge to conduct field surveys at the Airport's North Field. Lorena is an authorized signer for projects at the Airport.

Biologist, Concord to Sacramento Pipeline Project, CA, Kinder Morgan Energy Partners, 2003 – 2007, $2M: Conducted two consecutive years of protocol surveys for listed vernal pool fairy shrimp species for a proposed 60-mile refined petroleum products pipeline. Utilized Global Positioning System (GPS) receivers to locate vernal pools and sensitive species occurrences during field surveys. Conducted post-construction monitoring to evaluate the performance of wetland and oak tree mitigation. Conducted post-construction monitoring of mitigation sites. Coordinated the implementation of remedial oak tree plantings in 2006.

Biologist, State Route 44, Redding, CA, Caltrans, 2004 – 2005, [Cost]: Conducted and collected a dry-season sampling of vernal pool fairy shrimp vouchers along State Route 44. The samples were processed to determine which fairy shrimp species inhabit the project area.

Biologist, Sacramento International Airport, Sacramento, CA, Sacramento Airport, 2006 – 2007, $1M: Conducted field surveys at the Airport and surrounding areas and drafted a Biological Assessment under ESA and the biological analysis for an EIS/EIR to address the long-term development of the Airport.

Biologist, Crescent City Airport Expansion Project, Crescent City, CA, Crescent City Airport, 2006 – 2007, $200K: Conducted field surveys at the Airport and surrounding areas and drafted a Biological Assessment to initiate Section 7 consultation under the ESA, as well as potential wetland impacts.

Biologist, Almaden Dam Outlet Works Project, Santa Clara County, CA, Santa Clara Valley Water District (SCVWD), 2004 – 2005, $100K: Prepared the biological resources section for the Initial Study as required under CEQA. Gathered data on special status species and sensitive habitats surrounding the Almaden Dam project area and drafted an impact analysis. The Santa Clara Valley Water District owns and operates the dam and reservoir and is the Lead Agency for the proposed program per CEQA. Attended meetings with the District to discuss the project alternatives and the potential impacts to the biological resources within the project area.

Biologist, Richmond Field Station, Richmond, CA, University of California at Berkeley, 2002 – 2003, $1M: Prepared the wildlife section of the Initial Study as required under CEQA. Conducted reconnaissance level surveys and habitat mapping. The habitats within the project area included salt marsh and coastal prairie. Drafted an impact analysis for the species in the project area.

Biologist, Hedrick Ranch Nature Area, Ventura County, CA, California Coastal Conservancy, 2004 – 2005, $100K: Prepared the Management Plan for an approximately 300-acre site. All habitats encountered onsite were mapped. The Management Plan for the Hedrick Ranch Nature Area describes 17 habitat management and restoration elements. The information collected in this report will be used to management, enhance, and restore riparian habitat on the site in coordination with the Friends of the Santa Clara River.

Biologist, Potrero Power Plant Unit 7 Project, San Francisco, CA, Mirant, 2002 – 2004, $1M: Drafted the terrestrial biological resources section of the Biological Assessment for this project according to requirements of Section 7 of the Endangered Species Act. The impact analysis included a site survey of biological resources at the power plant site, description of existing conditions, and impact analysis due to construction and operation of the proposed project.

Biologist, Colusa Power Plant Project, Colusa County, CA, E&L Westcoast, LLC., 2001 – 2002, 2006 – 2007, $1.5M: Conducted burrowing owl surveys. Coordinated response to multi-disciplinary data requests following the Application for Certification (AFC) of this power plant. Coordinated focused surveys for special status species and wetlands that were implemented in 2006 to update the 2002 AFC.

Biologist, Solano County Juvenile Detention Facility Project, Solano County, CA, 2002 – 2003, $100K: Drafted the biological resources section and impact analysis of the Initial Study and Environmental Assessment as required under CEQA and NEPA. Conducted the corresponding agency correspondence.

Biologist, Long-Term Contingency Plan for Water Supply, Carmel River, CA, [Client], 2001, $300K: Coordinated the biological resources team, including terrestrial, freshwater, and marine resources for the preparation of a long-term contingency plan in Monterey County. The proposed plan included desalinization plants, seasonal water diversion, and underground water injection wells, among other components.

Biologist, Falcon to Gonder 345kV Transmission Power Line, CA-NV, [Client], 2001, $1M: Prepared the biological resources section of the environmental impact statement for a 180-mile transmission power line project in Nevada. Analyzed potential impacts to wildlife and threatened and endangered species as a result of habitat loss and disturbance, habitat fragmentation, and increased human access.

Biologist, Supplemental Environmental Impact Statement / Environmental Impact Report (EIS/EIR) for Sale of Naval Petroleum Reserve No. 1 (NPR-1), Fresno County, CA, NPR, 1996-1999, $1M: Prepared the biological resources section of the environmental impact statement, which discussed the ecological conditions at NPR-1 and the impacts of the proposed action on animal and plant communities. The biological resources section analyzed the current conditions and the impacts to plant and animal communities, threatened, endangered and special concern species in the area of study.

Biologist, Environmental Assessment for the Privatization of the Long Island Railroad, Long Island, NY, Railroad Company, 1997, $100K: Prepared the biological resources section of an environmental impact statement for the privatization of the Long Island Railroad freight operations. Visited railroad yards for a site characterization and determined the presence of endangered or threatened species in the area of study. The EA was prepared under the New York State Environmental Quality Review Act (SEQR) to address the potential environmental impacts of the proposed privatization.

Lorena Solorzano-Vincent

Biologist, Environmental Assessment for the F/A 18-E/F Fighter Jet, Naval Air Station Patuxent River Complex, MD, Department of Defense, 1996-1999, $1M: Prepared parts of the biological resources section of an environmental impact statement for the testing of the F/A 18-E/F aircraft. The proposed action was to test weapons separation from the aircraft F/A 18-E/F at the Naval Air Station Patuxent River Complex. Drafted a report analyzing the impacts of the aircraft's testing on migratory birds and shellfisheries in the area. Visited the Patuxent River Naval Air Station and interviewed local biologists, especially regarding the impacts to bald eagles in the area of study.

Biologist, Flood Control Project, American Samoa, 2006, $100K: Collected biological data on habitat and endangered species in the project area. Drafted an impact analysis on a flood control project and consulted with the local agencies regarding endangered species in the area.

Biologist, Lower Hamakua Ditch Project, Big Island of Hawaii Big Island, HI, FEMA, 2005, $100K: Collected biological data on habitat and endangered species in the project area. Drafted an impact analysis an irrigation and flood control project and consulted with the local agencies regarding endangered species in the area.

Researcher, Macaw Project in the Tambopata-Candamo Reserved Zone, Peru, 2001: Conducted a summer research project on macaw clay licks in the lowland rainforest (i.e., the Amazon basin) of southeastern Peru. Coordinated educational sessions and presented research findings for visitors to the center.

Biologist, Environmental Impact Statement for the Punta Peña-Almirante Road, Bocas del Toro Province, Panama, Republic of Panama, 1997, $200K: Prepared an Environmental Impact Statement for the construction of the road connecting Punta Peña to Almirante. The area of study is highly sensitive for biological issues because it is fairly undisturbed and is located near wetlands, coral reefs, and national parks. Reviewed the Rapid Ecological Assessment for the area of study. Prepared the biological resources section of the EIS, which included the analysis of potential impacts to terrestrial flora and fauna, freshwater ecosystems, coastal ecosystems and threatened and endangered species in several parks located near the impacted area. Drafted and reviewed specific mitigation measures to reduce the impacts analyzed in the EIS.

Biologist, Pre-feasibility Study of an Integrated Electric Mass Transit System to Reduce Commuter Congestion and Air Pollution, San Jose, Costa Rica, 1997, $200K: Prepared detailed materials and descriptions of the railroad right-of-way that had potential to be developed as a Light Rail Transit (LRT) system in San Jose. The final report analyzed several components as potential solutions for San Jose's problems with traffic congestion and air pollution. Potential solutions included an LRT, Electric Trolley Bus, and clean diesel buses. Worked daily with the client, government officials, and other local consultants. Drafted the environmental impact assessment section of the final report.

Lorena Solorzano-Vincent

Biologist, Rapid Ecological Assessment for the Petaquilla Mining Project, Panama, 1996, $200K: Reviewed the Rapid Ecological Assessment of terrestrial and aquatic ecosystems in the concession area for the Petaquilla copper mine. The development of this mine required a careful assessment of the biodiversity of the area because it is located within an undisturbed rainforest. The assessment analyzed the current conditions of forest cover and land use, terrestrial flora and fauna, aquatic ecosystems, terrestrial insects, biodiversity and areas of high ecological sensibility. Visited the area of study in Panama to survey the rainforest and helped collect relevant samples of flora and fauna.

Biologist, Environmental Assessment for Rocket Launching Activities, Sombrero Island, Anguilla, 1998, $200K: Prepared an environmental impact analysis on the potential impacts caused by the development of the proposed rocket launching activities on Sombrero Island, which is located in the Eastern Caribbean. The area of study is especially sensitive because migratory birds nest on the island and an endemic species of lizard inhabits the island. During a field trip, collected data on the migratory seabirds that nest on Sombrero Island during the summer and gathered data on the local lizard population.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Adequacy Request 9. Please provide a discussion of air emission impacts to sensitive species habitat during construction, operation, and maintenance.

Response: No adverse effects on biological resources, including special management species or their habitat, are expected to result from air emissions for this project as described in the AFC. This solar power project, with the modifications discussed in response to Data Adequacy Request 1, will not result in substantial emissions from NOx or other air pollutants that are common considerations for gas-fired power plants. Therefore, no local or regional adverse effects on biological resources from such pollutants will occur, such as effects of nitrogen deposition from gas-fired power plant emissions that may fertilize surrounding lands and favor intrusive, non-native species.

Dust emissions during construction and operation will be controlled using best available means, as discussed in response to Data Adequacy Request 1. This region is subject to heavy levels of windblown dust and sand, and the biological resources on site are naturally adapted to this type of dusty environment. The proposed project will not result in substantial increase in dust emissions that would adversely affect biological resources on site or on adjacent land.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Adequacy Request 10. Please contact the USACE regarding jurisdictionality of waters on-site. Also provide contact information of the USACE representative, a description of what was discussed, and when the discussion took place.

Response: URS met with Unites States Army Corps of Engineers (USACE) staff (Jim Mace, P: (915) 568-1359, F: (915) 568-1348, james.e.mace@spa02.usace.army.mil) at the project site on January 23, 2009 to discuss jurisdictional issues. The USACE indicated during the site visit that drainage features on site appear to not be federally jurisdictional for a variety of reasons. URS is continuing to coordinate with the USACE to provide additional information to conclude the jurisdictional determination. To date, USACE has not indicated a date when they will make a final determination on jurisdiction.

Federal permitting for waters of the U.S. is a subsequent, separate permit action from the CEC permit process; however, we will forward the materials from the USACE to the CEC for informational purposes separate from this data response once the USACE renders its official determination. The information provided in the AFC describes the justification for making a determination of no Federal jurisdiction pursuant to Section 401 or 404 of the Federal Clean Water Act. In the absence of Federal jurisdictional waters of the U.S., permits from the USACE pursuant to Section 404 of the Federal Clean Water Act and from the Lahontan Regional Water Quality Control Board pursuant to Section 401 Certification will not be required.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Adequacy Request 11. Please add USACE AND RWQCB to Tables 5.6-4 and 5.6-5.

Response: Tables 5.6-4 and 5.6-5 have been revised and are presented below.

Table 5.6-4
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	United States Fish and Wildlife Service	Ray Bransfield	United States Fish and Wildlife Service – 2140 Eastman Avenue, Suite 100 Ventura, CA 93003	(805) 644-1766
2	California Department of Fish and Game	Becky Jones, Tonya Moore	California Department of Fish and Game – Inland Desert Regional 3602 Inland Empire Boulevard Ontario, CA 91764	(661) 285-5867 (760) 955-8139
3	Bureau of Land Management	Chris Otahal	Bureau of Land Management 2601 Barstow Road Barstow, CA 9231	(760) 252-6000
	United States Army Corps of Engineers	Jim Mace	U.S. Army Corps of Engineers Prado Dam Regulatory Field Office 2493 Pomona-Rincon Road Corona, CA 92880	(915) 568-1359
	Regional Water Quality Control Board	M. Plaziak	Lahontan Regional Water Quality Control Board Victorville Office 14440 Civic Drive, Suite 200 Victorville, CA 92392	(760) 241-6583

Source: URS Corporation, 2008.
Note:
LORS = laws, ordinances, regulations, and standards

Table 5.6-5
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
USFWS Endangered Species Act of 1973 and implementing regulations, Title 16 USC §1531 *et seq.*, Title 50 CFR §17.1 *et seq*.	Through the Section 7 process, issues biological opinion with conditions or approval after review of Project effects and mitigation measures.	Obtain a biological opinion for take of desert tortoise. Implement BIO-1 and BIO-9 mitigation measures.
USFWS Migratory Bird Treaty Act (MBTA) 16 USC §§703-711.	Prohibits the take of migratory birds, as specified at 50 CFR Part 10. Will avoid take of active nests.	Implement BIO-2, BIO-6 and BIO-9 measures.
CDFG Fish and Game Fully Protected Species Includes: §3511: Fully Protected Birds; §4700: Fully CDFG Protected Mammals; §5050: Fully Protected Reptiles and Amphibians; §5515: Fully Protected Fishes.	Issues guidance after Project effect assessment (CEQA) review. Note: no legal means exists whereby take of California Fully Protected species may be authorized by CDFG.	Implement all BIO mitigation measures.
CDFG California Endangered Species Act of 1984, Fish and Game Code, §2050 through §2098.	Issues guidance after Project effect assessment (CEQA) review.	Obtain a 2081.1 MOU for take of desert tortoise habitat and translocation of tortoise from the project site. Implement BIO-1 and BIO-9 mitigation measures.
CDFG Fish & Game Code 1602.	Streambed Alteration Agreement.	Execute an agreement after California Energy Commission certification and before construction on private property or if required by the Bureau of Land Management.
USACE	In the absence of waters of the U.S., permits from the USACE pursuant to the Federal Clean Water Act will not be required.	No permits are required.

Table 5.6-5
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Lahontan Regional Water Quality Control Board	In the absence of waters of the U.S., Section 401 Certification from the Lahontan Regional Water Quality Control Board will not be required. Permitting for potential waste discharge to surface waters of the State would be required if the regional board asserts jurisdiction on site. At this time, no jurisdictional waters of the State have been identified.	Currently, no permits are required, other than storm water permitting as discussed in Section 5.5 of the AFC.

Notes:
CDFG = California Department of Fish and Game
CEQA = California Environmental Quality Act of 1970
CFR = Code of Federal Regulations
RWQCB = Regional Water Quality Control Board
USACE = United States Army Corps of Engineers
USC = United States Code
USFWS = United States Fish and Wildlife Service

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 12. The applicant proposes mitigation measures in Section 5.7 of the AFC. Please discuss the potential effectiveness of these measures.

The applicant proposes monitoring of ground disturbance associated with "the Project" in Section 5.7 of the AFC. Please propose a plan or protocol to monitor the effectiveness of the overall mitigation program for cultural resources.

Response: Please refer to the discussion of mitigation measures and how the Applicant plans to monitor the effectiveness of the overall mitigation program on Page 5.7-166 – 5.7-178 of the revised Section 5.7, Cultural Resources provided as attachment CUL-1. A summary is also provided below.

The mitigation measures provided in the revised Section 5.7 of the AFC are considered highly effective in addressing adverse effects to eligible known or previously unknown cultural resources. A tabular matrix of the mitigation measures are provided in the revised Section 5.7. The table provides a matrix with potential impact(s) along with corresponding mitigation measure(s), monitoring/reporting action(s), effectiveness criteria, responsible agencies, and timing (Pages 5.7-171 – 5.7-178).

The effectiveness of the monitoring program will be measured through monthly and end of construction final monitoring reports based on completed daily monitoring logs and non-compliance forms. The components and protocols of the monitoring program will be formalized in a CEC/BLM approved Cultural Resources Monitoring and Mitigation Plan/Historic Properties Treatment Plan and a Worker Environmental Awareness Program.

Attachment

CUL-1

TABLE OF CONTENTS

Tables

Figures

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A&P	Atlantic & Pacific Railroad
ACEC	Area of Critical Environmental Concern
AD	Anno Domini
AFC	Application for Certification
amsl	Above Mean Sea Level
APE	Area of Potential Effect
Applicant	SES Solar One, LLC
AT&SF	Atchison, Topeka & Santa Fe Railroad
B.C.	Before Christ
BNSF	Burlington Northern Santa Fe Railroad
CARIDAP	California Archaeological Resource Identification and Data Acquisition Program
CCR	Code of Regulations
CDC	California Development Company
CDCA	California Desert Conservation Area
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cm	centimeters
CRHR	California Register of Historic Resources
DPR	Department of Parks and Recreation
DTC	Desert Training Center
ECSZ	Eastern California Shear Zone
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPNG	El Paso Natural Gas Company
FSA	Final Staff assessment
GLO	Government Land Office
GPS	global position system
HPTP	History Property Treatment Plan
I-15	Interstate Highway 15
I-40	Interstate Highway 40
kV	kilovolt(s)
LORS	Laws, Ordinances, Regulations and Standards
m	meters
MOU	Memorandum of Understanding
MW	megawatts
NAGRPA	National Graves and Repatriation Act
NAHC	Native American Heritage Commission
NAP	Not A Part
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHV	Off-Highway Vehicle
Old Route 66	Nationals Trails Highway
PCU	Power Conversion Unit

PI	Principal Investigator
POD	Plan of Development
PPA	Power Purchase Agreement
PRC	Public Resource Code
Project	Solar One APE and Appropriate Regulatory Buffers
ROE	Right-of-Entry
ROW	Right-of-Way
RPS	Renewal Portfolio Standards
S.B.B.M.	San Bernardino Base Meridian
SBAIC	San Bernardino Archaeological Information Center
SCE	Southern California Edison
Section 106	Section 106 of the National Historic Preservation Act of 1966, as amended
SEEU	Subsurface Exploratory Excavation Units
SES	Stirling Energy Systems
SHPO	State Historic Preservation Officer
SHWF	Specified Hazardous Waste Facility
SLF	Sacred Lands File
SoCal	Southern California Gas Company
Solar One	SES Solar One, LLC
U.S.	United States
URS	URS Corporation
USG	U.S. Gypsum Company
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
WSA	Wilderness Study Area
YBP	years before present

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SECTION 5 ENVIRONMENTAL INFORMATION

5.7 CULTURAL RESOURCES

5.7.1 Affected Environment

This section analyzes the potential impacts of Stirling Energy Systems (SES) Solar One Project, (referred to as the Project) may have on previously recorded or newly recorded cultural resources located within the Area of Potential Effect (APE). The Project is located in the Central Mojave Desert, in an undeveloped area of eastern San Bernardino County, California. The Project is located approximately 37 miles northeast of the city of Barstow, California.

The Project APE as used in this section refers to 100 percent of the Project site, linear facility routes, and ancillary project areas contained within the APE, as well as the appropriate regulatory buffers. The Project APE totals approximately 8,767 acres without regulatory buffers, as described below.

There are three portions of the Project APE that are not included in the Project boundaries, identified as Not A Part (NAP) areas. These include areas found in Sections 1, 9, 13, 36 (7.5' USGS Hector quadrangle 1993 Revised, 1982 Provisional). The Applicant (SES) does not have a Plan of Development (POD) for the NAP areas because these properties are privately owned and access could not be obtained. SES requested right-of-entry (ROE) from the private landowners to survey their parcels. Survey data provided herein is for the purpose of reporting on cultural resources (where access was authorized) within the regulatory buffers that extend into this area (Figure 5.7-1 Confidential Appendix A). The private parcels in which landowners denied ROE have no regulatory buffer because survey of these areas was not authorized. See below in the section titled "Area of Potential Effects", for further details regarding the APE.

The proposed Project includes the construction, operation, maintenance, and abandonment of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (Phase I: 500MW [approximately 5,000 acres] and Phase II 350MW [approximately 2,700 acres]) (Figure 5.7-1). The proposed Project would consist of up to approximately 34,000 SunCatchers. Construction is anticipated to occur over a 48-month period beginning in 2010 and ending in 2014. Temporary construction site access would be provided from I-40, beginning east of the Lugo-Pisgah Transmission Line and would run approximately 3.5 miles across the Pisgah Area of Critical Environmental Concern (ACEC) requiring an approximate 100-foot right-of-way (ROW). Long-term permanent access would be provided by a bridge over the BSNF railroad along Hector Road north of I-40. The bridge would be 220 feet long with a clear span of 125 feet, and 36 feet wide.

For the purposes of discussing Project related effects, the discussion of cultural resources is divided by phases: Phase 1, Phase 2, Pisgah Substation Triangle Area, Access Road Corridors and Bridge Crossing, 200-Foot Archaeological Buffer, and ½-Mile Built Environment Buffer (Figure 5.7-1).

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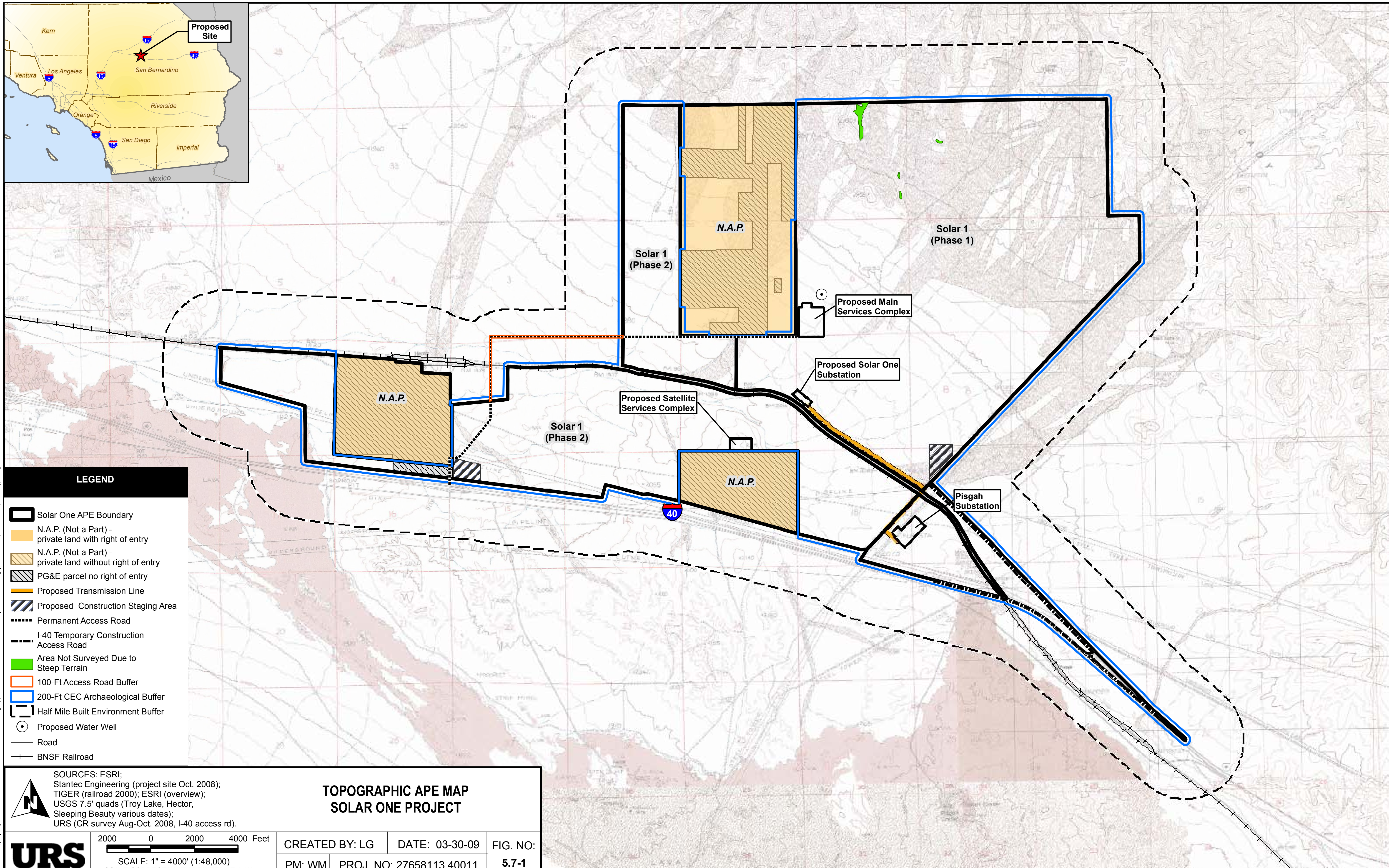

TOPOGRAPHIC APE MAP
SOLAR ONE PROJECT

FIG. NO: 5.7-1

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Cultural resources include prehistoric resources, historic buildings, structures, objects, districts, and archaeological sites, and sites and resources of concern to Native American and other ethnic groups. The complete results of the Class III intensive field survey are found in Appendix Z-Confidential Technical Report.

The cultural resources assessment prepared for the Project includes: a description of the Project APE and affected environment; existing site conditions; a summary of the prehistory, ethnography, history of the region; a review of site records for previously completed cultural resource investigations and recorded sites in the APE and within a 1-mile study area surrounding the Project APE; results of the archaeological and historic architecture pedestrian surveys of the APE; Native American consultation; environmental consequences; cumulative effects; mitigation measures; effectiveness of the proposed measures and a plan to monitor the effectiveness of these measures ; compliance with Laws, Ordinances, Regulations and Standards (LORS); agencies and agency contacts; permits required and permitting schedule and references. Complete documentation of the cultural resources assessment is appended in the archaeological survey report (refer to Appendix Z-Confidential Technical Report and Appendices).

All cultural resources work for the Project was carried out under the direct supervision of an archaeologist who meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation Professional Qualification Standards (36 Code of Federal Regulations (CFR) Part 61). The Class III intensive field survey was done in accordance with the Warren-Alquist State Energy Resources Conservation and Development Act, Public Resources Code (PRC), Section 25000 *et seq.*; Instructions to the California Energy Commission (CEC) Staff for the Review of and Information Requirements for an Application for Certification (CEC 1992); Regulations Pertaining to the Rules of Practice and Procedure and Power Plant Site Certification (CEC 2007); and Rules of Practice and Procedure and Power Plant Site Regulations Revisions (CEC 2007). Additionally, this study was done in accordance with the California Environmental Quality Act (CEQA), PRC Section 21000 *et seq.*, and the California Code of Regulations (CCR) Title 14, Chapter 3, Section 15000.

Because this Project is a federal undertaking, permits must be obtained from the BLM, which is the lead agency for the Project. The CEC is the lead agency and has a certified regulatory program under CEQA. Because the Project also requires approval by the CEC, Bureau of Land Management (BLM) and the CEC have developed and entered into a Memorandum of Understanding (MOU). This MOU requires that a joint NEPA/CEQA process be followed in the approval by the two agencies of all solar energy projects. For the Project, BLM's NEPA compliance requirements will be met, in part, through the preparation and filing of a joint Environmental Impact Statement (EIS)/Final Staff assessment (FSA) document. The CEC's preliminary and final Staff Assessment will be prepared in conjunction with the BLM's draft and final EIS. In compliance with NEPA, the EIS/FSA document will address the effects of the Solar One Project and the proposed land use plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

The effects of the Project on cultural resources eligible for or listed in the National Register of Historic Places (NRHP) must be taken into account per Section 106 of the National Historic Preservation Act (NHPA), codified under 36 CFR §800. Cultural resource work for the Project was conducted in accordance with the BLM and State Historic Preservation Office (SHPO) Programmatic Agreement and the BLM Handbook 8110 for identifying Cultural Resources.

The Class III Intensive Field Survey was carried out under URS statewide permit CA-0611 and fieldwork authorization 680-026, issued in July 2008, and in effect through December 2009. Approval of the proposed Project ROW Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands managed by the BLM. The Project also requires a plan amendment to the 1980 CDCA Plan.

The Solar One Class III work began late July 2008, with preliminary background research. The Class III intensive field survey was carried out between August 4 and October 31, 2008. The Built Environment survey was conducted by Architectural Historian, Kirsten Erickson, who conducted background research on August 11 through 14, August 20 through 22, and October 29 and 30, 2008, and field surveys on August 19, 2008 and October 27 and 28, 2008. The Class III Intensive field survey covered 98 percent of the Project APE (8,767 acres) plus regulatory appropriate regulatory buffers (760 acre(s) archaeological buffer and 11,522 acres built environment buffer). The Project APE refers to 100 percent of the Project site, linear facility routes, and ancillary project areas, which are contained within the APE, as well as the appropriate regulatory buffers (Figure 5.7-1).

The Class III Intensive Field Survey identified a total of 401 cultural resources within the Project APE and appropriate regulatory buffers; of those, 391 are archaeological sites and 10 are built environment resources.

Of the 391 archaeological resources; 143 are archaeological sites and 247 are isolated finds. Of the 143 archaeological sites, 14 occur in Phase 1; 107 occur in Phase 2; 7 occur in the Pisgah Substation Triangle survey area, 8 occur in access road corridors and bridge crossing, 5 occur within the 200-foot archaeological buffer, and 1 is in the NAP area, which is beyond the APE and 200-foot regulatory buffer.

Of these 143 archaeological sites, 46, including 1 in the NAP area, are assumed eligible for the National Register of Historic Places (NRHP) under Criterion D: Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4). They are also identified in the California Register of Historical Resources (CRHR) as potentially significant under the criterion that these sites have yielded or are likely to yield information important information to prehistory or history (Section 15064.5). Of the 46 archaeological sites, 41 are prehistoric, 2 are historic, and 3 are multi-component archaeological sites. The single assumed eligible archaeological site within the NAP area is outside of the Project APE and archaeological buffer. As such, no direct or indirect effects are anticipated. To insure that no assumed eligible archaeological resources are adversely affected, avoidance of the NAP areas is recommended. The remaining 97 archaeological sites are recommended not eligible under NRHP and/or CRHR and, therefore, do not constitute historic properties or significant cultural resources.

A total of 247 isolated archaeological finds occur with the Project APE and 200 foot archaeological buffer. Isolates are typically considered ineligible resources under NRHP and/or CRHR, because such finds generally, have low-likelihood for subsurface deposition, represent a single isolated event, and/or are not in-situ and lack context; therefore, data potential is considered exhausted through recordation. The 247 isolates and 97 archaeological sites not recommended eligible for listing in the NRHP and/or CRHR lack the potential to provide additional data that would contribute to the current body of archaeological data. Therefore, a recommendation of no effect on Historic Properties or significant cultural resources is recommended for the 247 isolates and 97 archaeological sites. The isolates and sites are detailed in tabular summaries in Table 5.7.10 and management considerations in Table 5.7.13. Site descriptions and evaluations of each individual site are provided in Appendix Z-Confidential Technical Report.

The results of this study indicate that the Project may adversely affect 46 archaeological resources that are assumed eligible for listing under the NRHP and/or the CRHR, including one site in the NAP area. In order to validate NRHP and/or CRHR eligibility recommendation, an extended Class III limited subsurface testing program is recommended for the 45 archaeological sites within the APE and 200 foot archaeological buffer.

The built environment assessment identified 10 historic resources. Two of these resources have been previously recorded and determined to be eligible for listing in the NRHP and CRHR (Atlanta & Pacific/Atchison, Topeka, & Santa Fe Railroad and National Old Trails Highway/U.S. Route 66). Of the 8 newly recorded built environment resources, 3 are recommended as eligible for the NRHP and CRHR (Southern California Edison North and South 220-Kilovolt Transmission Lines, and Pisgah Substation); the other 5 newly recorded built environment resources are not recommended eligible for NRHP and CRHR. Because many of the built environment resources are linear, they are located in two or more of the surveyed areas. Of these sites, 1 occurs in Phase 1; 4 occur in Phase 2, 7 occur in the Pisgah Triangle, 3 occur within proposed access road corridors and bridge crossing, and 7 occur in the ½-mile buffer.

Indirect impacts to NRHP and/or CRHR eligible cultural resources are also addressed in this section, including impacts to natural setting, and viewshed, as well as the increased traffic/ activity in the Project APE that may lead to unauthorized collecting of artifacts in and around the Project APE. A Management/Mitigation Measures has been provided, and when implemented, would result in no indirect effects on NRHP- and/or CRHR-eligible cultural resources within the Project APE and buffers.

There remains a possibility that construction-related activities could disturb and/or destroy known or previously unknown NRHP- and/or CRHR-eligible cultural resources. Measures have been provided that would mitigate adverse effects to eligible or potentially eligible cultural resources. If avoidance is not feasible, a treatment/data recovery plan would be implemented to mitigate adverse effects and impacts to resources would be less than significant level as a result.

5.7.1.1 Project Area

The Project is located in the Central Mojave Desert, in an undeveloped area of eastern San Bernardino County, California. The Project is located approximately 37 miles east of the city of Barstow, California. The Project is located primarily on land managed by BLM, Barstow Field Office. The Project APE consists of approximately 8,767 acres and as identified on the following USGS quadrangle maps; Hector (1993 Revised, 1982 Provisional), Lavic Lake (1955 Photorevised 1973), Sleeping Beauty (1982 Provisional Minor Changes 1993), Sunshine Peak (1955 Photorevised 1992), and Troy Lake (1982 Provisional Minor Changes 1993) United States Geological Survey (USGS) 7.5-minute series quadrangle maps, San Bernardino Base Meridian (S.B.B.M.).

The Project is an irregular shaped area north of Interstate 40 and primarily east of Hector Road. The southern Project boundary borders I-40; the Burlington Northern and Santa Fe (BNSF) Railway ROW bisects the northern and southern portions of the Project APE; the western Project boundary borders the proposed Solar Three, UC Project; the southeastern boundary borders the transmission line; the eastern boundary is within the Cady Mountains Range; and the northern Project boundary borders the base of the Cady Mountains. The triangular parcel encompassing the Pisgah Substation and immediately surrounding area is also included in the APE, as well as the eastern temporary I-40 access ramp and other ancillary temporary access routes.

The Cady Mountain Wilderness Study Area (WSA) and the Sleeping Beauty Proposed Wilderness Area are located north and northeast, respectively, of the Project APE. Pisgah Crater, located within the Pisgah ACEC, is located south of the Project APE. Historic U.S. Route 66 traverses the proposed Project in an east-west orientation and somewhat parallel to the BNSF railroad. Several underground and above ground utilities currently traverse the APE as well, also predominately with an east-west orientation.

An on-site substation (*i.e.,* Solar One Substation [covering approximately 35 acres]) would be constructed to deliver the electrical power generated by the Solar One Project to the SCE Pisgah Substation. Approximately twelve to fifteen 220kV transmission line structures (90 to 110 feet tall) would be required to make the interconnection from the Solar One Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project APE. (Figure 5.7-1).

The Project would include a centrally located Main Services Complex, encompassing approximately 22.6 acres, that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including, a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and potable water tank.

Adjacent to the Main Services Complex, a 14-acre temporary construction laydown area would be developed. An additional construction laydown area would be located on 25 acres in Section 17 and Section 8, north of the access road from I-40.

An 8-acre Satellite Services Complex, used as a temporary construction laydown area, would include three SunCatcher assembly buildings to support SunCatcher installation in Section 12 south of the BNSF railroad.

Temporary construction site access would be provided from I-40 beginning east of the Lugo-Pisgah Transmission Line, and would run approximately 3.5 miles across the Pisgah ACEC, requiring an approximate 100-foot ROW. Long-term permanent access would be provided by a bridge over the BSNF railroad along Hector Road north of I-40. Equipment may be transported during construction via trucks and/or railroad (through the construction of a siding), that would be located on the north side of BNSF railroad and east of Hector Road. The bridge would be 220 feet long with a 125-foot clear span and would be 36 feet wide.

Water would be provided via a groundwater well located on a portion of the BLM ROW grant in Section 12, southwest of the Main Services Complex, and transported through an underground pipeline. Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), water required will be approximately 36.2 acre-feet per year. Emergency water may be trucked in from local municipalities. The proposed Project has been designed to minimize water use and maximizes the recovery of processed potable water. When possible, wastewater discharge will be routed to the on-site raw water storage tank for reuse.

5.7.1.2 Area of Potential Effect

The APE includes 3 individual regulatory buffers: archaeological, built environment and access route corridors. The archaeological APE includes the Project APE, plus an additional 200-foot buffer. The historic architecture APE includes the Project APE, plus an additional ½-mile wide buffer. The access road corridors that extend beyond the APE include the centerline of the road plus a 50 foot buffer on either side. The APE for this Project is equivalent to 100 percent of the project site, and linear facility routes, ancillary project areas, contained within the APE, as well as appropriate regulatory buffers. The delineation of both the archaeological and built environment APEs were completed in accordance with BLM Manual 8100, BLM Barstow Field Office requirements per BLM Archaeologist Jim Shearer, and the CEC Rules of Practice and Procedure and Power Plant Site Regulations Revisions, Appendix B (g)(2)(C) (CEC, 2007a).

There are three NAP areas within the Project APE, which include areas found in Sections 1, 9, 13, 36 (7.5' USGS Hector quadrangle 1993 Revised, 1982 Provisional). The Project Proponent (SES) does not have a POD for the NAP areas because these properties are privately owned and access could not be obtained. SES requested ROE from the private landowners to survey their parcels. The survey data is provided for the purpose of reporting on cultural resources (where access was authorized) within the regulatory buffers that extend into these area(s) (Figure 5.7-1). The private parcels in which landowners denied ROE have no regulatory buffer because survey of these areas was not authorized (Figure 5.7-1).

There is one private parcel in Section 16 USGS 7.5' Hector Quad that is part of the Project, owned by PG&E where ROE was not authorized; therefore this parcel could not be surveyed.

The southern boundary of the Project APE abuts Caltrans ROW in two places. The regulatory buffers extend into the Caltrans ROW, which was not surveyed for cultural resources because access was not granted. A Caltrans encroachment permit is pending; it is unknown when this permit may be authorized and when the Caltrans ROW would be surveyed.

The Project APE totals approximately 8,767 acres without regulatory buffers. The 200-foot archaeological buffer is an additional 760 additional acres, and the ½ mile built environment buffer totals approximately 11,522 additional acres. As stated above, the cultural resource regulatory buffers were surveyed in areas with ROE permission from property owners. The collective percentage of the above Project APE and regulatory buffers that were surveyed for archaeological and built resources is 98 percent of the APE, with the remaining 2 percent not surveyed due to areas of steep terrain and/or areas without ROE.

5.7.1.3 Physiography

The Project is located in an undeveloped area of the Mojave Desert approximately 115 miles east of Los Angeles and 37 miles east of Barstow, California along Interstate Highway 40 (I-40). The Cady Mountains border the Project APE's northern and eastern boundaries. Cady Peak is approximately four miles northeast and Sleeping Beauty Mountain is five miles to the east. Nearby urban communities include Newberry Springs and Ludlow, both approximately twelve miles to the west and east, respectively, of the Project APE. The Project APE is located within the Mojave Valley-Granite Mountains ecological subsection (Subsection 322Ah) of the broader Mojave Desert (Miles and Goudey 1997). The general environmental setting is that of a wide valley within arid desert, along which is an expansive alluvial fan that is dissected by numerous unnamed south-southwest trending washes and ephemeral drainages.

No springs are indicated on the USGS quad maps for the Project APE, although three well sites do occur on the USGS quad maps and were observed during the pedestrian survey. Of these, the well located in southwestern quarter of Section 1 of Township 8 North, Range 5 West (Hector – 1982 Provisional 7.5 minute series quad) has water present. The nearest reliable water source existing outside the Project APE occurs approximately 12 miles to the west, in the Mojave Valley; numerous springs and wells surround the dry lake bed of ancient Troy Lake, which is just west of the project APE. Water is seasonally available in the form of rain swollen drainages, as indicated by the existence of numerous washes originating in the Cady Mountains and off-site to the east. A substantial east to west drainage crosses the southern portion of the Project APE, eventually emptying into Troy Lake (Figure 2.1-1). The presence of water in drainages and lakes was certainly greater during the terminal Pleistocene and early Holocene periods. Numerous dry stream drainages and lake remnants (*i.e.,* Troy Lake, Lavic Lake, and Broadwell Lake) are located in the vicinity of the Project APE and attest to this increased presence of water. Based on paleoenvironmental data, the general climatic pattern in the Mojave Desert seems to be that of cool and wet periods, followed by warmer and drier conditions, from the Late Pleistocene through the Late Holocene periods, as reflected in the numerous dry lake beds that are interspersed throughout the area (Sutton, *et al.,* 2007; S. Hall 1985; Spaulding 1991).

5.7.1.4 Soils and Geology

The Mojave Desert Geomorphic Province is a wedge shaped area largely bound by major faults and structurally referred to as the Mojave Block. The Mojave Desert Geomorphic Province is characterized by broad expanses of desert with localized mountains and dry lakebeds and is bound by the San Bernardino Mountains and the Pinto fault to the south, the San Andreas fault to the west, the Garlock fault to the north and the Basin and Range Province to the east. The block itself is cut by a series of northwest to southeast striking faults including the Helendale, Lenwood, Johnson Valley, Camp Rock, Emerson, Calico, Pisgah, Bullion and Lavic Lake faults. Collectively, the strike slip faults in the Mojave Block are referred to as the Eastern California Shear Zone (ECSZ). The Project APE is within a broad valley between the Southwestern and Southeastern Cady mountains, in the central portion of the Mojave Desert Geomorphic Province.

The Project area is characterized by Holocene-age and Pleistocene-age alluvial deposition. Alluvial deposits from the adjacent highlands are composed of silty sands and gravels with localized gravel and cobble channels. These sandy alluvial deposits may be locally intertwined with finer-grained basin deposits. The bounding highlands, which include a small portion along the northern Project boundary, are underlain by granitic and metamorphic terrain and along the southern edge by younger volcanic deposits (Dibble and Bassett 1966).

5.7.1.5 Geomorphology

The deposition history is dominated by older (Pleistocene) and younger (Holocene) fanglomerates consisting of sands and gravels flowing in a generally southern direction, derived from the uplifted granitic and andesitic Cady Mountains (Dibblee and Bassett 1966). The older alluvium dominates the upper reaches of the fanglomerate, whereas the younger deposits dominate the lower reaches of the slope. This younger alluvium includes materials associated with a substantial east to west drainage that crosses the southern portion of the Project. Although limited data is available, field observations indicate a substantial depth to the fanglomerate deposits. Older fanglomerates and alluvium form low hills in the southern-most extent of the Project APE and are separated from the remainder of the Solar One APE by the drainage noted above. These hills, and a northward extension of the Pisgah lava flow, channel the drainage towards Troy Lake to the west.

A major factor affecting the geomorphology of the Mojave, and specifically the Project APE and its environs, is the Mojave River itself. This river and its drainage system represent the largest present-day hydrological system in the Mojave Desert (Enzel 2003:62). Fluctuations in the paleo-climate between wet and dry periods, coupled with the changing path of the sizable Mojave River, resulted in the formation of several freshwater lakes, the most notable of which are Lake Manix and Lake Mojave. As the river changed its course, the overabundance of freshwater would be transported and deposited into naturally occurring basins along or at the terminus of the Mojave River. Marith Reheis and co-authors (2007) note that Lake Manix consists of several subbasins, which are referred to as Coyote Lake, Troy Lake, Manix, and Afton. As the lake developed, "fluvial and deltaic sediments were deposited progressively eastward into the lake" and that studies have hypothesized that there were at least four major lake cycles (2007:5). Based on geological and geomorphological studies the Lake Manix shoreline reached an elevation of 557 meters (m). At this level, the southern extent of the lake itself would have pushed east, potentially abutting the westernmost boundary of the Project APE (Enzel 2003; Reheis *et al.,* 2007: Figure 3).

The occurrence of desert pavements and basalt outcrops within the Project APE reflects the context as described above. In particular, the pavements on the slopes of the Cady Mountains are broader and better developed atop the older, up-slope Pleistocene fanglomerates rather than on the younger surfaces at lower elevations. The older surfaces, and likely the younger ones as well, predate the accepted presence of people in the western hemisphere. The most stable pavements, and likely the oldest, lie atop Quaternary alluvium woven among the fanglomerate hills and lava flows within the southern portion of the Project APE. Buried deposits would not be found beneath these stable surfaces. The cryptocrystalline silicate nodules that occur as part of the desert pavement matrix may be secondarily sourced to the fanglomerate deposits, though their original matrix remains unknown. Holocene alluvial deposits within and adjacent to the east-west drainage are the most likely source for buried deposits. Archaeological deposits identified along this drainage contain a variety of artifact types, including groundstone and other indications of, at the least, temporary encampment. The loose sandy matrix and the seasonal rain and flood events are likely to have obscured portions of these deposits.

5.7.1.6 Biology

California's diverse environment is separated into ten different bioregions. The Project APE lies within the Mojave Bioregion. The Mojave Bioregion is an arid desert environment which covers over 25 million acres of southern California, southern Nevada and the southwestern Utah and is characterized by desert washes, high plateaus, mountain peaks, palm oases, and large dry prehistoric lake beds called playas. These playas usually consist of sand and gravel basins surrounding central salt flats and were formed by pluvial lakes which once dominated the Mojave Bioregion. The Mojave is bordered on the north by the

Sierra Nevada Bioregion, on the west and south by the Transverse and Peninsular ranges and is separated from the Great Basin, on the east, by the Garlock Fault (Moratto 1984:16, 17). Elevations in the bioregion average between 2,000 to 3,000 feet above sea level and contain isolated peaks of 6,000 to 7,000 feet above sea level.

Although the desert appears barren and remote, it contains a large variety of plant and animal life. Vegetation in the Mojave Bioregion includes Mojave creosote bush, scattered desert saltbush, Joshua tree scrub, alkali scrub, juniper pinyon woodland, numerous varieties of cacti, and hardwood and conifer forests in the higher elevations. Rare plants in the bioregion include white bear poppy, Barstow woolly sunflower, alkali mariposa lily, Red Rock poppy, Mojave monkey flower, and Stephen's beartongue. (Ceres, n.d.). The Mojave Bioregion is characterized by hot dry summers followed by cool winters with occasional rainstorms that often develop into flash floods. Much of the land within the Mojave Bioregion is owned and managed by the BLM or contained in one of the three National Parks: Death Valley, Eastern Mojave, and Joshua Tree; and several other recreational areas (Ceres, n.d.).

5.7.1.7 Existing Conditions

The Project APE is located north of I-40, at Hector Road. The Burlington Northern and Santa Fe (BNSF) Railway tracks bisect the northern and southern portions of the Project APE. Historic Route 66 roughly follows a similar route as I-40 though they are discrete within the Project. A series of underground pipelines occur within the Solar One (Phase 2) APE south of the railroad tracks. Four series of transmission towers also occur along the eastern-southeastern Project APE. These towers include a pair of steel towers a wooden transmission tower line, and a modern transmission tower. The Pisgah Substation, which is located within a triangular shaped parcel and the I-40 temporary access route is included in the APE. Two radio facilities are located within the vicinity of the Solar One Project APE; one is situated to the southwest and the other to the east-northeast of the Project APE.

Historic mines occur throughout the region, and include the Black Butte Mine to the east and the Logan Mine to the north. Both the Logan and Black Butte Mines were used for the extraction of the mineral manganese; both are located within one-mile of the Project APE. The historic mines consist of borrow open pit mines. The Pisgah Crater, a volcanic cinder cone, is approximately 4.5 miles south-southeast of the Pisgah substation, beyond the southeast corner of the Project APE. Pisgah Crater is on private land and has been mined for landscape rock, which has reduced much of the cinder cone from its original state.

The Project APE is distinctively rural in nature, and the landscape's environs are characterized by cattle ranching activities (*e.g.,* grazing, rangeland), historic mining, I-40, U.S. Route 66, transmission lines, and historic and modern railroad activities. The majority of the Project APE is relatively undisturbed and the landscape/topography generally resembles its natural environment. There are no standing, intact structures within the APE, only dilapidated mining related structures, mining processing equipment, corrals, water tanks, barbed wire fencing, and historic transmission poles, transmission line corridors and power facilities (*e.g.,* the Pisgah substation). Those of historic-age were recorded or updated and include evaluation recommendations.

5.7.1.8 Site Disturbance within the Project Area and APEs

The primary sources of the previous surface and subsurface disturbance in and adjacent to the Project APE are, in no specific order, related to cattle grazing, off-road vehicle use, mining in the Project Area, pipeline construction, construction of the railroad and associated facilities, dirt access road grading, maintenance, and use, the National Old Trails Highway construction and use, I-40 construction and use, and transmission line construction and use.

5.7.1.9 Prehistoric Context

The chronological sequence of the cultural complexes for the Mojave Desert initially proposed by Warren (1980, 1984) and Warren and Crabtree (1986), divides the prehistoric era into five temporal periods: Lake Mojave, Pinto, Gypsum, Saratoga Springs, and Shoshonean. The four earlier periods encompass what is called the Archaic Period of the Great Basin and, in the Saratoga Springs period, formative influences from the Southwest (Lyneis 1982), while the Shoshonean period includes the ethnographic era. Claims have been made for archaeological assemblages dating to periods earlier than Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

The Mojave Desert sequence has recently been expanded by Sutton *et al.,* (2007) to include elements more closely aligned to prehistoric cultural complexes in the Central Mojave Desert. Similar to Warren and Crabtree (1986), Sutton *et al.,* (2007) notes little evidence of a "Pre-Clovis" occupation of the Mojave Desert during the Pleistocene, but does not discount the possibility of such evidence existing in the region. In contrast to the earlier sequence, Pleistocene era occupation is identified and termed the hypothetical "Pre-Clovis" and "Paleo-Indian" Complexes. Other elements of the Sutton *et al.,* (2007) Mojave Desert chronology for the Holocene period include the Lake Mojave complex, Pinto complex, Dead Man Lake complex, Gypsum complex, Rose Spring complex, and Late Prehistoric complex, as described below. As used herein, "climactic periods (*e.g.,* Early Holocene) [refers] to specific spans of calendric time and cultural complexes (*e.g.,* Lake Mojave Complex) to denote specific archaeological manifestations that existed during (and across) those periods" (Sutton *et al.,* 2007:233).

Additionally, Sutton *et al.,* (2007: Table 15.1 and 15.2) provide good summaries of major archaeological research conducted in the Mojave Desert since 1982. Due to the advent of cultural resource management projects, primarily on military bases and on federal land in the Mojave, more than 3 million acres have been surveyed with more than 20,000 sites identified in the last twenty-seven years. These include surveys at China Lake Naval Weapons Center, Edwards Air Force Base, Fort Irwin, Twenty-Nine Palms Marine Corps Center, and federal Bureau of Land Management Land (Basgall and Giambastiani 2000; Basgall 2004; Hall 1993; Warren 1991). In terms of excavation projects in the Mojave, work has been conducted on a wide range of site types, from Paleo-Indian sites to Late Prehistoric sites, several of which have provided radiocarbon dates that support the cultural chronology that has evolved with these more recent investigations (Sutton *et al.,* 2007: Table 15.3). The chronological sequence presented below is based on both the earlier and more recent archaeological survey and excavation projects in the Mojave.

5.7.1.9.1 Paleo-Indian Complex (10,000 to 8000 cal B.C.)

The Paleo-Indian Complex was an era of environmental transition between the late Pleistocene and early Holocene. The beginning of the Paleo-Indian Complex was characterized by increased rainfall and cooler temperatures, which formed deep lakes and marshes, even in the interior desert regions of California. As temperatures warmed at the start of the Holocene, glaciers slowly retreated, sea levels rose, and the interior lakes and marshes gradually evaporated over the millennia (Moratto 1984:78).

The earliest, clear evidence for human occupation of the Mojave Desert begins at about 12,000 years ago, while claims for earlier, pre-Holocene era occupations such as those made for the Calico Early Man site (Duvall and Venner 1979), Tule Springs (Harrington and Simpson 1961), Lake China (Davis 1978), and Lake Manix (Simpson 1958, 1960, 1961) remain unsubstantiated.

In 1926, a fluted point found in Folsom, New Mexico transformed the debate about the antiquity of the earliest inhabitants of the New World, pushing the date back to approximately 15,000 B.P. Since that time, many other sites containing this type of point have been identified throughout the United States. Many of these sites contain variations of the fluted point tradition including the Clovis.

The Paleo-Indian Complex within the Mojave Desert is, thus far, represented exclusively by the Clovis Complex, though the relationship with the later Great Basin stemmed series points is also a consideration. The Paleo-Indian Complex experienced profound environmental changes, as cool, moist conditions of the terminal Wisconsin glacial age gave way to a warmer, drier climate of the Holocene (Spaulding 1990).

The China Lake site remains the only presumed occupation of the Paleo-Indian complex in the Mojave Desert for the late Pleistocene Period. China Lake is located near an ancient Pleistocene lake. Excavations at this site began in 1968 and lasted through the end of the 1970s (Moratto 1984:66-70). China Lake has a well-sealed stratigraphic context with prehistoric tools intermixed with the fossilized remains of extinct mammals. The tool sequence from the site suggests that China Lake was inhabited from as early as 9,200 cal. B.C. (Sutton *et al.,* 2007: 234). The earliest calibrated dates for China Lake are from habitation debris at the Pleistocene lakeshore that continued through 10,000 B.C., where Proto-Clovis and Clovis cultures were identified. Nearly all of the tools identified at this site were produced from obsidian and fine-grained cryptocrystalline silicates (cherts and jaspers).

One common theme among nearly all Paleo-Indian sites in North America is the tool assemblage: projectile points, hafted to the end of a spear and launched using a throwing tool (atlatl), made from fine-grained lithic material and fluted. Fluted points, defined as a component of the Clovis culture in California, have been found nearly throughout the entire state from coastal estuary environments to ancient Pleistocene lakeshores, which are now in desert areas. At least five sites near Cajon Pass have been identified containing fluted projectile points, suggesting an early occupation of approximately 12,000 BP, which corresponds to the “hypothetical Pre-Clovis” complex (pre-10,000 cal B.P) for San Bernardino County (Sutton *et al.,* 2007:236). In addition to fluted points, the Paleo-Indian tool assemblage was composed mainly of scrapers, burins, awls, and choppers, all used for the processing of animal remains and foodstuffs.

The late Pleistocene to early Holocene geological period of transition, approximately 14,000 to 8,000 BP, was a period of global climatic change and in the California interior, pluvial lakes formed from glacial melt (Roberts 1989). Some early researchers pose the theory of two different traditions relating to interior and coastal adaptation during this transition. Based on work in the Panamint Valley, Davis (1969) posited the theory of "Paleo-Desert," a geographic distinction from Paleo-Indian sites of the "Paleo-Coastal" tradition. In the Paleo-Desert geographic region, Paleo-Indian sites are generally located along the shorelines of these ancient pluvial lakes (Davis 1969).

5.7.1.9.2 Lake Mojave Complex (ca. 8000 – 6500 cal B.C.)

The temporal period 8000 to 6500 cal B.C. is referred to as the Altithermal Climatic Phase in which there was a dramatic shift towards a much warmer environment in the desert regions, and which appears to have witnessed a near hiatus in the occupation of the Mojave Desert. During this time it seems that people living in the desert regions migrated towards the coastal region. As the climate changed so did the distribution of floral and faunal communities; hence resulting in the migration of people towards the coast to exploit littoral resources. A small frequency of ground stone implements is present during this time, from which infers limited hard seed grinding activities (Sutton *et al.,* 2007:237). The high incidence of extra-local materials and marine shell is interpreted as wider spheres of interaction than witnessed previously. Sutton *et al.,* (2007: 237) interprets these and other data as indicators of "a forager-like strategy organized around relatively small social units."

Cultural materials dating from this Complex encompass the Playa cultures (Rogers 1939), the San Dieguito Complex (Warren 1967), and the Lake Mojave Complex (Warren and Crabtree 1986). This phase is considered ancestral to the Early Archaic cultures of the Pinto Complex, representing a shift toward a more diversified and generalized economy (Sutton 1996:228). The Lake Mojave assemblages, first identified at Lake Mojave (Campbell *et al.,* 1937), include Lake Mojave series projectile points (leaf-shaped, long stemmed points with narrow shoulders) and Silver Lake points (short bladed, stemmed point with distinct shoulders). Other diagnostic items include flaked stone crescents; abundant bifaces; and a variety of large, well-made scrapers, gravers, perforators, heavy core tools, and ground stone implements (Sutton *et al.,* 2007:234).

Millingstones generally occur in small numbers during this time. In the Mojave Desert and southern Great Basin, this assemblage is typically (but not exclusively) found around the margins of ancient lakes, although the role of the lakes in the overall adaptation remains unclear. According to Sutton (1996:229), Lake Mojave Complex sites occur more commonly in the eastern and central Mojave Desert, while rare occurrences have been noted within the western Mojave in the Lake China, Coso, and Owens Lake areas.

The Lake Mojave cultural pattern seems to represent relatively small nomadic social units centered on foraging strategies with undefined hunting and lacustrine resource exploitation patterns. Studies conducted at Fort Irwin show a reliance on smaller taxa with less reliance on large game based on protein residue analysis; however, these data are contradictory to the cultural constituents recorded for this complex that suggest large game exploitation (Sutton *et al.,* 2007:237). There is an overlap in time between the Lake Mojave Complex and the Pinto Complex of approximately 1,000 years, in which continuity of technology occurs with a steady introduction of technologies referred to as the Pinto Complex.

5.7.1.9.3 The Pinto Complex (ca. 6500 - 4000 cal B.C.)

The Pinto Complex represents a broad continuity in the use of flaked stone technology, including less reliance on obsidian and cryptocrystalline silicates, as well as the prevalence of ground stone implements in the material culture (Sutton *et al.,* 2007:238), which distinguishes it from the Lake Mojave Complex. Climatic changes occur between the Early and Middle Holocene periods about 7500 B.P and 5000 B.P. appears to have been more arid across the Mojave region (S. Hall 1985; Spaulding 1991). It is during this time that woodland attained its approximate modern elevation range, and the modernization of desert scrub communities was completed with the migration of plant species such as creosote bush into the area (Byers and Broughton 2004). Warren (1984) sees this period as marking the beginning of cultural adaptation to the desert, as materials characteristic of the Pinto Complex gradually replace those of the preceding Lake Mojave Complex. Sites associated with this era are usually found in open settings, in relatively well-watered locales representing isolated oases of high productivity.

From the period 5000 B.C. to 3500 B.C., there was increased occupation of the desert regions during the Medithermal Climatic Period, a period of moister and cooler temperatures allowing for the intensive re-occupation of the desert region. In the desert region, the occupation is referred to as the Pinto Basin Complex. However, Sutton *et al.,* (2007:238) cite recent work conducted on Fort Irwin and Twenty-Nine Palms that produced radiocarbon dates as 6870 cal B.C., thus pushing back the inception of the complex coincidental with the Lake Mojave Complex.

The Pinto Complex is marked by the appearance of Pinto series projectile points, characterized as thick, shouldered, expanding stem points with concave bases, as well as, bifacial and unifacial core tools, and an increase in millingstones. Pinto points were typically produced by percussion reduction, with limited pressure retouch. Named for the Pinto Basin site (Campbell and Campbell 1935), the points were presumably used on atlatl darts. Large numbers of such artifacts were also recovered from the Stahl site near Little Lake (Harrington 1957; Schroth 1994).

Major technological shifts for this Complex include a significant increase in the use of millingstones (Warren and Crabtree 1986; Sutton *et al.,* 2007:238). Warren (1990) attributes the latter development to the exploitation of hard seeds, part of a process of subsistence diversification brought on by increased aridity and reduced ecosystem carrying capacity. Big game hunting probably continued as an important focus during this time, but the economic return of this activity likely decreased as mountain sheep and deer (artiodactyls) populations declined in response to increased aridity (Warren and Crabtree 1986). During this transitional period there is faunal evidence that indicates exploitation of rabbit, rodent, reptile, and fresh water mussel resources.

The majority of Pinto Complex archaeological sites have been found near pluvial lakes, adjacent to fossil stream channels, near springs, and in upland regions. Many of these sites contain substantial midden deposition and cultural debris, which indicates larger groups and prolonged occupation for this time period (Sutton *et al.,* 2007:238).

A new complex has been proposed by Sutton *et al.,* (2007) that appears to be a variation of the Pinto Complex: the Dead Man Lake Complex (7000-3000 cal. B.C.), based on archaeological findings from the Twenty-Nine Palms area. The primary variation between Pinto and the Dead Man Complex is the presence of small to medium sized contracting stemmed or lozenge shaped points, battered cobbles, bifaces, simple flaked tools, milling implements, and shell beads (Sutton *et al.,* 2007:239).

Based on the current archaeological data there appears to have been a gap between the Middle and Late Holocene period, since few sites have been found that date between 3000 and 2000 cal B.C. It is believed that climatic changes during this period resulted in hotter and drier conditions, which may have led to the abandonment this region for approximately 1,000 years (Sutton *et al.,* 2007:241). People migrated to areas with no more suitable climates (*e.g.,* San Bernardino Mountains).

5.7.1.9.4 Gypsum Complex (ca. 2000 cal B.D. – cal A.C. 200)

Gradual amelioration of the climate began by around 5000 B.P, culminating in the Neoglaciation at about 3600 B.P., with a period of increased moisture dating to the latter part of the Middle Holocene (Spaulding 1995). This increase in moisture would have presumably resulted in favorable conditions in the desert, and may have influenced changes in cultural adaptations, including increasing population, trade, and social complexity (Sutton 1996: 232; Sutton *et al.,* 2007:241).

Gypsum Complex sites are characterized by medium to large stemmed and corner notched projectile points, including Elko series, Humboldt Concave Base, and Gypsum. In addition, rectangular-based knives, flake scrapers, occasional large scraper planes, choppers and hammerstones; handstones and milling tools become relatively commonplace and the mortar and pestle appear for the first time.

This Complex is marked by population increases and broadening economic activities as technological adaptation to the desert environment evolved. Hunting continued to be an important subsistence focus, but the processing of plant foods took on greater importance as evidenced by an increase in the frequency and diversity of ground stone artifacts. Later, the bow and arrow were introduced, increasing hunting efficiency. Perhaps due to these new adaptive mechanisms, the increase in aridity during the late Gypsum Complex (after ca. 2500 B.P.) seems to have had relatively little consequence on the distribution and increase in human populations (Warren 1984; Warren and Crabtree 1986). In addition to open sites, the use of rockshelters appears to have increased at this time. Base camps with extensive midden development are a prominent site type in well-watered valleys and near concentrated subsistence resources (Warren and Crabtree 1986). Additionally, evidence of ritualistic behavior during this time exists through the presence of rock art, quartz crystals, and paint (Sutton *et al.,* 2007:241).

A shift in subsistence orientation and mobility near the end of the Gypsum Complex is suggested, with increased emphasis on the hunting of smaller mammals (Basgall *et al.,* 1986; Sutton 1996:234). Rock art suggests that the hunting of mountain sheep was important during the Gypsum Complex (Grant *et al.,* 1968); mountain sheep and deer, rabbits and hares, rodents, and reptiles remains are reported from Gypsum Complex sites in the central Mojave Desert (Hall and Basgall 1994). Evidence from the western Mojave Desert suggests that there was a major population increase ca. 3000 to 2300 B.P (Gilreath and Hildebrandt 1991; Sutton 1988).

5.7.1.9.5 Rose Spring Complex (ca. cal A.D. 200 -1100)

The climate during the Rose Spring Complex remains relatively stable and consistent during the middle of the Late Holocene period. In the western Mojave Desert, some regions show an increase in lake stands, such as at Koehn Lake during this time (Sutton *et al.*, 2007:241). At the beginning of this period lakes were at high points; as the environment began to shift towards the end of this period, lakes began to desiccate and recede, which marked the end of the Rose Spring Complex around A.D. 1100.

The Rose Spring Complex is characterized by small projectile points, such as the Eastgate and Rose Spring series, stone knives, drills, pipes, bone awls, various milling implements, marine shell ornaments; the use of obsidian is prevalent during this time (Sutton *et. al.,* 2007:241). Smaller projectile points appear to mark the introduction of a bow and arrow technology and the decline of the atlatl and spear weaponry (Sutton 1996: 235). Sutton (1996: 235; 2007:241) notes that Rose Spring Complex sites are common in the Mojave Desert and are often found near springs, washes, and lakeshores.

Subsistence practices during the Rose Spring Complex appear to have shifted to the exploitation of medium and small game, including rabbits/hares and rodents, with a decreased emphasis on large game. At the Rose Spring archaeological site, numerous bedrock milling features, including mortar cups and slicks, are associated with rich midden deposits, indicating that milling of plant foods had become an important activity. In addition, evidence of permanent living structures are found during this time and include wickiups, pit houses, and other types of structures (Sutton *et al.*, 2007:241). In the eastern Mojave Desert, agricultural activities appear to have been present, as Anasazi populations from Arizona controlled or influenced a large portion of the northeastern Mojave Desert by cal A.D. 700 (Sutton *et al.*, 2007:242).

5.7.1.9.6 The Late Prehistoric Complexes (ca. cal A.D. 1100 – Contact)

Paleoenvironmental studies conducted within the western Mojave Desert point to increased effective moisture beginning just after 2000 B.P., as evidenced by a shoreline bench feature at Koehn Lake (Sutton 1996:238). The Koehn Lake site appears to have been abandoned by 1,000 years ago, as Koehn Lake desiccated during a major "medieval drought." This drought may have influenced the movement of people from this area north and east across the Great Basin (Sutton 1996:239). Population began to decrease, due in part to a drier climate, and later as a result of European contact.

Characteristic artifacts of this Complex include Desert series projectile points (Desert Side-notched and Cottonwood Triangular), Brownware ceramics, Lower Colorado Buff Ware, unshaped handstones and millingstones, incised stones, mortars, pestles, and shell beads (Warren and Crabtree 1986). The faunal assemblages typically contain deer, rabbits/hares, reptile, and rodents. The use of obsidian dropped off during this time with the increased use of cryptocrystalline silicates.

Between 1,000 and 750 years ago, ethnic and linguistic patterns within the Mojave Desert increased in complexity. One of the most important regional developments during the Late Prehistoric Period was the apparent expansion of Numic-speakers (Shoshonean groups) throughout most of the Great Basin. Many researchers accept the idea that sometime around A.D. 1,000, the Numa spread westward from a homeland in the southwestern Great Basin, possibly from Death Valley (Lamb 1958) or Owens Valley (Bettinger and Baumhoff 1982). While there is little dispute that the Numic spread occurred, there is much disagreement over its mechanics and timing (see Madsen and Rhode 1995).

The Late Prehistoric Complexes mark the first recorded historical documentation of Native American inhabitants at European contact. The ethnohistoric record provides valuable data for understanding Late

Prehistoric archaeology. The Late Prehistoric Complexes reveal a significantly different suite of material culture than that seen in earlier Complex assemblages. Manos and millingstones became more frequent, as did mortar and pestles. In addition, bow and arrow technology with the use of Desert Side-notched and Cottonwood points, both emerge during the Late Prehistoric Complexes. Large occupation sites, representing semi-permanent and permanent villages, emerge during this time as well.

During this time the first locally produced pottery is seen in the Mojave Desert region, likely coming from the Anasazi in the southwest. Also, smaller projectile points, Cottonwood and later Desert Side- Notched points were introduced to use with bow and arrow technology. Plant food processing is indicated by the presence of manos and metates.

5.7.1.9.7 Archaeology in the Project Vicinity

This section provides a discussion of prior archaeological research specifically relating to the Project APE as well as the main elements of material culture found therein, and in the vicinity of the APE, as related to the prehistoric cultural context described above. Summaries of cultural resource investigations previously conducted in the Project APE and its environs are discussed, particularly those that relate to the prehistory and ethnography of the region. This information was compiled during the record check conducted by the San Bernardino Archaeological Information Center (SBAIC). More detailed discussion of previous reports and cultural resources is provided in Appendix Z – Confidential Technical Report - Section 5 of the technical report, entitled *Report of Findings*.

Generally, prehistoric archaeology within the Project APE exhibits a similar pattern of site types and distribution as identified elsewhere in the Central Mojave Desert. Site types and their distribution are directly correlated with geographical regions and resource procurement (*e.g.,* water, plant, animal, stone, and wood) and the area of prehistoric use/habitation is also related to travel and trade routes, most of which are oriented west to east connecting coastal groups with inland groups situated along the Colorado River. Previous archaeological research in and around the Project APE has identified a variety of such sites, representing a wide range of cultural sequences. A summary of previous archaeological work in the region is provided below.

In the early to late 1950s, Ruth D. Simpson (1958 and 1960) surveyed the eastern portion of the Calico Mountains and ancient Manix Lake shoreline, identifying numerous lithic implements such as large flakes and cores that range in age from ethnohistoric through what was then called the Amargosa and Pinto Basin horizons; rock alignments of unknown age were also identified during this study at Troy Lake (Simpson 1960:26-29).

Subsequent work by Simpson at Troy Lake (No Date: 45) confirms findings made at Manix Lake which conclude that the Lake Mojave and Pinto Basin sites represent the oldest cultural remains in the area. Many of her conclusions pertaining to the prehistory of this area were derived from the analysis of private collections. The Troy Lake Playa area assemblage included scrapers, numerous hammerstones, groundstone, 2 pipe fragments, 2 stone pendants, and several projectile points (Lake Mojave, Pinto, Elko, and Desert-side notch), with stone material types being cryptocrystalline silicates (jasper, chert, and chalcedony), rhyolite, basalt, and granitic.

Simpson also concluded that along the higher elevations and outer periphery of the playa, sites were noted as widely distributed sparse surface quarries/lithic scatters consisting of crude choppers, bifaces/bifacial cores, and cores. She observed that these artifacts were heavily patinated and well-imbedded in the desert pavement, suggesting that these sites represent an older complex dating to the Troy Lake stand within the Pleistocene Period (Simpson 1958, 1962, 1964). Unfortunately, these sites lack datable materials, other than relative dating of desert pavement, which is problematic due the extreme conditions in such desert environments. Simpson's overall assessment of the Troy Lake findings is that the area was used as a seasonal/temporary encampment over the course of thousands of years. Temporal specimens indicated these sites were occupied as early as 8000 B.P (based on projectile point types), although Simpson suggests that it may extend as far back as the Pleistocene period (10-20,000 B.P).

Therefore, it seems that between approximately 8000 B.P. until European Contact, the Project APE has been utilized by various Native American groups. The stone tool assemblages derived directly from, and in many locations, appears to reflect the progression of technology of stemmed points. However, the presence of groundstone indicates the increased dietary reliance on mesquite, acorns, Indian ricegrass/bunchgrass, seeds, and other processed plant resources, and the dart, atlatl and bow and arrow appear as projectile technology (Pinto, Gypsum, and Cottonwood Triangular points). In the Project APE, the cultural traditions/complexes include the Silver Lake, Pinto, Gypsum, Rose Springs, and Late Prehistoric, and indicate a seasonal/temporary use of the region for over 6,000 years, with a hypothesized 1,000 year period of abandonment between the middle and late Holocene, a time when the climate changed to hotter drier conditions (Sutton *et al*, 2007).

Since 1958, a total of 18 studies have been conducted in the Project APE and have identified the same types of sites outlined by Simpson. Barker, Rector, and Wilke (1979) reported on a large stratified random sample survey (non-intensive survey) for the Allen-Warner Valley Energy Project that went from Boulder City, Nevada to Palmdale California, with two alignments close to the proposed Project Site. They report the presence of sites attributable to the Rose Spring Complex, discussed above, with metate fragments, pottery, and lithic artifacts (Barker, Rector, and Wilke 1979: V-8 through V-15), as well as quarry sites, rock alignments, trails located to the north of the Project APE, and isolates. Sutton and Parr (1989) conducted a survey in the Hidden Valley of the Cady Mountains. They discovered a total of 31 new cultural sites, including trails, lithic scatters, rock shelters, camps, a quarry, a roasting feature, a special purpose site, food processing sites, and three historic sites. The sites are assigned a range of Elko to Late Prehistoric age by Sutton and Parr (1989:12).

A cultural resource survey and report by McGuire (1990) describes the results of the 387-mile Mojave natural gas pipeline corridor which traversed portions of Kern and San Bernardino Counties in California and Mohave County in Arizona. A portion of the route was located considerably south of the APE. They identified a total of 66 sites along the route, 49 prehistoric and 17 historic-era sites. Resources in proximity to the Project APE include one historic site that also had a major prehistoric component, including Late Prehistoric projectile points, flakes, hearths, and trash mounds, as well as two quarries and two lithic reduction areas. A similar pipeline project survey by McGuire and Glover (1991) from Adelanto, California to Ward Valley, California revealed the presence of 54 cultural resource sites, including 47 prehistoric and 7 historic resources. Site types included flaked stone scatters, small feature areas, quarry sites, and historic sites, such as mining features, railroad lines, military complexes, and historic homesteads (McGuire and Glover 1991: i).

Padon and Breece (1991:1) conducted a survey for another pipeline project at the extant community of Hector, California, adjacent to the Project APE, with negative results. Clark (1998:3) surveyed in the same general location and identified a series of widely spaced flaking material and a bifacial tool in the vicinity. One additional survey in the area was conducted by McCorkle-Apple in 1993 for the Fort Cady Boric Acid Mining Facility. Results revealed a total of 24 cultural resource sites, including lithic reduction areas, flake and tool scatters, sparse lithic scatters, and historic sites, primarily debris scatters and transportation-related sites. The last research of note in the area was a Class I literature review conducted by Rowe (2006). SES initially proposed the Solar One Power Generation Facility in that year, and the original project had identified two potential locations totaling 51,520 acres. The record search identified 20 previously conducted studies in the area, 38 previously recorded sites and 34 previously identified isolates within the APE and a 1-mile radius. Based on the record search results, a field survey was recommended for the project site.

As derived from previous research and archaeological investigation of the area, the general artifact assemblage for this portion of the Mojave Valley includes debitage, cores, bifaces/bifacial cores, projectile points, scrapers, drills, edge modified flakes, shaped and unshaped manos, slab and mortar metates, and to a lesser extent ceramics (buff, gray and brown wares). The types of projectile points reported in this area include; Silver Lake, Pinto, Elko, Desert Side Notched, and Cottonwood Triangular. Features frequently reported in the Project area include trails, cleared circles, cairns, rock circles/hearths, and low-lying rock piles/shrines. The prehistoric site types observed in this region can be characterized as widely distributed low density surface quarries and lithic scatters, temporary encampments, tool maintenance, transportation, rock features, and isolated/single use localities. The stone tool materials observed in sites within the Project APE is predominately cryptocrystalline silicates (jasper, chalcedony, and chert), rhyolite, basalt, and limited obsidian, all of which being locally available with the exception of the few obsidian findings.

5.7.1.10 Ethnography

Prehistorically, there was a large movement of people across the Mojave Desert and ethnographically several groups are associated with the Project APE and surrounding Mojave Desert region. The Kawaiisu, Kitanemuk, Southern Paiute, Serrano, Chemehuevi, Tabtulabal, and Panamint occupied the Mojave Desert region, north, south, west, and east of the Project. In this region there were four major linguistic groups originating from northern Uto-Aztecan groups; Tubatulabalic, Hopic, Numic, and Takic (Sutton *et al.,* 2007:243). The Mojave River appears to have been a major boundary between Takic and Numic speaking groups during prehistoric times. Groups occupying the Central Mojave Desert were of the Takic and Numic linguistic groups. Takic speaking groups originated in the southwestern Mojave Desert, expanding south and east sometime around 500 cal. B.P, and include the Serrano and Kitanemuk (Sutton *et al.,* 2007:243). At time of contact, groups south of the Mojave River and much of southern California were part of the Takic linguistic group. The groups north and east of the Project were of the Numic linguistic group, which included the Kawaiisu, Chemehuevi, and Southern Paiute.

During the ethnographic period, the Serrano, Vanyume (Beñeme) and the Chemehuevi occupied the region in which the Project is located. The Vanyume were a small division of the Serrano, about whom little ethnographic information is known. The Chemehuevi entered the Mojave Desert much later in time. Other groups that could have entered the Project area were the Kawaiisu, the Kitanemuk, the Southern

Paiute, the Mohave, and the Ancestral Pueblo. Eerkens (1999:301) states that the area around Fort Irwin, northeast of the Project Site, was inhabited by the Kawaiisu, Chemehuevi, Las Vegas Paiute, and the Vanyume, although he acknowledges that all groups in the area maintained flexible settlement patterns based on availability of resources (1999:302). The Project APE and surrounding valleys were not conducive for large scale inhabitation based on the fluctuating environmental conditions and overall arid nature of the region; therefore groups occupying and utilizing the area would have been small and nomadic (Zigmond 1986:398).

5.7.1.10.1 Serrano

The Project APE is situated within the traditional boundaries associated with Mission San Gabriel during the Spanish Period (1769–1821) (Bean and Vane 1979). The natives in this area were known as the Yucaipaiem clan of the Serrano (Altschul, Rose and Lerch 1984; Kroeber 1925; Strong 1929; Bean and Smith 1978). They spoke a language that falls within the Takic family of the Uto-Aztecan language group. This language family is extremely large and includes the Shoshonean groups of the Great Basin. Due to the proximity of the Serrano and Gabrieliño bands in the area and their linguistic similarities, ethnographers have suggested that these two bands shared the same ethnic origins (Kroeber 1925; Bean and Smith 1978). For this reason, they will be referred to as the Serrano.

According to Kroeber (1976:611), the Serrano comprised five groups or bands: Kitanemuk, Alliklik, Vanyume, Kawaiisu and Serrano. They inhabited lands from the San Bernardino Mountains, part of the Transverse Mountains east of the Cajon Pass, across the Mojave Desert east as far as Twenty-Nine Palms, and from the Tehachapi Mountains to the northern Colorado Desert. They occupied most of modern day San Bernardino County (Bean and Smith 1978). Relatives of the Serrano included the Gabrieliño and Luiseño to the west at the Pacific Coast, and the Cahuilla inhabiting the Colorado Desert. For much of the Late Prehistoric Complex, the Serrano band of the much larger Serrano tribe were the likely inhabitants of the western Mojave Desert, what is today the Cajon Pass and Barstow area. Most of what is known about the Serrano has been based upon the work done by Hicks (1958) and by later researchers working on a site known as CA-SBR-1000, located near Yucaipa, San Bernardino County, California. Studies indicate that the village had been occupied for thousands of years and that it was a major trading center both prehistorically and historically. Little is known about early Serrano social organization because the band was not studied until the 1920s (Kroeber 1925) and enculturation had seriously compromised their native lifeway. Kroeber (1925) indicates that the Serrano were a hierarchically ordered society with a chief who oversaw social and political interactions both within their own culture and with other groups. The Serrano had multiple villages ranging from seasonal satellite villages to larger, more permanent villages.

Resource exploitation was focused on village-centered territories and ranged from gathering and hunting with occasional fishing. The primary staple varied depending on locality. Acorns and piñon nuts were gathered by groups in the foothills; honey mesquite, piñon nuts, yucca roots, mesquite and cacti fruits were gathered by groups in or near the desert (Bean and Smith 1978). Hunting activities consisted of deer, mountain sheep, antelope, rabbits, other small rodents, birds, with the most desired game bird quail (Bean and Smith 1978).

Serrano structures were situated near water sources and consisted of large, circular thatched and domed structures of willow and covered with tule thatching. These living structures were often sufficient to house a large family. In addition to the living structure, a ramada, an open air structure for outdoor cooking, was located adjacent to the home (Benedict 1924; Kroeber 1925; Drucker 1937; Bean and Smith 1978). A large ceremonial structure was often present and was used as the religious center where the lineage leader resided. Additional structures, such as granaries for food storage and sweathouses for ritual activities, were often located adjacent to pools or streams (Strong 1929; Bean 1962-1972; Bean and Smith 1978).

The Serrano, like the neighboring groups, were primarily semi-nomadic, hunter-gatherers. Because of their inland location, Serrano society was left relatively intact during the period of initial Spanish colonization, unlike the Gabrielino, who inhabited the coastal area. In 1772, Spanish explorer Pedro Fagès traveled through the Cajon Pass to the Mojave Desert in an attempt to identify the native groups in this region. Fages' ultimate goal was to place the Serrano under supervision of a mission. By 1819, the Serrano were relocated to the Estancia of the Mission San Gabriel in Redlands (Bean and Smith 1978:573). At the time of relocation, there were likely on the order of 3,500 Serrano inhabiting the Mojave Basin. Between 1840 and 1860 a smallpox epidemic decimated the population. By 1885, there were only "390 Serranos [sic] remaining in all of southern California" (AccessGenealogy.com 2005) and the census of 1910 recorded only 100 Serrano (Kroeber 1976:616).

5.7.1.10.2 Vanyume (Beñeme)

Limited information is available on the Vanyume during the historic period. What information exists describes the Vanyume as a small division of the Serrano living in the Mojave Desert, north of Serrano territory. They were referred to as the "Serrano of the Mohave River" (Kroeber 1925:614). The name Vanyume is a Mohave word; the name Beñeme was given to the entire Serrano cultural group by Father Garcés. The Vanyume spoke a Takic language related to the Kitanemuk to the west and the Serrano to the South. Kroeber reported that the Vanyume were occasionally friendly with the Mohave and Chemehuevi, but hostile to the Serrano (Kroeber 1925:614). Kroeber also stated that the population of the Vanyume was very small at the time of historic contact. The "chief" of the Vanyume reportedly lived in one of the villages at the upper reaches of the Mojave River near Victorville. The Vanyume were hunters and gatherers, and because of their expansive trade network along the river were reportedly rich in shell bead money and had acorns. The Vanyume are generally associated with similar life ways as the Serrano to the south (Yohe II and Sutton 1991).

5.7.1.10.3 Chemeheuvi

The Chemehuevi were a band of the Southern Paiute that possibly entered the eastern Mojave Desert area from the north in fairly recent prehistoric times. The Chemehuevi, also called the Pah-Utes, were closely related to the Southern Paiute in Death Valley and the Southern Nevada region. At the time of ethnographic contact, the Chemehuevi claimed a large portion of the eastern and central Mojave Desert, perhaps as far west as Afton Canyon on the Mojave River (Kelly and Fowler 1986:368). Although the Chemehuevi territory boundaries are unclear, it is certain that they inhabited the Providence Mountains. Based on archaeological data, the Chemehuevi entered the Mojave Desert sometime in the 17th century (Yohe II and Sutton 1991).

The Chemehuevi were strongly influenced by the Mohave. It is possible that they displaced the Desert Mohave, a Yuman speaking group (Kelly and Fowler 1986:368). Many Chemehuevi words are related to

Mohave vocabulary, along with agricultural practices, house construction, warfare, and other cultural elements such as religious practices. Like the Mohave, the Chemehuevi used square metates, paddle and anvil pottery techniques and hair dye (Kelly and Fowler 1986:369). In addition to their close association with the Mohave, the Chemehuevi traded widely with the Shoshone, Kawaiisu, Serrano, Vanyume, Cahuilla, and Diegueno (Kelly and Fowler 1986:369).

Influence from the Pueblo area to the east is seen in the form of agricultural practices of many of the Southern Paiute groups. The Chemehuevi, in more well watered areas and flood plains, grew yellow maize, gourds, beans, and winter wheat, combining Mohave and Pueblo practices (Kelly and Fowler 1986:371). Kroeber reported that the Chemehuevi occasionally farmed small areas of corn, beans, melon and pumpkins and wheat. In more arid areas the Chemehuevi were hunter-gatherers. They hunted large game, such as deer and mountain sheep, along with rabbits, rodents, lizards and other small game (Kroeber 1925:597). Plant foods were of great importance and included a variety of grass seeds, pinyon, and mescal (yucca).

The Chemehuevi had a large range associated with seasonal food practices and traveled through most of the Mojave Desert as far as the Tehachapi area and the San Bernardino Mountains. Occasionally they traveled to the Pacific coast to collect haliotis shells (Kelly and Fowler 1986:377). It was also reported that they would travel as far east as the Hopi's territory, about a two month round trip (Kelly and Fowler 1986:377).

Little is known about the Chemehuevi material culture. However, in historic times they used basketry, primarily willow, to a great extent both for storage and for carrying possessions (Kroeber 1925:97). They also made basketry hats. The Chemehuevi used some pottery but relied more on basketry.

Spanish colonization had little effect on the Chemehuevi until the early 1800s. Although other Southern Paiute groups were enculturated earlier by the Spanish, the Chemehuevi's isolated territory protected from being assimilated into the mission system. With the opening of the Old Spanish Trail, the Chemehuevi became more affected by the Spanish, and were brought to the missions to work (Kelly and Fowler 1986:386).

In 1874, the United States government established the Colorado River Reservation in an effort to move the remaining Chemehuevi onto the reservation. However, the reservation was shared with the Mohave band, with whom the Chemehuevi had differences from 1865 to 1871, the Chemehuevi were at war with the Mohave. They were therefore, reluctant to move to the reservation (Kelly and Fowler 1986:388). Some of them were either forced to move to the reservation, while some of them would not move. Many stayed in their historic locations, finding work on farms and ranches and in mines. In 1901, the Chemehuevi received their own reservation in the Chemehuevi Valley.

5.7.1.10.4 Other Native American Groups Associated with the Region

In addition to those groups affiliated with the Project area, many other groups occupied and utilized the Mojave Desert in a variety of ways. For example, it appears that the Anasazi of southern Nevada greatly influenced the cultures within the region. By 1450 B.P., the Anasazi were exploiting turquoise deposits at Halloran Springs, approximately 25 miles northeast of the Solar One APE. The Anasazi Pueblo was 150 miles across the desert; therefore Anasazi miners must have spent a considerable amount of time in the area based on the amount of turquoise mined and the abundance of "Basketmaker III" pottery found near the springs (Fagan 2003: 310). Turquoise was mined up to twelve feet below the ground and for centuries Mojave turquoise was traded to the east of its source, throughout the Southwest; however, it does not appear that turquoise was traded to the west as evidence of it does not appear in the material cultural of California tribes.

About 1450 B.P., the use of bow and arrow technology spread throughout California's eastern deserts, eventually becoming the dominant hunting technology throughout California. The bow and arrow has many advantages over spears and atlatls and made hunting much more efficient. Bow and arrow technology could have been introduced to California by the Anasazi or by another Great Basin group, during this time. In addition, by 1200 B.P., buff, gray, and brownware pottery, made by Ancestral Pueblo groups and other surrounding tribes of the Lower Colorado River region, entered the Mojave Desert. The trade of technology along with items such as sea shells and steatite objects probably took place along the Mojave Trail (Fagan 2003:311) (Figure 2.8-1, Appendix Z – Confidential Appendix A).

Other tribes in the region include the Mohave. The Mohave lived long both the east and west banks of the Colorado River. During the winter, they inhabited semi-subterranean houses and depended upon maize agriculture for subsistence (Kroeber 1902; 1925). Throughout the rest of the year they were a hunting and gathering group, often traveling west, far into the Mojave Desert. The Mohave traveled throughout southern California and northern Arizona utilizing a large network of trails (King and Casebier 1976:281). Two major geographical features influenced the Mohave's trade routes: the location of their villages along the Colorado River, and the waterless portions of the desert, also known as the Mojave Sink or Mojave Trough. Two major trade routes were used which started at villages along the Colorado River. The first route was the Pah-Ute Creek to Soda Springs route, which later became known as the Mojave Road wagon train. The other route ran south of the Mojave Road route through Poshay Pass and the Mojave River flood plain to the southeast corner of Soda Lake. The more northern route, the Mojave Road, was more heavily used, both prehistorically and in more recent historic times by Native Americans and European and American settlers alike (King and Casebier 1976:282).

Although the Mohave lived southeast of the Project area, they had a great amount of influence over the Mojave Desert region. They were skilled traders and traveled long distances to either fight or trade with other groups (Fagan 2003:297). Their movement across the southwest promoted the spread of new technologies, beliefs and ideas throughout the desert and southwestern regions.

5.7.1.11 Historic Period

5.7.1.11.1 Spanish Period (1540 to 1821)

The Spanish had explored much of the California coast and San Francisco and Monterrey bays by 1769, but paid little attention to the California interior. Several factors were detrimental to European exploration in the Project area: travel and communication were slow; there were few roads, trails and maps; and no supply stations existed in California's interior deserts (King and Casebier 1976).

Between 1775 and 1776, Father Francisco Garcés, a Franciscan missionary originally stationed near present-day Tucson, Arizona, explored the Mojave Desert as part of Spain's effort to forge an overland route to its settlements in Alta California. Garcés traveled with the 1775 Anza expedition until it crossed the Colorado River near present-day Yuma, Arizona (King and Casebier 1976:283). Garcés left the expedition at the Colorado River crossing and traveled north to the Mohave Villages near present-day Needles, California, while Anza continued west. Garces, in the company of Mohave guides, proceeded west to Mission San Gabriel in Los Angeles along the Mohave Trail, in the approximate location of the Mojave Road wagon route. The corridors of the Mojave Trail and the later Mojave Road are approximately 15 miles north of the Burlington Northern Santa Fe Railroad, north of the Cady Mountains near I-15 (Figure 2.8-1). On his return trip he visited several Mohave villages on the banks of the Colorado River. The journal Garcés kept during this expedition is the earliest written record of the eastern Mojave Desert (King and Casebier 1976; Robinson 2005). Spanish contact with the Mohave and Colorado Desert peoples likely came from both the east and west during this time (Vane and Bean 1994:1-8), as evidenced by the Anza/Garces expeditions, as well as known contacts made on the California coast.

The closest Spanish mission, Mission San Gabriel in Los Angeles, was too far away to have an every day effect on the Native Americans in the Mojave Desert. Native Americans who fled the missions often escaped into the Mojave Desert and exposed the Mohave tribe to Spanish influences, including the use of horses, which led to raids on the missions and horse thievery. In 1819, Lieutenant Gabriel Moraga led an expedition of fifty soldiers into the Mojave Desert in an attempt to retrieve stolen horses, to exact revenge against the Mohave for their raids on the coastal Spanish settlements, and for their ability to spread unrest against the Spanish and other Native American groups (King and Casebier 1976:284). Moraga's expedition was only the second Spanish-sponsored trip into the Mojave Desert. Lack of water in the arid Mojave Desert forced Moraga and his soldiers to turn back.

During the Spanish period, no permanent European settlements were established in the project vicinity, although there were reports that the Spanish had active mines in the Barstow area. It is unknown if the mines were being worked by the Spanish, Native Americans, or later Mexican or American prospectors because only mine shafts remained and no written records have been discovered (King and Casebier 1976:300).

5.7.1.11.2 Mexican Period (1821 to 1848)

In 1810, an independence movement began as many rancheros sought to split Mexico (and California) from Spain. In 1821, this desire came to fruition when New Spain (Mexico) became independent. Following Mexico's independence, the Alta and Baja California missions received less financial support from Spain and Mexico, and ultimately, independence from Spain was a catalyst for Mexico to secularize all California missions. Secularization would free vast amounts of land that had been under mission control and the land would become civilian pueblos or large land grants awarded to Mexican, American, or European settlers. In 1831, Governor Jose Maria Echeandia announced the secularization of a number of missions, and by 1834, all the missions were secularized, including Mission San Gabriel in Los Angeles, the nearest mission to the Project. Within ten years, the mission system had failed, the neophytes had left, and the buildings were in disrepair. Following secularization, San Gabriel mission became a parish for the City of San Gabriel and had little further effect on the Native Americans in the Project vicinity (Rolle 2003).

During Mexican control of Alta California, Americans started to enter California through the Mojave Desert, many of them using the Mojave Trail located north of the Project Area (Figure 2.8-1, Appendix Z – Confidential Appendix A). Jedediah Smith, mountain man and fur trapper, was the first American to reach California using an overland route. Smith followed a route from the Great Salt Lake in Utah south to the Virgin and Colorado rivers and across the Mojave Desert to Spanish southern California. Smith arrived at the Mohave Villages in October 1826, then proceeded west on the Mojave Trail. After Smith's initial visit other American mountain men and trappers ventured into the desert, including William Wolfskill, George C. Yount, Christopher "Kit" Carson, James Ohio Pattie, and Ewing Young (Brooks and others 1981; King and Casebier 1976:285; Robinson 2005).

Jedediah Smith's ventures down the Virgin and Colorado rivers, combined with Garcés' route across the Mojave Desert, linked the Spanish settlements in New Mexico and California, stimulating trade between these regions (Wright 1982). In 1829, New Mexico merchant Antonio Armijo reached the Las Vegas Valley via the Virgin River, pioneering a route that became known as the Old Spanish Trail. Armijo's route followed the Mojave Trail in the project vicinity, but later routes of the Old Spanish Trail turned southwest out of Utah and headed toward the Mojave River through the San Bernardino Mountains. This route became known as the Northern Route of the Old Spanish Trail (Figure 2.8-1, Confidential Appendix Z). The Mohave Indians had become increasingly hostile to travelers through their territories, and blazers of the northern route most likely took this path to avoid conflicts. The junction of the Northern Route of the Old Spanish Trail and the Mojave Trail was approximately 18 miles east of present-day Barstow, at a location historically called Fork of the Roads, northwest of the project area (Figure 2.8-1, Appendix Z - Confidential Appendix A). Trade along the trail ended in 1848 with the Mexican-American War (Nystrom 2003; Robinson 2005; Rogge 2008).

5.7.1.11.3 American Period

Transportation

Mojave Road

The term "Manifest Destiny" was one of the likely causes for the Mexican-American War, which took place between 1846 and 1848. Jacksonian Democrats coined the phrase in the 1840s as a political philosophy whereby the United States would control all of the land between the Atlantic and Pacific oceans. The focus for expansion was on the northwest coast in Oregon territory and on the Texas territory. In 1845, during the Presidency of James K. Polk, the United States annexed Texas; the following year, the U.S. invaded Mexico. In 1848, the United States, victorious over the Mexican Army, signed the Treaty of Guadalupe Hidalgo, and acquired all Mexican territory north and west of the Rio Grande and Gila Rivers, which included Texas, New Mexico territory, and Alta California. American settlers began to migrate to the newly acquired territory, and the discovery of gold in 1848 and the ensuing Gold Rush in 1849 brought numerous settlers to California. Most of these travelers likely used the northern route of the Old Spanish Trail to enter California from New Mexico, Utah, and Nevada, although some likely followed the Mojave Trail as well (Robinson 2005).

Soon after California was granted statehood in 1850, the government wanted to recognize all of the trails running through California to promote immigration to the state, facilitate trade and communication, and develop routes of defense. A year after the Treaty of Guadalupe Hidalgo was signed, Lieutenant James H. Simpson of the Army Corps Topographical Engineers attempted to follow Father Graces' direct route across the Mojave Desert (Mohave Trail), and in 1851, the U.S. Army Corps of Engineers sent another expedition to explore the area. During the 1840s and 1850s, the Union Pacific Railroad also contemplated using Gracés' route in an attempt to find the most practical course for a railroad line across the desert. Several explorers, hired by railroad companies, traveled throughout the Mojave Desert during the 1840s and 1850s. Eventually, a more northern route was selected for the transcontinental railroad line. In the late 1850s the General Land Office in California began the process of mapping the Mojave Desert area, and at that time several groups of surveyors mapped the desert (King and Casebier 1976:288-289).

Beale's Wagon Road was built in 1857 north of the Project APE, along the 35th Parallel, and was in use between 1857 and 1861. Edward Fitzgerald Beale was a famous American Frontiersmen and was superintendent of the wagon road development. Beale, along with his party and 25 camels, crossed the Colorado River into California 15 miles north of present-day Needles, California, and followed the Mojave Trail west. In 1859, the U.S. Army established Fort Mojave near the location of Beale's river crossing in an effort to protect travelers from Mohave Indian attacks. As a result, the Mojave Trail developed into a wagon road, which allowed supplies to be brought to Fort Mojave overland from Los Angeles. The wagon road was called the Mojave Road or the Government Road and was actively used until the beginning of the Civil War in 1861 (Figure 2.8-1, Confidential Appendix Z.

During the Civil War, troops stationed at Fort Mojave were ordered to abandon the fort and report for duty in Los Angeles. The fort remained abandoned until the middle of 1863, when California Volunteers occupied it to protect travelers on the Mojave Road. Traffic had increased along the road as a result of gold discoveries about 100 miles south of Fort Mohave in the La Paz Mining District. Other travelers along the Mojave Road in the 1860s were members of the military on their way to Arizona to fight in the Apache Wars or merchants and ranchers hauling supplies and livestock to Prescott, the capital of the Arizona Territory. The Mojave Road also was used as a mail route between 1866 and 1868 (King and Casebier 1976; Nystrom 2003; Robinson 2005).

Although there was considerable traffic through the Mojave Desert into Southern California, most followed the Old Spanish Trail to the west of the Project APE or the Mojave Road to the north, and any settlements associated with these routes would have been located adjacent to the trails. Except for miners, most other settlers did not stay in the desert until a railroad was constructed. Only a few early homestead claims were filed. These early homesteads consisted mainly of ranches raising sheep and cattle. The arid environment prohibited large scale agriculture except on the banks of the Mojave or Colorado Rivers (Walthall and Keeling 1986).

Atlantic & Pacific Railroad

Plans for a transcontinental railroad had been delayed due to the Civil War, but once the war ended, interest in the construction of transcontinental railroads resumed. In 1866, Congress contracted the Atlanta & Pacific Railroad (A&P) to construct a railway from the east to the California border. In 1879, the A&P partnered with the St. Louis & San Francisco Railroad and the Atchison, Topeka, & Santa Fe Railroad to facilitate construction of the transcontinental railroad. The A&P began construction of their track in Albuquerque, New Mexico in 1880 and reached Needles, California in May 1883. The A&P

constructed a bridge over the Colorado River at Needles in August 1883 (Gustafson and Serpico 1992; Myrick 1992; Robinson 2005).

As the A&P tracks were being laid, the Southern Pacific Railroad was constructing a new railroad line between Mojave and Needles to intercept the A&P tracks at the Arizona border and protect its California interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their Mojave station (Figure 2.8-1, Appendix Z – Confidential Appendix A) (Gustafson and Serpico 1992; Myrick 1992). When surveyors initially explored the project vicinity for a viable railroad route, they assessed the Mojave Road corridor, and found that the terrain was too steep and unsuitable for railroad construction. In the arid Mojave, the trail through the mountain range was preferred to the flatter terrain because more sources of water could be found in the mountainous areas. In 1868, General William J. Palmer of the Union Pacific Railroad eastern division surveyed a railroad route to the south of the Cady Mountains, where the terrain was more favorable for railroad construction. Although the Union Pacific never constructed the railroad through the Mojave Desert, it was largely Palmer's route that the Southern Pacific used to construct the Mojave to Needles branch (Nystrom 2003; Robinson 2005).

For more than a year, the A&P and the Southern Pacific lines continued to operate independently. The Southern Pacific Railroad instituted tri-weekly service to Needles in 1883, but the trip through the Mojave Desert was long and desolate. The railroad had constructed only one station and turntable in the 124-mile stretch between Mojave and Ludlow. The Southern Pacific Railroad was reluctant to join rails with the A&P fearing that the completed line would compete with their newly constructed Sunset Route, which crossed into California further south on the Arizona border at Yuma. Passengers heading east on the Southern Pacific Railroad's line to Needles were inconveniently required to disembark from the train with their belongings and transfer to the A&P cars. Although each of the railroads developed local business, the volume of passenger travel was not large enough to support operations. The Southern Pacific Railroad's route through the Mojave Desert did facilitate mining operations in the area. Anticipating large future revenues from hauling bulk ore, the railroad provided water for miners at 2 cents per gallon anywhere on the route, putting an end to the water scarcity problem for mine development in the area (Myrick 1992).

By the end of 1883, the A&P began making plans to construct their own line parallel to the Southern Pacific's line across the Mojave Desert to San Francisco. The Southern Pacific Railroad realized that if the A&P constructed a parallel line across the desolate Mojave Desert, its line would essentially become useless. In October 1884, an agreement was signed in which the Southern Pacific Railroad would sell its Needles to Mojave section to the A&P for $30,000 per mile. Until the debt was paid, the A&P would lease the line. In addition, the A&P also received an option for trackage rights between Mojave and San Francisco. The A&P received full title to the Mojave to Needles branch in 1911 (Gustafson and Serpico 1992; Myrick 1992). The construction of the railroad changed the course of travel across the Mojave Desert in the project vicinity. The railroad provided travelers with water sources across the vast desert and travel was much easier along the flat railroad corridor than along the mountainous Mojave Road to the north. A wagon road was constructed adjacent to the railroad alignment and use of the Mojave Road decreased.

The California Southern Railroad joined with the A&P in 1885 to provide service from Kansas City to San Diego. The junction of the two lines was initially called Waterman Junction, but in 1886, it was renamed Barstow. Barstow is located approximately 40 miles west of the Project APE and is the closest city. The construction of the railroad brought numerous settlers to the area and although other railroad lines were eventually constructed throughout southern California, the route passing through Barstow remained a popular line for both freight and passenger service. In addition, the railroad acted as a lifeline connecting Barstow, alone in the desert, to the rest of Southern California. Barstow was a sizable railroad hub, and the railroad was the main employer in the city for many years.

In 1897, the A&P was redesignated as the Santa Fe Pacific Railroad and later became the Atchison, Topeka, & Santa Fe Railroad. When the A&P took over the Mojave to Needles branch in 1884, there were depots at Daggett, Fenner, and Needles. During the 1880s, 1890s, and the first decade of the twentieth century, Santa Fe Pacific constructed facilities at various locations along the line. All of the structures were wood frame, with the exception of brick and reinforced concrete structures in Needles. Santa Fe Pacific railroad sidings in the project vicinity include Troy, Hector, Pisgah, and Lavic (see Confidential Appendix A, Figure 2.8-1). The Hector siding is the closest to the Project APE. Neither the Pisgah or Troy sidings had any depot facilities. Hector had a 12-by-14-foot wood frame telegraph and train-order office that was constructed in 1906, which was closed in 1923 and moved to Earp in 1934. The Lavic siding was the largest of the four with a 24-by-34-foot frame combination passenger and freight depot that was constructed in 1901. The depot was closed in 1923 and removed (Gustafson and Serpico 1992; Myrick 1992).

The lack of water along the Mojave to Needles branch required the railroad to haul water in large tanks to the stations and construction camps. In 1897, a station was constructed at Newberry Springs, approximately 6 miles west of Troy, and this station became the railroad's primary source of water in the region. Although freight trains typically carried surplus water cars, engineers often had to go back to Newberry Springs for additional water supply (Gustafson and Serpico 1992; Myrick 1992).

The A&P Railroad/Santa Fe Pacific Railroad/Atchison, Topeka & Santa Fe Railroad is located between the Solar One Phase 1 and Phase 2 and within the Pisgah triangle area. The railroad is now operated as the Burlington Northern Santa Fe Railway.

Old National Trails Highway and U.S. Route 66

Prior to the construction of the railroad between Needles and Barstow in 1883, travel across the Mojave Desert in the project vicinity was limited to the Mojave Road corridor, which evolved from a network of prehistoric trails, early trails developed by mountain men, early explorers, and gold seekers; and routes developed during the railroad surveys of the 1850s (Figure 2.8-1, Appendix Z - Confidential Appendix A). After the railroad was completed, the travel corridor shifted south of the Cady Mountains, new roads were constructed between local mines and railroad sidings, and a wagon road was constructed adjacent to the railroad tracks from Barstow to the Arizona border (Hatheway 2001). In the first decade of the 1900s, this wagon road would be converted to an auto route, as the use and ownership of the automobile became more prevalent.

The automobile first made its appearance to the American public in the late 1890s, and by 1900, automobiles were still the toys of the wealthy, with only one for every one thousand Americans. Although

Henry Ford introduced his Model T in 1907, widespread use of the automobile did not occur until after World War I. In 1914, Ford perfected full assembly line production and two years later more than half a million automobiles were sold. As the use of the automobile rose, the demand for good roads increased. Most rural roads in the 1900s had been constructed for wagon traffic and were not suited to automobile traffic (Fischer and Carroll 1988; Keane and Bruder 2004; Lyman 1999; Paxson 1946).

By 1910, national and local organizations promoted good roads in the United States, including the National Old Trails Highway (Figure 2.8-1, Appendix Z – Confidential Appendix A). A precursor to U.S. Route 66, the National Old Trails Highway was part of the 2,448-mile ocean-to-ocean highway from Baltimore, Maryland to the California coast. The National Old Trails Highway also was part of the National Auto Trail System, an informal network of automobile routes marked by local organizations in the early twentieth century. The National Old Trails Highway, where it traverses the Project APE, was located along and in the vicinity of the alignment of the old wagon road that was constructed adjacent to the Santa Fe Railroad tracks in the 1880s. The highway was designated by booster organizations in 1912, and by 1914 the Auto Club of Southern California had provided signage for much of the highway (Keane and Bruder 2004; Robinson 2005; Wikipedia contributors 2008).

In 1916, the Federal Highway Aid Act was passed to help fund rural roads, using a 50/50 funding match for states with a highway department. Route planning, however, remained a local matter, which usually did not include engineering surveys. In 1919, Congress liberalized the funding match requirements, and by late 1921, Congress passed the Federal Highway Act that further reduced the state match to about 26 percent (Lyman 1999) and required federal aid to be concentrated upon "such projects as will expedite the completion of an adequate and connected system of highways, interstate in character" (Paxson 1946:245). Up to seven percent of a state's roads could be listed for reconstruction to create the national highway system. By 1923 a tentative plan had been developed linking every city with a population of 50,000 or more, with construction planned over a ten-year period (Paxson 1946).

During the early 1920s, automobile travel was an adventure for many Americans and was subsequently heavily promoted. By the late 1920s, much of the National Old Trails Highway in the project vicinity had been widened and oiled or surfaced with gravelly sand. The segment of the highway across the Mojave Desert was notorious for its poor condition, and by 1925 the highway was full of ruts and chuck holes. The highway was narrow with no road shoulders or striping, tended to follow the natural topography of the area, and was vulnerable to the effects of erosion. The State of California had designated the highway as a public highway in 1919, but did not take any responsibility for the segment between Barstow and Needles until 1923, leaving the burden of maintenance to San Bernardino County. Despite the poor conditions, motorists were never more than four miles from the railroad, where they could find help in the form of stations and section crews, and water was available every 5 to 10 miles (Bischoff 2005; Hatheway 2001; Scott and Kelly 1988).

In 1926, the American Association of State Highway and Transportation Officials designated the National Old Trails Highway in the Mojave Desert as U.S. Route 66. U.S. Route 66 was one of the main arteries of the National Highway System and was one of the first great highways in the United States, running from Chicago to the Pacific Ocean. Federal funding allowed for improvements, such as the construction of road shoulders. In the 1930s, the original alignment of the National Old Trails Highway in the Project Area was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66 (Bischoff 2005; Scott and Kelly 1988; Wikipedia contributors 2008).

The new U.S. Route 66 alignment eliminated sharp turns, reduced steep grades, and straightened the roadway to accommodate higher speeds. The use of heavy machinery allowed for large road cuts that had not been possible in the early days of road building. The section of U.S. Route 66 from Needles to Los Angeles was the most heavily traveled section of the highway, and in 1934 this segment was paved. Much of the paving of U.S. Route 66 was completed by the Works Progress Administration during the Great Depression of the 1930s. By 1938 all of U.S. Route 66 was paved (Bischoff 2005; Scott and Kelly 1988).

U.S. Route 66 was an important transportation route during the Great Depression. In his book, *The Grapes of Wrath*, John Steinbeck wrote about migration of Midwestern farmers to the Pacific coast along this roadway. World War II caused further migration to the west coast along U.S. Route 66 as millions of Americans went to work in war related jobs in California. U.S. Route 66 became so famous that it was memorialized in Bobby Troup’s popular song “Get Your Kicks on U.S. Route 66” (Scott and Kelly 1988) and was featured in many Hollywood movies.

As a consequence of its heavy use, thousands of businesses opened along U.S. Route 66, mostly serving cross-country travelers. Businesses varied from grocery stores, service stations, restaurants, and motels to dance halls and tourist attractions. One of these tourist attractions in the project vicinity may have been the Pisgah Crater, a young volcanic cinder cone located south of the Project APE (Figure 2.8-1, Appendix Z – Confidential Appendix A). A road was constructed from U.S. Route 66 to the Pisgah Crater between the late 1930s and early 1950s from U.S. Route 66 either to provide access for travelers along the highway or for local aggregate miners (Scott and Kelly 1988).

Barstow was the last stop from Los Angeles before crossing the desert or the first stop after the desert, and was a popular rest area along the highway even during the Depression. During that time, business from U.S. Route 66 was an important part of the economies of many towns and small cities. By World War II, many businesses along U.S. Route 66 competed for travelers’ money. Native American crafts sales became an important industry along the route. During the war, military use of the road increased in conjunction with development of military training bases in the Mojave Desert (Scott and Kelly 1988).

The Golden Age of U.S. Route 66 was the era after World War II and before the opening of other major east-west interstate highways, such as I-40. The increased traffic along U.S. Route 66 also led to its demise. Although the highway was an important east-west thoroughfare, it could no longer handle the volume of traffic and heavy military equipment using the road. After World War II, a new national interstate highway system was planned, and eventually replaced much of U.S. Route 66 (Scott and Kelly 1988).

There are no historic buildings associated with U.S. Route 66 along the segment of the road that is within 0.5 miles of the Project APE. There are historical buildings associated with U.S. Route 66 in the town of Ludlow, located about 12 miles east of Pisgah and about 11 miles east of the Project, and in Newberry Springs, about 15 miles west of the Interstate 40 Hector exit and about 13 miles west of the Project.

Interstate Highways

Throughout the 1950s and 1960s, U.S. Route 66 remained the main road between the Midwest and the West Coast. Increased traffic and the narrowness of the roadway eventually led to the downfall of the road. On August 2, 1956, President Dwight D. Eisenhower signed the Federal Aid Highway Act which provided funding to upgrade America's roads. Eisenhower based his vision of a more connected America on Germany's Reichautobahen rural super highways. Eisenhower and his advisors originally envisioned creating a 40,000 mile interstate system costing approximately twenty-seven billion dollars. Construction began almost immediately throughout the United States (Weingroff 2008).

On December 13, 1958, Interstate 15 (I-15) opened between Victorville and Barstow. This marked the beginning of the modern highway era in the Barstow area. The entire length of Interstate 15 from Los Angeles to Las Vegas was opened by July 1961. At that time, the stretch between Baker and Las Vegas was used by more than 500 vehicles an hour in one direction (Swisher 1997).

Interstate 40 begins at its junction with Interstate 15 in Barstow, then runs through the Mojave Desert to Needles and into Arizona. Interstate 40 is located along the southern edge of the Solar One APE. Although the Interstate 40 is now a cross-country highway, its last sections were not built until 1980. In the southwest, much of present day Interstate 40 absorbed U.S. Route 66. Many of the western portions of Interstate 40 also follow the Beale Wagon Road. The segment of Interstate 40 in the project vicinity was not constructed until 1968.

Anglo-American Relationships with Native Americans

Before transportation improvements were made, distance and harsh conditions in the Mojave Desert caused the Native Americans in the region to have little contact with Europeans and subsequently Americans. Bands of the Chemehuevi's, part of the Southern Paiutes, occasionally expressed to earlier settlers they were intruding on Native American land, but little action was taken. While the Mojave's were a large and powerful tribe and could wage war in large numbers against intruders, the Chemehuevi were forced to remain in small bands and were commonly on the verge of starvation because the lack of water and other resources in their territory. They were not able to gather in large groups or participate in acts of resistance against American settlers in their territories. Although the Chemehuevi were originally hostile to American settlers, by the 1860s they were so decimated by disease and lack of resources that they stopped all attempts at resistance, and little military attention was paid to them by the United States. By the 1870s they had been assimilated into American culture and were forced into laboring in prospectors' mines and on ranches (King and Casebier 1976:298-299).

The Mojave were a much stronger tribe and were able to organize large parties to wage war with United States soldiers. In 1859 Major William Hoffman led approximately 600 men to attack the Mojaves and their villages, ultimately forcing a surrender. Both before and after the large attack hundreds of United States soldiers were stationed in the desert, many of them along the Mojave Trail, to protect the transportation of supplies and the newly arrived settlers (King and Casebier 1976:295).

Mining in the Mojave Desert

Since the 1860s, mining has been the most important commercial industry near the Project APE. Silver was discovered in 1863, although it is possible the Spanish had mined in the area almost a century before. Prospectors attempted to establish mines in the area to sell to investors with sufficient capital. In the following decade, smaller operators attempted to compete with larger corporations, but without railroad transportation, very little money was made until the early 1880s with the coming of railroad through the eastern Mojave Desert (Brooks and others 1980; King and Casebier 1976:300-305).

The period between 1900 and 1919 was known as the "the Great Years" for mining in northeastern San Bernardino County (King and Casebier 1976:305) as it was more profitable than any other time. Copper, lead, zinc, and other base metals, as well as gold and silver, were mined throughout the Mojave Desert and San Bernardino County. Also, during World War I, chromium, manganese, tungsten, and vanadium were mined. Several large mining districts were developed, including Copper World, near Valley Wells; gold mines at Hart; lead, zinc, and copper in the Mohawk mines near Mountain Pass; copper mines near Von Trigger Spring; and gold mines at the north end of Old Dad Mountain (King and Casebier 1976).

During the Great Depression, a resurgence of gold mining took place, but World War II caused a return to the mining of base metals. The Vulcan Iron mine, in the Providence Mountains northeast of the Project, was excavated during that time. Since the end of World War II, mining in the area has considerably slowed. More recently, other nonmetals such as clay, talc and cinder mining have gained popularity, especially around the Kingston Mountains in the vicinity of Interstate 15. Aggregate mining for sand and gravel has become prevalent in the area (King and Casebier 1976).

Manganese Mining in the Project Vicinity

Several manganese mines exist in this region, including the Logan Mine within the Project APE, and the Black Butte Mine, located just over one half mile east of the Solar One APE (Figure 2.8-1, Appendix Z – Confidential Appendix A). Manganese was first mined in earnest during World War I, when the demand increased due to its use in the production of iron and steel. After World War I, manganese mining throughout the country decreased and continued to wane throughout the Depression but once again increased with the onset of World War II in the 1940s. In addition to iron and steel production, manganese also was used in the minting of the war-time nickel between 1942 and 1945. By 1943, deposits of manganese had been located in several desert locations throughout San Bernardino County, including the Lavic, Owl, and Whipple Mountains. Manganese, in combination with copper and silver, was used to produce these coins in an effort to conserve nickel for military uses (Tucker and Sampson 1943).

In 1942, the Metal Reserve Company of Washington D.C. published competitive price schedules for manganese ores. They offered $48 per ton for high grade ore (ore containing 48 percent manganese), $35.20 per ton for low grade A ore (44 percent manganese), and $26.00 per ton for low grade B ore (40 percent manganese). Ores containing 35 to 39 percent manganese were also accepted at a reduced price. Manganese producers in San Bernardino County brought their ore to stockpile points in Parker and Phoenix, Arizona. Lower grade ores containing 15 to 35 percent manganese often took their ore to the Kaiser Steel Corporation in Fontana, California. In the early 1940s, manganese ore was shipped from 5 deposits in San Bernardino County with ore containing 20 to 46 percent manganese. After the war, several manganese deposits continued to be worked in San Bernardino County (Tucker and Sampson 1943; Wright and others 1953).

Southern California Edison and the Hoover Dam

Two parallel Southern California Edison (SCE) steel-tower 220-kilovolt transmission lines are located the Pisgah Substation Triangle area and the historic built environment 0.5-mile buffer of the Project APE (Figure 2.8-1). The SCE 220-Kilovolt (kV) North Transmission Line was constructed between 1936 and 1939 and the SCE South 220-Kilvolt South Transmission Line between 1939 and 1941. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. The transmission lines were constructed to deliver power from the Hoover Dam to SCE service areas in southern California.

Plans for development of a hydroelectric plant on the Colorado River were conceived as early as 1902 in response to fuel shortages that were limiting the mining activities in the vicinity of the river. SCE began to investigate development of such a plant and signed an option to utilize river water for power generation. Engineers surveyed the Colorado River and a preferred dam site was selected, but at the time the technology to transport the power to the SCE's service area (a distance of 300 to 400 miles) at high voltages did not exist. Because of technological limitations and the decline in mining activity along the Colorado River, SCE abandoned this option (Myers 1983).

Throughout the next twenty years, development of a power generating facility on the Colorado River was discussed and debated by public and private power companies and the concept of the use of a dam was investigated to control the highly variable flows of the river. In 1921, SCE and U.S. Geological Survey engineers once again surveyed the river and throughout the 1920s, SCE filed licensing applications with the Federal Power Commission in an effort to obtain the right to construct dams and power generating facilities, but none were approved. In 1928, Congress passed the Boulder Canyon Act, which stipulated that the federal government would construct a dam on the Colorado River if public and private utility companies would take responsibility for the distribution of electrical hydropower. In 1930, SCE signed a contract stating that they would buy and distribute power for themselves and all other investor-owned utility companies. The Los Angeles Bureau of Power and Light agreed to purchase and distribute power for state and municipal utilities, as well as the metropolitan water district (Myers 1983).

Construction of Hoover Dam began in 1931 and was completed in 1935. Power production for use began in 1936 when power was delivered to the cities of Los Angeles, Pasadena, Glendale, and Burbank through three parallel transmission lines constructed by the Los Angeles Bureau of Power and Light (currently Los Angeles Department of Water and Power). The second company to distribute Hoover Dam power was the Nevada-California Corporation. The power was conveyed by a 132-kilovolt transmission line that had been originally constructed in 1930 and 1931 to deliver power to the dam site during construction. This transmission line is known as the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line (Hatheway 2006; Hughes 1993; Myers 1983).

The Metropolitan Water District of Southern California was the next to distribute electrical power in 1938. This transmission line, known as the Metropolitan Water District Line, used technology similar to that used previously by SCE for 220-kilovolt transmission lines in southern California. Utility companies in southern California, such as the Pacific Light and Power Company (which merged with SCE in 1917) and SCE, were innovators in the development of high voltage systems. In 1926, Stanford University established a high-voltage laboratory and worked with Pacific Gas and Electric and SCE in research and development. Through this collaboration insulators for California's 220-kilovolt lines were developed (Hughes 1993; Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its high-voltage transmission lines in southern California (including its Vincent 220-kilovolt line), and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line was energized in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001).

When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line, in 1939. SCE North and SCE South take divergent courses from the SCE switchyard at the Hoover Dam, but meet near Hemenway Wash in Nevada, and run nearly parallel to each other from north of Boulder City, Nevada to Chino, California. SCE North and SCE South are parallel within the Project APE (Figure 2.8-1, Appendix Z – Confidential Appendix A). Both SCE North and SCE South delivered electricity that was essential to war-time industries in Southern California. These industries included the Douglas, Vultee, and Northrup aircraft plants, Consolidated Steel, the Long Beach Naval Shipyard, Kaiser Steel, Alcoa, Columbia Steel, as well as automobile factories, tire plants, oil refineries, ordnance works, and military bases and depots (Myers 1983; Schweigert and Labrum 2001).

Natural Gas Pipeline

Two natural gas pipelines run through the Project APE —the Pacific Gas and Electric Pipeline and the Mojave Pipeline (Figure 2.8-1, Appendix Z – Confidential Appendix A). Although it was known that natural gas could be used for fuel in the early years of the nineteenth century, it was not until 1859 when large amounts of natural gas were discovered in Titusville, Pennsylvania, that a commercial market for natural gas developed. Wide-spread use of natural gas began in the west when southwestern natural gas fields were discovered in the 1920s. Large natural gas fields found in the north Texas panhandle in 1918 and in Kansas in 1922, as well as the development of the technology needed to transport natural gas the long distances to urban areas, resulted in the development of the interstate gas pipeline industry (Castaneda 2001).

The Pacific Gas and Electric Pipeline on the Project Site is a 33-to-44-inch natural gas pipeline. The pipeline is an interstate pipeline that carries natural gas from the natural gas fields of Texas and New Mexico to Northern California. The 502-mile long pipeline was constructed in 1948, and at the time, was the largest pipeline in the country (PG&E Corporation 2004).

The Mojave Pipeline on the Project Site is a 24-inch natural gas pipeline, owned by El Paso Natural Gas Corporation, one of the largest natural gas companies in North America. The El Paso Natural Gas Corporation expanded their services into southern California in the 1940s in response to the post World War II population growth. The Mojave Pipeline is a 450-mile-long interstate pipeline that carries natural gas from Arizona to Kern County, California. It was constructed in the late 1940s (El Paso Corporation 2008; International Directory of Company Histories 1996).

Military Use

Several military bases are located in the Mojave Desert region and within the same region as the Project, including Twenty-Nine Palms, south of the Project, and Fort Irwin, located approximately 37 miles northeast of Barstow. These, and other military installations in the area, led to an increase of traffic near the Project, and in the area population as civilians associated with the military took up residence.

During World War II, General George S. Patton established the Desert Training Center in California and Arizona, much of which was located on public land east of the APE. Training exercises were designed to prepare U.S. troops for combat in the hostile desert terrain and climate. The army established camps and emergency airfields, remnants of which can still be found, including rock alignments designating tent camps and emergency airfields. The Desert Training Center closed in 1944 toward the end of World War II. During desert training, the army created the first detailed maps of the Mojave Desert to facilitate training activities. The maps were created using aerial photography and land-based methods. After the war, those maps were used by the U.S. Geological Survey to create 15-minute topographic quadrangles in the late 1940s and early 1950s (Nystrom 2003). These training areas were located on public land east of the Project APE; there are no known desert training areas in the project vicinity.

Twenty years later, during the Cold War, the Mojave Desert in the vicinity of the Project again hosted a major training exercise. A training exercise, known as Desert Strike included troops from both the U.S. Army and Air Force and encompassed a 12 million-acre area in California and Arizona centered on the Colorado River. The two-week exercise was designed to test tactical deployment of nuclear weapons, and involved combat training between two hypothetical countries. Desert Strike occurred in May 1964 and resulted in the expenditure of approximately $60 million and 33 deaths (Garthoff 2001; Nystrom 2003; Time Magazine 1964).

5.7.1.11.4 Conclusions

Prior to arrival of Europeans in California, the Project APE was inhabited for thousands of years by indigenous populations, as evidenced by multiple archaeological complexes of different cultural affiliations. During ethnographic times, the Serrano, Vanyume and the Chemehuevi inhabited the area. The Project APE lies in a transitional zone near pluvial lakes, such as Troy Lake located to the west of the APE, which experienced episodes of inundations and desiccations. As a result it is unlikely that this area would have been suitable to support a large population for prolonged periods of time. Indigenous people traveling in this area adapted to these arid desert environments and managed successfully to exploit resources as is evident in the cultural materials they left behind.

During the Spanish and Mexican periods, San Bernardino County and the Project area remained relatively isolated. There were no Spanish and Mexican land grants in the region surrounding the Project APE, and the Spanish were mainly interested in using the area as an overland route to their coastal missions. The Spanish explored and used the Mojave Trail trade route blazed by the Mohave Indians north of the Project APE. This trail also was used by American explorers and mountain men who ventured into Mexican territory prior to the American period. The establishment of Fort Mohave on the banks of the Colorado River resulted in the use of the Mojave Trail as a wagon route, subsequently renamed the Mojave Road. This roadway was used as a travel and trade corridor until the railroad was constructed in the 1880s. After the railroad was built, travel through the Mojave Desert in the project vicinity shifted south into the Project APE. In the early 1900s, a wagon road that had been constructed adjacent to the railroad began to be used by automobiles and was designed the National Old Trails Highway. The National Old Trails Highway was designed as U.S. Route 66 in the 1920s, and by the 1930s, its original alignment was abandoned in favor of the alignment of U.S. Route 66 to the south. In the late 1960s, I-40 was constructed along the north side of U.S. Route 66 in the Project APE.

During the American period, the area was not ranched or farmed due to arid conditions, though some attempts at cattle grazing have been noted. Because of the arid conditions, the Project APE and its vicinity were used as a travel corridor rather than an area of settlement. Some mining activities occurred in the area, in particular manganese mining beginning in the 1940s. The region was also used as the setting for the Desert Strike military training exercises in 1964 and has been used as a corridor for electrical transmission lines and natural gas pipelines. Modern infrastructure in the project vicinity includes two steel tower transmission lines, wooden pole power lines, and underground pipelines along the south and east borders of the Project. Radio facilities are also located south and east of the Project APE.

5.7.1.12 Key Personnel Qualifications

All cultural resources work for the Project was carried out under the direct supervision of archaeologists that meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. All cultural resources work was consistent with the procedures for compliance with National Environmental Policy Act (NEPA), Section 106 of the National Historical Preservation Act (NHPA), and CEQA Section 15064.5. The key cultural resources personnel who conducted and/or supervised the field survey and prepared the technical report are:

Brian K. Glenn, MA, RPA (URS Cultural Resources Group Leader and Editor)

Rachael Nixon, MA, RPA (URS Principal Investigator)

Sarah Mattiussi (URS Archaeologist)

Kirsten Erickson, MA (URS Architectural Historian)

Gary R. Fink, AICP, RPA (URS Report Editor)

The following individuals directed crews both in the field and in the office. These individuals met with the Principal Investigator (PI) every morning and at the end of every day to discuss daily field/office efforts. In addition, these individuals were in consultation with the PI throughout the day as needed. The following individuals directed crews and/or managed office crews during the Class III Intensive Field Survey.

Dustin R. Kay – BA (URS Staff Archaeologist)

BS in Anthropology – Oregon State University

Sixteen years experience in Cultural Resource Management (survey, excavation, monitoring, record search, report writing)

Leroy Laurie – BA (URS Staff Archaeologist)

B.S. Social Science, concentration in Environmental Geography; minor in Anthropology/Geography – California Polytechnic University, San Luis Obispo.
Seven years experience in Cultural Resource Management (survey, excavation, monitoring, record search, report writing).

Sarah Mattiussi –BA (URS Staff Archaeologist)

BA in Archaeology – Escuela Nacional de Antropologia e Historia (ENAH), Mexico City
Eight years experience in Cultural Resource Management (survey, excavation, monitoring, report writing, record search)

Shane Wetherbee – MA (URS Field Technician/Archaeologist)

MA in Latin American Studies, concentration in Anthropology – USC San Diego
Six years experience in Cultural Resource Management (survey, excavation, monitoring).

Spencer Bietz – BA (URS Field Technician/Archaeologist)

BA in Anthropology with concentration in Archaeology – USC San Diego
Four years experience in Cultural Resource Management (survey, excavation, monitoring).

All staff working on the Class III Intensive Field Survey meet the professional requirements of the Secretary of Interior Standards and Guidelines for Archaeology and Historic Preservation, National Parks Service, 1983. Refer to Appendix Z – Appendix A for resumes of key personnel used in this effort.

5.7.1.13 Report of Findings and Evaluation Recommendations

5.7.1.13.1 Records Search Results

Previously Conducted Investigations

According to the SBAIC, housed at the San Bernardino County Museum, 18 cultural resource studies have been performed within the Project APE and the 1-mile search radius surrounding the Project APE (Table 5.7-1 and Figure 5.7-1). Of these, 1 occurs exclusively within the Project APE, 8 occur in 1-mile search radius, but not within the Project APE, and 9 occur within both the Project APE and 1-mile search radius.

Of these investigations; 12 were linear pedestrian surveys; 7 of the 12 extend into the Project APE; 6 previous studies examined several separate rectangular areas in the region and 2 of these extend into the Project APE. The previous investigations examined less than 5% of the Project APE. Fifteen of the previous surveys were positive for cultural resources; 10 of these studies occur within the Project APE.

In spite of this, the vast majority of the project area has not been previously investigated. The table below summarizes the previous studies conducted within the Project APE and 1-mile search. The previous investigations within the Project APE are summarized in Table 5.7-1. Copies of previously conducted investigations reports are provided in Appendix Z – Confidential Appendix I.

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
1060038	N/A	Simpson, Ruth D.	1958	The Manix Lake Archaeological Survey	Hector Station	Positive Archaeological Survey		X
1060047	N/A	Simpson, Ruth D.	1960	Archaeological Survey of the Eastern Calico Mountains	Manix, Harvard Hill, Newberry Springs, Tory Lake, Alvord Mountain, Daggett, Lane Mountain	Positive Archaeological Survey		X
1060874	Archaeological Research Unit, UCR	Barker, James P., Rector, Carol H., and Wilke, Philip J.	1979	An Archaeological Sampling of the Proposed Allen-Warner Valley Energy System, Western Transmission Line Corridors, Mojave Desert, Los Angeles and San Bernardino Counties, California and Clark County Nevada	Baldy Mesa, Adelanto, Victorville, Apple Valley North, Barstow SE, Ludlow, Ash Hill, Manix, Harvard Hill, Clark Mountain, Roach Lake, Broadwell Lake, Soda Lake, Mesca Range, Searchlight, Alvrod Mountain, Danby, Old Dad Mountain, Kelso, Crescent Peak, Ivanpah, Cave Mountain, Red Pass Lake, Baker, Halloran Spring, Kingston Peak, Dagget, Lavis, Apple Valley, Cady Mountains, Cadiz, Ord Mountains, Rodman	Positive Archaeological Survey	X	X

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius (Continued)

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
					Mountains, Bagdad, Essex, Fenner, Bannock and Hommer Mountain			
1060964	Regional Environmental Consultants	Norwood, Richard H.	1980	Cultural Resource Survey for a Portion of the Earp to Johnson Valley, California, Enduro Racecourse Route	Bagdad, Amboy Crater Lead Mountain, Bristol Lake NW, Bristol Lake SW, Bristol Lake, Cadiz Lake, Cadiz valley, Iron Mountains, Silver Bell Mine, Sunshine Peak, Lavic Lake, Ludlow, Ludlow SE, Troy Lake, and Cady Mountains	Positive Archaeological Survey		X
1060965	Unknown	Musser, Ruth A.	1980	A Cultural Resource Inventory: Johnson Valley to Parker Motorcycle Race – The Public Comment Alternative	Bagdad, ,Amboy Crater, Lead Mountain, Bristol Lake NW, Bristol Lake SW, Bristol Lake, Cadiz Lake, Cadiz Valley, Iron Mountains, Silver Bell Mine, Sunshine Peak, Lavis Lake, Ludlow, Ludlow SE, Troy Lake and Cady Mountains	Negative Archaeological Findings		X

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius (Continued)

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
1061449	E.R. of Applied Conservation Technology, Inc.	Well, Edward B., Weisbord, Jill and Blakely	1964	Cultural Resources Literature Research, Records Check and Sample Field Survey for the California Portion of the Celeron/All American Pipeline Project.	Newberry Springs, Troy Lake, Kramer, Hawes, Barstow, Daggett, Cady Mountains, Lavic, Ludlow, Iron Mountains, Bagdad, Cadiz, Danby, Essex, Millligan, Cadiz Lake, and Rice	Positive Archaeological Survey	X	X
1061979	New Mexico University	Fagan Bryan *et al.*	1989	Cultural Resource Report for the All American Pipeline Project: Santa Barbara, California to McCarney Texas and Additional Areas to the East – Along the Central Pipeline Route Texas	Leuhman Ridge, Kramer Junction, Kramer Hills, Twelve Gauge Lake, Hinkley, Barstow, Nebo, Daggett, Minneola, Newberry Springs, Troy Lake, Hector, Sleeping Beauty, Lavic Lake, Ludlow, Ash Hill, Ludlow SE, Bagdad, Amboy Crater, Amboy, Cadiz, Cadiz Summit, Cadiz Lake NW, Cadiz Lake NE, Chubbuck, Milligan, East of Milligan, Danby Lake, Sablon and Arica Mountains	Positive Archaeological Survey	X	X

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius (Continued)

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
1062220	Bureau of Land Management	BLM	1978	Archaeological Sites of the California Desert Area (Owlshead, Amargosa, Mojave Basin Planning Unit, Phase III): Archaeological Sample Unit Records.	Avawatz Pass, Silurian Hill, Baker, Red Pass Lake, Soda Lake, Cave Mountain, Lavic, Ludlow and Bagdad	Positive Archaeological Survey	X	X
1062234	California State University, Bakersfield – Cultural Resource Facility	Yohe II, Robert M. and Sutton, Mark Q.	1992	An Archaeological Assessment of Eight Alternative Access Routes Into the Proposed Hidden Valley Hazardous Waste Disposal Facility, San Bernardino County	Cady Mountains	Positive Archaeological Survey	X	X
1062330	N/A	Simpson, Ruth D.	1964	The Archaeological Survey of Pleistocene Manix Lake (and Early Lithic Horizon)	Yermo, Harvard Hill, Manix, Troy Lake, Alvord Mountain, Cave Mountain, Lane Mountain	Positive Archaeological Survey		X
1062388	Far Western Anthropological Research Group	McGuire, Kelly R.	1990	A Cultural Resources Inventory and Limited Evaluation of the Proposed Mojave Pipeline Corridor in California and Arizona	Topock, Whale Mountain, Monumental Pass, Stepladder Mountains, Stepladder Mountains NW, Little Paiute Mountains, Essex, Danby, Skeleton Pass, Cadiz Summit, Cadiz, Amboy, Amboy Crater,	Positive Archaeological Survey	X	X

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius
(Continued)

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
					Bagdad SW, Ludlow SE, Ash Hill, Ludlow, Lavic Lake, Sleeping Beauty, Hector, Troy Lake, Newberry Springs, Minneola, Daggett, Barstow SE, Hodge, Hinkley, Twelve Gauge Lake, Kramer Hills, Kramer Junction and Leuhman Ridge			
1062399	Far Western Anthropological Research Group	McGuire, Kelly R. and Glover, Leslie	1991	A Cultural Resource Inventory of a Proposed Natural Gas Pipeline Corridor From Adelanto to Ward Valley, San Bernardo County , California	Little Paiute Mountains, Essex, Danby, Castle Dome, Van Winckle Wash, Brown Buttes, East of Siberia, Siberia, Ash Hill, Ludlow, Lavic Lake, Sleeping Beauty, Hector, Newberry Springs, Camp Rock Mine, Ord Mountain, West Ord Mountain, Stoddard Well, Turtle Valley, Hodge, Barstow SE, Apple Valley North, Victorville, and Adelanto	Positive Archaeological Survey	X	X

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius (Continued)

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
1062406	California State University, Bakersfield – Cultural Resource Facility	Osborne, Richard H.	1991	Addendum to Archaeological Investigation of Hidden Valley Hazardous Waste Facility Access Route From Highway 40 to Hector Siding	Hector	Positive Archaeological Survey	X	X
1062710	Dames and Moore	Apple-McCorkle, Rebecca and Lilburn, Lori	1993	Cultural Resources for the Fort Cady Boric Acid Mining and Processing Facility Newberry Springs, California	Hector, Sleeping Beauty, and Sunshine Peak	Positive Archaeological Survey		X
1062808	Southern California Gas Company	Padon, Beth and Breece, Laurel	1993	Archaeological Assessment, Kern Mojave Pipeline, San Bernardino County, Ca	Hector	Positive Archaeological Survey		X
1062862	Dames and Moore	Apple- McCorkle, Rebecca	1993	Cultural Resources Testing and Evaluation Report for the Fort Cady Boric Acid Mining and Processing Facility, Newberry Springs - CA	Hector, Lavic Lake, Sleeping Beauty, Sunshine Peak and Troy Lake	Positive Archaeological Survey	X	
1063630	Tetra-Tech	Budinger, Fred	2001	An Archaeological Assessment of the Proposed Verizon Wireless Newberry Springs Unnamed Cellular Telecommunications Site to be Located South of National Trails Highway (Old Rte 66) and West	Hector	Negative Archaeological Survey		X

Table 5.7-1
Previously Conducted Cultural Resources Investigations Within the Project APE and 1-Mile Search Radius
(Continued)

Survey Report Number	Company	Author	Date	Report Title	Quadrangle	Investigation Type	In APE	In 1- mile research radius
				of Hector Off-Ramp From Hwy 40				
1063631	ACS Limited	Clark, Caven	1998	Archaeological Survey at the Hector Meter Station	Hector	Positive Archaeological Survey	X	X
On File with BLM	Environmental Planning Group	Rowe, Robert, A.	2006	Results of Cultural Records Search in Support of the Proposed Solar One Power Generating Facility, Hector, San Bernardino County, California	Sleeping Beauty, Broadwell Lake	Positive Records Search	X	X

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The following paragraphs describe in further detail the contents of the technical reports for the previously conducted investigations.

Report # 1060038
The Manix Lake Archaeological Survey
Ruth D. Simpson

Article published in 1958 in the Masterkey Journal of the Southwest Museum. The article addresses archaeological fieldwork done during the late 1950s at Pleistocene Manix Lake basin with the intent to better understand man's occupation of Western America during glacial and early post-glacial periods

Report # 1060064
An Archaeological Survey of Troy Lake, San Bernardino County
Ruth D. Simpson

This report provides information on Troy Lake and was prepared to provide additional data on the Great Basin Area to fieldworkers, and to assist in establishing a uniform terminology for the region.

Report # 1060874
An Archaeological Sampling of the proposed Allen-Warner Valley Energy System, western transmission line corridors, Mojave Desert, Los Angeles and San Bernardino Counties, California, and Clark County, Nevada.
James P. Barkers *et al.*

Report describes the results of an archaeological survey and testing by random stratified/non-stratified sampling design, for a series of proposed transmission line corridors and their alternatives in the Mojave Desert of California and Nevada. The areas examined comprise portions of the proposed Allen-Warner Valley Energy System, Western Transmission Line Corridors, of the Southern California Edison (SCE), Rosemead, California. The archaeological survey ranged from Eldorado Substation near Boulder City, Nevada to the vicinity of Vincent Substation near Palmdale, California.

Report # 1061449
Cultural Resources Literature Search, Records Check and Sample Field Survey for the California Portion of the Celeron/All American Pipeline Project. Technical Appendix to: Draft Environmental Impact Report / Environmental Impact Statement Proposed Celeron/All American and Getty Pipeline Projects.
Edward B. Weil, Ph.D *et al.*

Report was prepared for a combined Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for the Getty and Celeron/All American Pipeline Project. The reports intent was to determine the nature of cultural resource sensitivities potentially impacted by the construction and operation of the proposed pipeline facilities, and documentation of the research and heritage preservation concerns in the project area. This documentation included California, Texas, Arizona and New Mexico.

Report # 1061940
A Cultural Resource Inventory for the Proposed Hidden Valley Hazardous Waste Disposal Facility, San Bernardino County, California.
Mark Q. Sutton and Robert E. Parr

Report was written to complete the cultural resources section for the proposed Specified Hazardous Waste Facility (SHWF) in Hidden Valley, Cady Mountains, San Bernardino County, California EIR. The project was viewed as an opportunity to examine the cultural resources within the small valley that encompasses several ecozones. Sutton was interested in collecting information regarding the settlement/subsistence system(s) operating within the valley, and the relationships between other systems based elsewhere.

Report # 1061979
Cultural Resources Report for the All American Pipeline Project: Santa Barbara, California to McCamey, Texas and Additional Areas to the East along the Central Pipeline Route in Texas.
New Mexico State University

The report encompasses results of the survey done for the All American Pipeline Project. The surface survey covered the length of the line between the proposed sites of AAPL's Las Flores and Gaviota pump stations along coastal California in Santa Barbara County, passing through southern Arizona, New Mexico, and into west Texas north of El Paso. The report exposes innovative approaches to cultural resources management, sampling and report writing used by combining various anthropological disciplines.

Report # 1062234
An Archaeological Assessment of Eight Alternative Access Routes into the Proposed Hidden Valley Hazardous Waste Disposal Facility, San Bernardino County, California
Robert M. Yohe II and Mark Q. Sutton

The report was written as part of an Environmental Impact Report for a proposed Specified Hazardous Waste Facility (SHWF) in Hidden Valley, Cady Mountains, San Bernardino County, California. The report reflects the results of the archaeological assessment of 8 proposed access routes into the SHWF and includes recommendations for further work.

Report # 1062388
A Cultural Resources Inventory and Limited Evaluation of the Proposed Mojave Pipeline Corridor in California and Arizona.
Kelly R. McGuire

Report describes the results of a cultural resources inventory and initial evaluation of a 387-mile proposed Mojave natural gas pipeline corridor which traverses portions of Kern and San Bernardino Counties in California and Mohave County in Arizona.

Report # 1062399
A Cultural Resource Inventory of a Proposed Natural Gas Pipeline Corridor from Adelanto to Ward Valley, San Bernardino County, California
Kelly R. McGuire and Leslie Glover

Report describes the results of a cultural resources inventory of a proposed Southern California Gas Company (SoCal) 204 mile natural gas pipeline corridor in San Bernardino County, California. The report states that after the initial fieldwork was completed the pipeline project was canceled and as a result further cultural resources investigations in the area were halted.

Report # 1062701
An Archaeological Survey of Hidden Valley, Central Mojave Desert, California
Mark Q. Sutton and Robert E. Parr

Paper presented at the 1989 SCA Fall Data Sharing Meeting, Santa Barbara. The intention of the paper was to expose the results of the cultural resources investigation conducted in Hidden Valley in October 1989. Although the survey data and subsequent investigations were limited, Sutton was able to provide a synchronic view of the utilization of an upland valley in the central Mojave Desert.

Report # 1062808
Archaeological Assessment Kern Mojave Pipeline, San Bernardino County, California
Beth Padon, M.S. and Laurel Breece, M.A.

Report presenting results of an archival review and intensive pedestrian survey of the proposed Kern Mojave Pipeline, located 32 miles of the City of Barstow, San Bernardino County, California. During survey no intact cultural resources were found.

Report # 1063630

An Archaeological Assessment of the Proposed Verizon Wireless Newberry Springs Unmanned Cellular Telecommunications site to be Located South of Nationals Trails Highway (Old Route 66) and West of Hector Off Ramp from Interstate Highway 40, San Bernardino County, California.
Fred Budinger

Report presenting results of an archaeological assessment of a proposed Verizon Wireless, Inc. unmanned cellular telecommunications site. The report states that there were negative findings in the area.

Report # 1063631
Archaeological Survey at the Hector Meter Station, San Bernardino County, California
Caven P. Clark

Report presents results of an archaeological survey of a proposed expansion of the Hector Meter Station of the El Paso Natural Gas Company (EPNG) Mojave Pipeline. The report states that the survey disclosed the presence of a small number of prehistoric lithic artifacts in a heavily to moderately disturbed area.

Report# 1060047
Archaeological Survey of the Eastern Calico Mountains
Ruth D. Simpson

Article published in 1960 in the Masterkey Journal of the Southwest Museum. The article is a continuation of the article written during 1958 entitled "The Manix Lake Archaeological Survey". In this article the author describes surveys done in the Calico Mountains during 1960 as well as artifact descriptions.

Report # 1062862
Cultural Resources Testing and Evaluation Report for the Fort Cady Boric Acid Mining and Processing Facility Newberry Springs, California
Rebecca McCorkle Apple

Report is part of an Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for a proposed mine and processing structures for Boric acid. A cultural resources survey was conducted to provide an inventory of resources potentially affected by the project. A testing and evaluation program was designed and approved by the BLM to mitigate the sites found within the project area using the Sparse Lithic Scatter Program (CARIDAP).

Report on file with BLM
Results of Cultural Records Search in Support of the Proposed Solar One Power Generating Facility, Hector, San Bernardino County, California.
Robert A. Rowe RPA

In 2006, SES proposed the Solar One Power Generation Facility. The original project proposed two siting locations totaling 51,520 acres; one of which was considered an alternative siting location. The scope of the report was to review and identify prior investigations and previously recorded sites located within a 1-mile radius of the project area. The record search identified 20 previously conducted studies in the area, 38 previously recorded sites and 34 previously identified isolates within the project area and 1-mile radius. Based on the record search results, Environmental Research Group recommended a field survey be conducted by qualified professional for historic and prehistoric resources within the portions of the project areas that had not been previously been surveyed.

Previously Recorded Cultural Resources

A total of 79 cultural resources have been previously recorded in the Project APE and the one-mile search radius (Table 5.1-2 and Figure 5.1-2). Forty-two of these previously recorded resources are archaeological sites, 28 are prehistoric isolates, and 9 are historic resources (2 of which are built environment). Sixteen of the cultural resources occur within the Project APE (1 isolate, 13 prehistoric sites, and 2 historic sites); 63 occur within the 1-mile search radius (32 isolates, 29 prehistoric, and 2 historic), and 3 of occur both in the Solar 1 APE and 1-mile search radius (1 prehistoric site, and 2 historic sites).

Two of these sites, SBR-2910H and SBR-6693H, are listed as eligible for the National Register Historic Places (NRHP). SBR-2910H is the National Old Trails Highway 66/U.S. Route 66, which varies from a graded dirt road to a two-lane paved road. Historic trash scatters are found sporadically along the road consisting of historic glass, cans, signs, and car parts. This highway represents one of the earliest trans-continental automobile routes. Between 1990 and 1998 portions of this site were given status codes 2S2 (individual property determined eligible for the NR [National Register] by a consensus through Section 106 process; listed in the CR [California Register]) and 2S (individual property determined eligible for the NR by the Keeper; listed in the CR.) This resource is within the ½ mile historic built environment buffer for the Project APE.

SBR-6693H is the railroad line that was originally built in 1883 for the Atlantic and Pacific Railroad Company. From 1890, the railroad was operated by the Atchison, Topeka & Santa Fe Railroad until its merger in 1996 with the Burlington Northern Santa Fe Railway. In addition to the railroad track, associated historical artifacts include glass, metal, track and train parts, and railroad tableware. Between 1993 and 2002 portions of this site have been given status codes 2S2 (individual property determined eligible for the NR by a consensus through Section 106 process; listed in the CR) and 6Y (determined ineligible for NR by consensus through Section 106 process, not evaluated for CR or Local Listing). SBR-6693H bisects the Project APE and is located within the Project APE and ½ mile built environment buffer.

Copies of the previously recorded cultural resources (DPR 523 series) are provided Appendix Z – Confidential Appendix H.

Of the previous investigations, most were completed before the advent/availability of global position system (GPS) data collection and standardized archaeological data-recording processes. Much of the previously recorded information is unevaluated, site descriptions are poor, and locational information tends to be inaccurate or unavailable.

The following tables summarize the records search:

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Table 5.7-2
Previously Recorded Cultural Resources Within the Project APE and 1-Mile Search Radius

Primary #	Trinomial	Cultural Resource Type	Cultural Resource Description*	In APE	Within the 1 mile research radius	Latest Update
36-061410		Prehistoric	Black on white pottery sherd		X	Unknown
36-061415		Prehistoric	Isolated jasper flake		X	1990
36-061416		Prehistoric	Two isolated chalcedony flakes		X	1990
36-061417		Prehistoric	Isolated chalcedony flake		X	1990
36-061420		Prehistoric	Isolated chalcedony flake and isolated rhyolite flake		X	Unknown
36-061421		Prehistoric	Isolated jasper flake		X	1991
36-061423		Prehistoric	Isolated cryptocrystalline flake		X	1990
36-061424		Prehistoric	Isolated white cryptocrystalline flake		X	1990
36-061425		Prehistoric	Isolated white cryptocrystalline flake		X	1990
36-061426		Prehistoric	Isolated red cryptocrystalline flakes		X	1990
36-061427		Prehistoric	One isolated red cryptocrystalline flake tool and one red cryptocrystalline flake		X	1990
36-061428		Prehistoric	Two isolated cryptocrystalline flakes		X	1990
36-061429		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061430		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061431		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061432		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061433		Prehistoric	Two isolated cryptocrystalline silicate flakes		X	1990
36-061434		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061435		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990
36-061436		Prehistoric	Isolated cryptocrystalline silicate flake		X	1990

Table 5.7-2
Previously Recorded Cultural Resources Within the Project APE and 1-Mile Search Radius
(Continued)

Primary #	Trinomial	Cultural Resource Type	Cultural Resource Description*	In APE	Within the 1 mile research radius	Latest Update
36-061459		Prehistoric	3 cryptocrystalline flakes		X	1991
36-061460		Prehistoric	One multidirectional core and 1 flake of same material		X	1991
36-061461		Prehistoric	One red cryptocrystalline flake		X	1991
36-064406		Prehistoric	Isolated chert flake and one piece of angular waste		X	2001
36-064407		Prehistoric	Two isolated chalcedony flakes	X		2001
36-064408		Prehistoric	Isolated red jasper flake fragment		X	2001
36-064409		Prehistoric	Isolated agate bifacial core		X	2001
36-064410		Prehistoric	One isolated red jasper flake and a second flake with dorsal scars		X	2001
	CA-10649H	Prehistoric	Small lithic test and quarry area with flakes and one core	X		2001
36-001585	CA-SBR-1585	Prehistoric	Also known as EM-266. This is a Petroglyph Site		X	1976
	CA-SBR-1793H	Prehistoric	Pottery sherds, awl, and 2 bifaces		X	1963
	CA-SBR-1889	Prehistoric	Lithic scatter containing mutates, projectile points and debitage		X	1969
	CA-SBR-1893	Prehistoric	Also known as SBCM 674, this site consists of 2 projectile points, scrapers flakes and bone which were collected at time of recordation	X		1963
	CA-SBR-1905	Prehistoric	Jasper quarry with sparse scatters consists of flakes, bifaces and scrapers		X	1980
	CA-SBR-1907	Prehistoric	Large quarry area containing debitage, cores and bifaces		X	1990
	CA-SBR-1908	Prehistoric	Low density; sparse cobble testing/quarry area consisting of cryptocrystalline silicate, basalt and rhyolite materials.	X		1979
	CA-SBR-2330H	Historic	Lavic Chinese Labor Camp, Glasgow pottery along with hearths was recorded next to the Santa Fe Railroad near Lavic Siding.		X	1980

Table 5.7-2
Previously Recorded Cultural Resources Within the Project APE and 1-Mile Search Radius
(Continued)

Primary #	Trinomial	Cultural Resource Type	Cultural Resource Description*	In APE	Within the 1 mile research radius	Latest Update
	CA-SBR-2910H	Historic	National Old Trails Highway 66/U.S. Route 66, which varies from a graded dirt road to a two-lane paved road. Historic trash scatters are found sporadically along the road consisting of historic glass, cans, signs, and car parts.		X	2001
	CA-SBR-3515	Historic/Prehistoric	Two rock rings, it was not determined if they were historic or prehistoric		X	1978
	CA-SBR-3516	Prehistoric/Historic	Lithic quarry site containing flakes and cores of chert material and historic trash scatter		X	1991
	CA-SBR-3876	Prehistoric	Two rock circles made of volcanic basalt		X	1979
	CA-SBR-4307	Prehistoric	Several lithic scatters		X	1980
	CA-SBR-4308	Prehistoric	Two lithic reduction stations that contain flakes and cores		X	1980
	CA-SBR-4309	Prehistoric	Lithic scatter with a lithic reduction station. Possible basalt and andesite tools present on site.		X	1980
	CA-SBR-4405H	Historic	A booth and cargo loading platform located where the railroad splits.		X	
	CA-SBR-4558H	Historic	Also known as SBCM 4918. This site is a 1930s and 1940s manganese mining area containing a galvanized steel structure, mill tailings, mine and historic trash scatters	X	X	1979
	CA-SBR-4681	Prehistoric	Lithic scatter	X		1980
	CA-SBR-5600	Prehistoric	Lithic reduction station	X		1980
	CA-SBR-5598	Prehistoric	Large cobble test/quarry area		X	1991
	CA-SBR-5599	Prehistoric	Lithic scatter and rock rings		X	1980
	CA-SBR-5794	Prehistoric	Cobble quarrying and lithic reduction area		X	1989

Table 5.7-2
Previously Recorded Cultural Resources Within the Project APE and 1-Mile Search Radius
(Continued)

Primary #	Trinomial	Cultural Resource Type	Cultural Resource Description*	In APE	Within the 1 mile research radius	Latest Update
	CA-SBR-5795	Prehistoric	Lithic scatter originally containing 100s of flakes, several biface fragments and cores		X	2001
	CA-SBR-5796	Prehistoric	Low density lithic scatter containing flakes and cores	X		2001
	CA-SBR-5797	Prehistoric	Low density lithic scatter with dozens of flakes and cores		X	2001
	CA-SBR-6511	Prehistoric	Very large low density lithic scatter containing debitage and shatter	X		1989
	CA-SBR-6512	Prehistoric	Also known as MP-26. This is a small low density lithic scatter	X		1989
	CA-SBR-6513	Prehistoric	Also known as MP-27. This is a single segregated lithic reduction locus containing approximately 15 felsite flakes	X		1989
	CA-SBR-6517	Prehistoric	Small flake scatter with one core and 8 flakes		X	1989
	CA-SBR-6518	Prehistoric	Small cobble test and quarry area with 2 segregated reduction loci and debitage		X	1989
	CA-SBR-6519	Prehistoric	A single segregated reduction locus made up of approx. 4 flakes		X	1989
	CA-SBR-6520	Prehistoric	Small cobble test and quarry area with one segregated reduction locus and debitage	X		1989
	CA-SBR-6521	Prehistoric	Low density cobble test and quarry area with debitage, cores, bifaces and blanks	X		1989
	CA-SBR-6522/H	Prehistoric and Historic	Low density cobble test and quarry area with debitage, cores, bifaces and blanks		X	1989
	CA-SBR-6525	Prehistoric	Also known as MP-84. This is a low density lithic scatter that contains 1 lithic reduction locus flakes and debitage		X	1989
	CA-SBR-6526	Prehistoric	Also known as MP-85. This site contains 2 adjacent lithic reduction loci and flakes		X	1989

Table 5.7-2
Previously Recorded Cultural Resources Within the Project APE and 1-Mile Search Radius
(Continued)

Primary #	Trinomial	Cultural Resource Type	Cultural Resource Description*	In APE	Within the 1 mile research radius	Latest Update
	CA-SBR-6527	Prehistoric	Also known as MP-86. This site is a small low density flaked stone scatter		X	1989
	CA-SBR-6528	Prehistoric	Also known as MP-87. This is a small density lithic scatter	X		1989
	CA-SBR-6693H-NRHP	Historic	Railroad Line built in 1883 for the Atlantic and Pacific Railroad Co., associated artifacts include track and train parts, railroad tableware, and insulator glass fragments	X	X	2001
	CA-SBR-6786	Prehistoric	Cobble quarrying area comprised of approx. 200 flakes and 4 cores		X	1990
	CA-SBR-6836	Prehistoric	Small lithic scatter containing approx. 6 jasper flakes		X	1991
	CA-SBR-6895	Prehistoric	Single segregated reduction locus containing flakes		X	1990
	CA-SBR-6896	Prehistoric	Small, sparse lithic scatter consisting of 13 flakes		X	1990
	CA-SBR-6897	Prehistoric	Small moderately dense lithic scatter consisting of approx. 20 cryptocrystalline flakes.		X	1990
	CA-SBR-6898	Prehistoric	Cryptocrystalline lithic scatter with over 50 flakes and 4 bifaces.		X	1990
	CA-SBR-7114	Prehistoric	Moderately dense lithic scatter with 51 cryptocrystalline flakes representing all stages of reduction.		X	1991
	CA-SBR-7115	Prehistoric	Very sparse lithic scatter along lava ridges		X	1991
	CA-SBR-7116	Prehistoric	Possible pot hunter deposit, several flaked lithics in small cluster		X	1991

* Description represents the most recent data provided on the site record

Table 5.7-2
Previously Recorded Cultural Resources Within the Project APE and 1-Mile Search Radius
(Continued)

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Of the 49 previously recorded sites, 14 are found within the project area; CA-10649H, CA-SBR-1896, CA-SBR-1908, CA-SBR-4558H, CA-SBR-4681, CA-SBR-5600, CA-SBR-5796, CA-SBR-6511, CA-SBR-6512, CA-SBR-6513, CA-SBR-6520, CA-SBR-6521, CA-SBR-6528, CA-SBR-6693H-NRHP. The following site descriptions are based on the most recent data provided on the site records and in the corresponding report.

CA-10649H is a very small prehistoric lithic test quarry/scatter containing at least four chert/jasper flakes, 1 white chert core and 1 volcanic core. The site is located atop a sandy clay and disturbed desert pavement terrace with an open exposure and 0° degree slope. The site was recorded by Stephanie Rose and Iain Berdzar of Tierra Environmental Services in February 2001.

CA-SBR-1896 is a prehistoric lithic scatter containing fire stones and projectile points. The site was recorded by Lyle Richards, date unknown.

CA-SBR-1908 is a very large low density prehistoric cobble test/quarry area, measuring 115 m N/S x 95 m E/W. Raw materials consist of cryptocrystalline silicate, basalt and rhyolite materials. The site is most dense at the top of the hill at mile post 157. Site was originally recorded in 1965 and updated by J. Berg of Far Western Anthropological research Group, Inc. in November 1989. During the Far Western survey, the site was tested. A total of eight 25x50 cm test units was excavated, with only one flake found in STP#2. The site was recommended non eligible. Surface artifacts included 6 bifaces, 1 flaked tool, and 1 Silver Lake point. The projectile point was the only artifact collected. Far Western recommended that the site was not eligible based on test results. In February 2001 site information was updated by J. Dietler and J. Toenjes of Tierra Environmental Services. The condition of the site was considered the same as 1989 and no further description was provided.

CA-SBR-4558H also known as SBCM 4918. This is a 1930s and 1940s historic manganese mining area containing a galvanized steel structure, mill tailings, mine and historic trash. The site is situated on the south side of the Cady Mountains and approximately 5 miles north of Pisgah along the Santa Fe Railroad. The site was recorded by R. Brooks of BLM in October 1979.

CA-SBR-4681 is a prehistoric lithic scatter located atop an undisturbed alluvial bench. Lithic materials consist of a few relatively fresh basalt flakes and cryptocrystalline silicate jasper flakes. Some of the weathered basalt artifacts resemble the “Malpais” Complex. The site was recorded by Hardaker and Musser of BLM in January 1980.

CA-SBR-5600 is a prehistoric lithic reduction station located atop a desert pavement knoll. Raw materials consist of cryptocrystalline silicate (jasper) and basalt. The site has two components; one cryptocrystalline silicate jasper flaking station, and another consisting of basalt flakes with no evidence of wear. The site was recorded by Hardaker and Musser of BLM in January 1980.

CA-SBR-5796 is a prehistoric low density lithic scatter located in a bajada bisected by an alluvial wash. The site was originally recorded by J. Wollin of the New Mexico State University in 1985. During the survey there was lithic surface collection and testing; artifacts included dozens of flakes, mostly primary and several cores. Materials included cryptocrystalline silicate (jasper, chert and chalcedony) and basalt. The site was updated in February 2001 by J. Dietler and J. Toenjes of Tierra Environmental Services.

During the update a lithic scatter was relocated, numerous cryptocrystalline flakes and cores were noted. No additional data was provided.

CA-SBR-6511 is prehistoric low density lithic scatter measuring 40 m E/W x 50 m N/S. The site situated on a large alluvial plain in an area of moderately consolidated desert pavement mixed with areas of loose sandy soil. Materials include cryptocrystalline silicate and rhyolite. The site was tested; eight 25x50cm test units were excavated in the portion of the site which will be impacted by the Mojave Pipeline. The report states that 10 pieces of debitage were found in the 0-17 cm level. No further data provided. The site was recommended not eligible for NRHP and/or CRHR based on surface observations. The site was recorded by L. Glover *et al.,* of Far Western Anthropological research Group, Inc. in November 1989.

CA-SBR-6512 is a prehistoric small density lithic scatter of mixed materials that is situated on the slope of a small sand dune which was built up along the side of a small lava flow. The site measures 20 m E/W x 11 m N/S. Raw materials include cryptocrystalline silicate, basalt and rhyolite. The site was recorded by L. Glover *et al.,* of Far Western Anthropological research Group, Inc. in November 1989. No testing was conducted for this site, and based on surface observations, Far Western recommended that the site was not eligible for NRHP and/or CRHR.

CA-SBR-6513 is a prehistoric single segregated reduction locus located on unconsolidated desert pavement at the base of a small lava flow, that measures 2.4 m E/W x 1.4 m N/S. The SRL consists of approximately 15 felsite flakes. No tools are associated. The site was recorded by L. Glover *et al.,* of Far Western Anthropological research Group, Inc. in November 1989. No testing was conducted for this site, and based on surface observations, Far Western recommended that the site was not eligible for NRHP and/or CRHR.

CA-SBR-6520 is a prehistoric small low density cobble test/quarry area consisting of one segregated reduction locus, one cryptocrystalline silicate core and approximately 16 additional pieces of debitage. The site measures 67m NW/SE x 20m SW/NE. Raw materials are cryptocrystalline silicate and basalt. The site was recorded by L. Glover et al. of Far Western Anthropological research Group, Inc. in November 1989.

CA-SBR-6521 is a prehistoric low density desert pavement cobble test/quarry area site, measuring 135m N/S x 70m E/W. Raw materials consist of cryptocrystalline silicate, basalt and rhyolite. The site is essentially an area of primary reduction with a few first stage bifaces. In 1989, Far Western tested the site under the CARIDAP program, placing 4-25x50cm test units at this site. Artifacts found consist of 4 bifaces, 4 cores and 1 flake; the debitage was primarily from reducing on-site cobbles in pavement formation. No artifacts were collected. The site was recommended not eligible for NRHP and/or CRHR based on subsurface test results. The site was recorded by L. Glover et al. of Far Western Anthropological research Group, Inc. in November 1989

CA-SBR-6528 is a prehistoric small low density lithic scatter consisting of ten flakes of reddish/brown/purple cryptocrystalline silicate. The site measures 17m E/W x 14m N/S. Tools found within the site consist of one bifacial core, one multi-directional cryptocrystalline silicate core and debitage. The site was recorded by Mikkelsen et al. of Far Western Anthropological research Group, Inc. in November 1989.

CA-SBR-6693H-NRHP was originally recorded by Michael Lerch in 1990, who describes the railroad as having originally been built "in 1883 for the Atlantic and Pacific Railroad Co. by Southern Pacific, and subsequently purchased by the Atchison, Topeka & Santa Fe railroad. In 2001, Tierra Environmental Services updated the site stating that the railroad is currently operated by the Burlington Northern and Santa Fe Railroad Co. A wooden phone/telegraph line with two cross pieces with glass insulators and two wires paralleling the tracks were found. Other artifacts were found associated with the railroad such as track and train parts, railroad tableware, and insulator glass fragments.

5.7.1.13.2 Class III Field Survey Results

Survey of the Project APE was conducted between August 4, 2008 and October 31, 2008. URS PI, Rachael Nixon, directed between 4 and 5 crew chiefs. Each crew chief directed 3-5 cultural resource specialists during the Class III intensive field survey. Crew chiefs were provided with the scope of work, field methodology, BLM Fieldwork Authorization and safety manual prior to the onset of field work. Daily reporting to the PI occurred in the pre-field morning meetings and post-field meetings. In addition the PI was in the field at all times and in contact with crew chiefs throughout the day.

The Project APE for archaeological resources consists of the Project site, linear facility routes, ancillary project areas (Pisgah Triangle area), and 200 foot archaeological buffer, which total 9,527 acres (8,767 acres APE plus 760 acre 200 foot buffer) (Figure 5.7-1). The approximate collective percentage of the above areas surveyed for cultural resources is 98 percent of the Project APE.

Areas of steep terrain (greater than 45°slope) where access was not feasible due to unsafe/unstable surfaces were not surveyed. These areas total less than 11 acres and occur within the northeastern Project APE along the south-southwest facing slope of the Cady Mountains (Figure 5.7-1). The areas of steep terrain not surveyed have an extremely low likelihood of containing cultural resources based on the angle and decomposition of volcanic rocks eroding downslope. Areas situated within or on steep terrain having with the potential for cultural resources were investigated (*e.g.,* caves and ridge tops, and steep drainage cuts).

The principal archaeological survey method consisted of a systematic walk-over in parallel transect intervals no greater than 15 meters. The survey transects extended across the entire horizontal extent of the archaeological APE. Survey crews were guided by Trimble XH sub-meter GPS units uploaded with records search data, township, built environment features, and project-specific boundary data. Individual crews were assigned portions of sections for survey. Garmin Model 150 GPS units were carried as backups and as communication devices.

The guidelines applied to field survey and recordation methods for cultural resources within the Project APE were provided by BLM archaeologist Jim Shearer. The guidelines provided that archaeological sites consisted of 5 or more historic period artifacts or prehistoric period artifacts with a tool (6 or more artifacts) within 30 meters of each other. Groups of 5 or fewer prehistoric artifacts (without a tool) within 30 meters of each other were recorded as isolated finds. Individual and groups of less than 5 historic period artifacts were not recorded.

Sites containing higher concentrations of artifacts over a large area were assigned individual locus numbers. Loci were assigned for areas within sites with higher artifact concentrations. A locus was assigned to concentrations of more than 6 artifacts within a discrete location. Discrete locations were defined as single reduction loci, multiple single reduction loci, and/or lithic scatter concentrations. In the case of multi-component sites, historic and prehistoric components were, when possible, assigned individual locus designations.

From previous surveys on similar terrain, it was modeled that archaeological sites would be found on areas of desert pavement. For the purpose of this survey, desert pavement was defined as a desert surface covered with closely packed, interlocking angular or rounded rock fragments of pebble and cobble size. Within the Project Area, and other areas of the desert, a portion of the cobble constituents of desert pavement are of cryptocrystalline silicate (chalcedony, jasper, etc.) materials used by Native Americans for the production of flaked stone tools. As such, the correlation of these surfaces with the archaeological materials contained therein may be informative. In addition, the pavement stabilization level is directly correlated with the likelihood of the matrix containing buried deposits, *i.e.,* the more visible sediments the more likely the presence of buried archaeological deposits. The following is an elementary subdivision of desert pavements used to classify variability in surfaces, developed specifically for this Project.

1. <u>Partially stabilized</u> pavement has 30 percent or greater of the surface area with sediments visible.

2. <u>Moderately stabilized</u> pavement has 10-30 percent of the surface area with sediments visible.

3. <u>Stabilized pavement</u> has pavement 0-10 percent of the surface area with sediments visible.

The California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatters (CARIDAP) was applied in the preliminary field surface identification and management recommendation with regards to lithic scatters identified within the Project APE and 200-foot archaeological buffer (Jackson *et al.,* 1988). No surface collection, subsurface testing or data recovery was conducted during the Class III Intensive Field Survey. The CARIDAP classification as a sparse lithic scatter archaeological site is that it:

- Contains only flaked-stone and lack other classes of archaeological materials (*e.g.,* groundstone, fire affected rock, bone, or shellfish remains, pottery);
- Appears to lack a substantial subsurface deposit (based on surface observations); and
- exhibit surface densities equal to or less than three flaked-stone items per square meter.

These guidelines were applied throughout the entire Class III Intensive Field Survey for the Project APE.

Overall surface visibility was good to excellent across the Project APE and 200-foot archaeological buffer. Visibility ranged from 90-100 percent, and averaged approximately 95 percent of the ground surface; however, areas with greater visibility were thoroughly inspected for cultural materials to ensure adequate coverage for resource discovery. Evidence of disturbances within and surrounding the APE include numerous rodent burrows, flash flooding, mining activities, livestock trampling, OHV use, railroads, pipelines, transmission line, and both dirt and paved roads.

The URS archaeological team identified a total 391 archaeological resources: 247 isolates and 143 archaeological sites (9 of which were updates), in addition to 10 built environment resources, for a total of

401 cultural resources within the Project APE (Figures 5.3-1 and 5.3.4-1 Appendix Z Confidential Technical Report – Confidential Appendix A).

Of the 143 new and updated archaeological sites, 128 are prehistoric, 11 historic, and 4 multi component. Based on surface observations it appears that of the newly recorded archaeological sites and of the previously recorded archaeological sites 46, (including 1 in the NAP area) are assumed eligible for NRHP and/or CRHR. An Extended Class III limited subsurface testing is recommended to determine eligibility under NRHP Criterion D and/or CRHR Criterion 4 for the 45 sites situated within the APE. Evaluation and management recommendations for these resources are provided below. Ninety Seven (97) of the archaeological resources identified are recommended not eligible under NRHP and/or CRHP, and no further management is recommended.

Archaeological Survey

Phase 1 Area

A total of 13 new archaeological sites were identified and one previously recorded site was relocated within the Phase 1 area; of these, 12 are prehistoric and 2 are historic. Eight of the prehistoric sites are assumed eligible and further evaluation through an extended Class III limited subsurface testing program is recommended for sites located in non-desert pavement settings to determine eligibility for both the National Register and the California Register under Criteria D/4. The remaining 6 sites are recommended not eligible. Of those sites assumed eligible, five meet the CARIDAP criteria as described above and one warrants limited subsurface testing because these sites have the potential to yield additional information important to history and prehistory. The table below provides an outline of archaeological findings in Phase 1 area, recommended evaluations, and management of these resources. See Appendix Z – Section 5 – *Report of Findings* for individual detailed site descriptions and evaluations.

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Table 5.7-3
Archaeological Sites Within Phase 1 Area

Site Designation	Acres	Acres	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP Recommendation	Management Recommendation
CA-SBR-12991 (DRK-012)	0.8	3,090 m^2	0.4 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	5 lithic reduction loci. 109 flakes 2 Edge Modified Flake scraper 1 scraper/chopper 1 core 1 biface	Good	No	Not Eligible	None
CA-SBR-12993 (DRK-023)	0.01	63 m^2	0.2 artifacts per m^2	AP2 Lithic Scatter	12 flakes, 3 Edge Modified Flakes, 1 scraper	Good	No	Not Eligible	None
CA-SBR-13031 (KRM-024)	N/A	N/A	N/A	AP13 Trails / Linear Features	Prehistoric/Historic Trail	Poor	No	Assumed Eligible	Mitigate through further documentation
CA-SBR-13032 (KRM-028)	N/A	N/A	N/A	AP13 Trails / Linear Features	Prehistoric/Historic Trail	Good	No	Assumed Eligible	Mitigate through further Documentation
CA-SBR-13053 (RAN-011)	0.04	147 m^2	0.2 artifacts per m^2	AP2 Lithic Scatter	29 flakes 1 preform	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-3
Archaeological Sites Within Phase 1 Area
(Continued)

Site Designation	Acres	Acres	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP Recommendation	Management Recommendation
CA-SBR-13054 (RAN-025)	0.3	135 m^2	0.2 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	25 flakes 2 cores 5 shatter	Good	No	Not Eligible	None
P-36-014578 (RAN-035H)	N/A	N/A	N/A	AH16 Historic cairn / land / mine claim	1 cairn	Good	No	Not Eligible	None
CA-SBR-13096 (SGB-013)	0.3	132 m^2	0.09 artifact per m^2	AP2 Lithic Scatter	12 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13097 (SGB-017)	0.2	651m^2	0.2 artifacts per m^2	AP2 Lithic Scatter	85 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13104 (SGB-041)	0.1	463m^2	0.2 artifacts per m^2	AP2 Lithic Scatter	125 flakes 1 Edge Modified Flake 1 Biface	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13105 (SGB-097)	0.2	613m^2	0.01 artifacts per m^2	AP2 Lithic Scatter	9 Flakes	Fair	No	Not Eligible	None
CA-SBR-13106 (SGB-099)	0.04	171m^2	0.06 artifacts per m^2	AP2 Lithic Scatter AP11 Hearth/pits	6 Flakes	Fair	No	Assumed Eligible	Extended Class III Limited Subsurface Testing

Table 5.7-3
Archaeological Sites Within Phase 1 Area
(Continued)

Site Designation	Acres	Acres	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP Recommendation	Management Recommendation
CA-SBR-13107 (SGB-104)	0.03	144m²	0.2 artifacts per m²	AP2 Lithic Scatter	34 Flakes	Fair	Unlikely-eroding basalt outcrop	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-4558H	75 acres	N/A	N/A	AH9 Mines/quarries/ tailings AH4 Privies/dumps/ trash scatters AH2 Foundations/ structure pads AH6 Water conveyance system AH10 Machinery AH16 Other	The Logan Mine=2 historic refuse deposits =1000+ artifacts	Fair	Yes	Not Eligible	None

Notes:
*CARIDAP = California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatter.
**Sites with multiple loci tend to have higher densities per loci than the overall density expresses.

Table 5.7-4
Archaeological Sites Within Phase 2 Area

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13001 (DRK-133)	0.05	224 m^2	0.03 artifacts per m^2	AP2 Lithic Scatter	5 flakes 1 cobble tool 1 hammerstone	Good	No	Not Eligible	None
CA-SBR-13002/H (DRK-134/H)	0.3	6,617ft^2	0.007 artifacts per ft^2	AH4 Privies / dumps / trash scatters AP2 Lithic Scatter	16 flakes 24 historic artifacts including matchstick cans square machine-cut nails green bottle neck and base fragments clear glass railroad marbles metal wire and straps jar seal sheet metal fragments 1 three circle dragonfly ceramic bowl	Fair	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13003 (DRK-136)	0.2	1,006m^2	0.02 artifacts per m^2	AP2 Lithic Scatter	21 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13004 (DRK-139)	0.2	799m^2	0.03 artifacts per m^2	AP2 Lithic Scatter	24 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13005 (DRK-140)	1.1	4,558m^2	0.01artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	58 flakes 2 cores 1 Edge Modified Flake 1 unifacially flaked tool 2 bifacially flaked tools	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13006 (DRK-141)	0.2	780m^2	0.04 artifacts per m^2	AP2 Lithic Scatter	25 flakes 1 Edge Modified Flake 1 unifacial core tool 1 multidirectional core tool 1 Lithic reduction locus	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13007 (DRK-142)	7	29,561m²	0.02 artifacts per m²	AP2 Lithic Scatter AP12 Quarry	420 flakes 8 cores 3 hammerstones 8 Edge Modified Flake 3 bifacial tools 9 bifaces 1 utilized flake 7 Lithic reduction loci	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13008 (DRK-145)	0.4	1,566m²	0.04 artifacts per m²	AP2 Lithic Scatter AP12 Quarry	59 flakes 4 multidirectional cores 2 bifacial cores 1 unidirectional core 4 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13009 (DRK-150)	0.2	807m²	0.05 artifacts per m²	AP2 Lithic Scatter	44 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13010 (DRK-152)	0.3	1,260m^2	0.01 artifacts per m^2	AP2 Lithic Scatter	18 flakes	Good	No	Not Eligible	None
CA-SBR-13011 (DRK-153)	0.4	1,543m^2	0.02 artifacts per m^2	AP2 Lithic Scatter	32 flakes 1 biface fragment 1 utilized flake 1 unifacial scraper	Good	No	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13012H (DRK-155H)	0.4	16,124ft^2	0.002 artifacts per ft^2	AH4 Privies / dumps / trash scatters AH16 Other (fire rock ring)	38 historic artifacts including Scattered lumber and structural railroad fragments nails barrel straps cans 1 glass bottle	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13013 (DRK-160)	0.2	695m^2	0.01 artifacts per m^2	AP2 Lithic Scatter	9 flakes	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13014H (DRK-163H)	0.9	38,838ft^2	0.002 artifacts per ft^2	AH4 Privies / dumps / trash scatters	97 historic artifacts including Cans Solder seam tin Metal strappings 55 gallon drum lid 1 gallon paint can Scattered lumber 3 higher refuse concentration loci	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13015 (DRK-166)	0.6	2,512m^2	0.06 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	157 flakes 7 cores 1 Edge Modified Flake 7 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13016 (DRK-167)	0.2	508m^2	0.1 artifacts per m^2	AP2 Lithic Scatter	54 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13017H (DRK-168H)	0.5	20,368ft²	0.005 artifacts per ft²	AH4 Privies / dumps / trash scatters	102 historic artifacts including wire, tobacco tins, matchstick cans, 5 gallon barrel cans, glass, Ceramics (2 soy sauce ceramic fragments) 1 gallon led sealed can 1 shell button	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13018 (DRK-170)	0.4	1,605m²	0.05 artifacts per m²	AP2 Lithic Scatter AP12 Quarry	66 flakes 9 cores, 1 edge modified core, 2 Edge Modified Flake 2 lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13019 (DRK-171)	0.04	165m²	0.05 artifacts per m²	AP2 Lithic Scatter	8 flakes 1 core	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13020 (DRK-173)	8	20,969m^2	0.1 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry AP16 Other (Groundstone)	2,357 flakes 15 cores 4 bifacial flakes 1 hammerstone 1 chopper 1 mano 2 Edge Modified Flake 78 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13021 (DRK-174)	1	4,438m^2	0.06 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	282 flakes 9 cores 1 biface 11 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13022 (DRK-175)	0.7	2,833m^2	0.07 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	179 flakes 3 bifaces 10 cores 1 bifacial tool	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13023/H (DRK-176/H)	0.3	Locus 1 240m² Locus 2 16,361 ft²	Locus 1 0.02 per m² Locus 2 0.001 sq ft²	AH4 Privies / dumps / trash scatters AP2 Lithic Scatter AP16 Other (Ground Stone)	1 mano 1 metate 2 flakes 23 historic artifacts including Cans Bottle/jar glass fragments Iron fasteners Metal sheets 1 prehistoric locus 1 historic locus	Good	Locus 1 Yes Locus 2 No	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13024 (DRK-177)	0.06	256m²	0.1 artifacts per m²	AP2 Lithic Scatter	29 flakes 3 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13025 (DRK-178)	0.5	2,220m²	0.08 artifact per m²	AP2 Lithic Scatter AP12 Quarry	180 flakes 4 cores 7 Lithic reduction loci	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-5796 (DRK-180)	0.8	3,530m^2	0.07 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	242 flakes 9 cores 9 bifacial tools 7 lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13026 (DRK-182)	0.5	2,065m^2	0.03 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	55 flakes 2 core tools 5 cores 4 lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13027 (DRK-184)	0.03	141m^2	0.2 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	30 flakes 2 multidirectional cores 1 Lithic reduction locus	Good	No	Not Eligible	None
CA-SBR-13123 (EJK-002)	0.5	1,864m^2	0.02 per m^2	AP2 lithic scatter.	40 flakes, 3 isolated cans	Fair	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13124 (EJK-004)	2	7,237m^2	0.004 per m^2	AP2 lithic scatter.	30 biface flakes, 2 flakes, 1 isolated historic external friction lid	Poor	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13125 (EJK-005)	0.06	228m^2	0.03 artifacts per m^2	AP2 Lithic scatter	6 flakes	Good	No	Not Eligible	None
CA-SBR-13126 (EJK-009)	26	105,03m^2	0.02 per m^2	AP2 lithic scatter AP12 Quarry	1,294 sample artifacts 1 ovate biface, 1 biface core, 3 cores, 1 flakes cobble tool, 3 flaked tools, 14 bifaces, 1 scraper, 1 edge modified flake, 1 core tool 3 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13028 (KRM-002)	0.6	2,599m^2	0.02 artifacts per m^2	AP2 Lithic scatter	54 flakes 1 Lithic reduction locus	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13029 (KRM-003)	0.2	741 m^2	0.01 artifacts per m^2	AP 2 lithic scatter	9 flakes	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13030 (KRM-008)	0.5	1,982m^2	0.02 artifacts per m^2	AP 2 lithic scatter	35 flakes, 2 bifaces 2 lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13121 (KRM-133)	4	17,621m2	0.007 per m^2	AP2 lithic scatter AP12 Quarry	125 flakes, 2 cores, 2 assayed cobbles, 6 bifaces	Poor	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13033 (KRM-135)	14	57,226m^2	0.01 per m^2	AP2 lithic scatter AP12 Quarry	751 flakes, 9 bifaces, 3 cores 2 lithic scatter loci	Good	No	Not Eligible	None
CA-SBR-13034 (KRM-137)	0.1	399m^2	0.01 per m^2	AP2 lithic scatter	6 flakes	Fair	No	Not Eligible	None
CA-SBR-13035 (KRM-141)	0.07	305m^2	0.1 per m^2	AP2 lithic scatter	44 flakes	Good	No	Not Eligible	None
CA-SBR-13036 (KRM-153)	1	5,019m^2	0.01 per m^2	AP2 lithic scatter	50 flakes, 2 bifaces	Good	No	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13037 (KRM-154)	0.1	468m^2	0.006 per m^2	AP2 Lithic scatter AP13 Trails/linear earthworks AP16 Other	2 flakes, 1 biface	N/A	No	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13038 (KRM-160)	5	21,146m^2	0.03 per m^2	AP2 lithic scatter AP12 Quarry	721 flakes, 5 cores, 8 bifaces 24 Lithic reduction loci	Fair	No	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13039 (KRM-164)	1	3,845m^2	0.004 per m^2	AP2 lithic scatter	19 flakes	Fair	No	Not Eligible	None
CA-SBR-13122 (KRM-165)	0.1	518m^2	0.015 artifacts per m^2	AP2 lithic scatter	8 flakes	Fair	Yes	Not Eligible	None
CA-SBR-13040 (KRM-167)	3.3	13,469m^2	0.05 per m^2	AP2 lithic scatter. AP8 cairn/rock feature AP12 Quarry	627 flakes 7 bifaces 5 cores 28 Lithic reduction loci	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13041 (KRM-170)	21	84,034m²	0.005 per m²	AP2 lithic scatter. AP8 cairn/ rock feature AP12 Quarry	386 flakes 23 cores 3 bifaces 2 flake tools 1 hammerstone 9 Lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13042 (LTL-008)	0.7	2,7095m²	0.02 per m²	AP2 lithic scatter AP12 Quarry	58 flakes, 1 bifacial modified flake 1 core	Good	No	Not Eligible	None
CA-SBR-13043 (LTL-009)	1.1	4,703m²	0.02 per m²	AP2 lithic scatter	84 flakes, 1 edge modified biface 6 Lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13044 (LTL-011)	0.1	398m²	0.07 per m²	AP2 lithic scatter AP12 Quarry	26 flakes 1 core	Good	No	Not Eligible	None
CA-SBR-13045 (LTL-012)	0.004	14m²	0.9 m²	AP2 lithic scatter	14 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13046 (LTL-015)	0.5	2,150m^2	0.02 artifact per m^2	AP 2 lithic scatter AP12 Quarry	44 flakes core fragments 1 core 1 Lithic reduction locus	Good	No	Not Eligible	None
CA-SBR-13047 (LTL-016)	0.3	1,153m^2	0.05 artifacts per m^2	AP 2 lithic scatter AP12 Quarry	59 flakes 1 bi-directional core 3 lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-13048 (LTL-017)	0.09	386m^2	0.11 artifacts per m^2	AP 2 lithic scatter	45 flakes 1 early stage biface	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13049 (LTL-018)	2	7989m^2	0.008 artifacts per m^2	AP 2 lithic scatter	69 flakes 2 Lithic reduction locus	Good	No	Not Eligible	None
CA-SBR-13050 (LTL-019)	0.03	1,216m^2	0.009 artifacts per m^2	AP 2 lithic scatter	12 flakes	Good	No	Not Eligible	None
CA-SBR-13051 (LTL-022)	0.03	111m^2	0.1 per m^2	AP2 lithic scatter	13 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13052 (LTL-023)	0.09	349m²	0.03 per m²	AP2 lithic scatter	10 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13055 (RAN-101)	0.7	2,804m²	0.009 per m²	AP2 lithic scatter AP11 Hearths / pits AP12 Quarry	91 flakes; 1 core, 2 flake tools 2 Lithic reduction loci 1 hearth	Fair	No	Not Eligible	None
CA-SBR-13057 (RAN-107)	0.4	1,786m²	0.003 per m²	AP2 lithic scatter	1 core; 6 flakes	Fair	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13058 (RAN-110)	0.4	1,691m²	0.006 per m²	AP2 lithic scatter	2 cores; 11 flakes	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13059 (RAN-114)	10	40,572m²	0.008 per m²	AP2 Lithic scatter AP12 Quarry	292 flakes, 16 cores, 1 tested cobble, 2 core fragments, 4 bifaces, 4 stone tools 17 lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13060 (RAN-116)	0.4	1,712m²	0.02 per m²	AP2 Lithic scatter AP12 Quarry	32 flakes, 1 core, 1 hammerstone 1 Lithic reduction locus	Fair	No	Not Eligible	None
CA-SBR-13061 (RAN-118)	6	25,036m²	0.01 per m²	AP2 lithic scatter AP12 Quarry	247 flakes, 31 cores, 10 core fragments, 1 Edge Modified Flake 11 lithic reduction loci	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13062 (RAN-120)	12.16	49,223m^2	0.01 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	554 flakes, 66 cores (bifacial and multidirectional) 1 biface 29 lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13063 (RAN-123)	0.01	50m^2	0.2 per m^2	AP2 Lithic scatter	17 flakes	Fair	No	Not Eligible	None
CA-SBR-13064 (RAN-128)	0.8	3,341m^2	0.008 per m^2	AP2 Lithic scatter AP12 Quarry	28 flakes 1 core/chopper 2 cores 1 lithic reduction locus	Good	No	Not Eligible	None
CA-SBR-13065 (RAN-131)	0.03	123m^2	0.06 artifacts per m^2	AP2 Lithic scatter	10 flakes 1 chopper core tool 1 lithic reduction locus	Good	No	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13066 (RAN-138)	0.60	2,459m^2	0.002 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	6 flakes 7 cores 1 bottle base 1 hole in top can	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13067 (RAN-139)	0.14	569m^2	0.03 artifacts per m^2	AP2 lithic scatter AP12 Quarry	16 flakes 3 core fragments 2 tested cobbles 2 loci	Fair	No	Not Eligible	None
CA-SBR-13068 (RAN-146)	0.006	26m^2	0.8 per m^2	AP2 Lithic scatter AP12 Quarry	20 flakes 1 core	Fair	No	Not Eligible	None
CA-SBR-13069 (RAN-154)	0.05	223m^2	0.05 per m^2	AP2 Lithic scatter	12 flakes	Fair	No	Not Eligible	None
CA-SBR-13070 (RAN-155)	1.6	6,440m^2	0.01 per m^2	AP2 lithic scatter AP12 Quarry	120 flakes 14 cores 4 Lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13071 (RAN-163)	0.4	1,446m^2	0.03 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	46 flakes 10 cores 1 tested cobble 3 lithic reduction areas	Fair	No	Not Eligible	None
CA-SBR-13072 (RAN-168)	0.06	241m^2	0.03 per m^2	AP2 lithic scatter	7 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13073 (RAN-169)	0.2	697m^2	0.04 per m^2	AP2 lithic scatter	27 flakes 2 cores (1 bifacial)	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13074 (RAN-170)	0.5	1,887m^2	0.08 per m^2	AP2 lithic scatter	142 flakes 2 biface fragments	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13075 (RAN-171)	0.08	316m^2	0.2 per m^2	AP2 Lithic scatter AP16 Other (abrader)	70 flakes 1 core 1 projectile point 1 abrader 5 bifaces	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13076 (RAN-173)	10	39,138m^2	0.02 per m^2	AP2 Lithic scatter AP12 Quarry	570 flakes 70 cores 1 biface core 7 shatter 12 Lithic reduction loci	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13077 (RAN-175)	0.01	62m^2	0.2 per m^2	AP2 lithic scatter	11 flakes	Good	No	Not Eligible	None
CA-SBR-13078 (RAN-177)	0.2	964m^2	0.05 per m^2	AP2 lithic scatter	44 flakes	Good	No	Not Eligible	None
CA-SBR-13079 (RAN-179)	0.1	586m^2	0.04 per m^2	AP2 Lithic scatter AP12 Quarry	20 flakes 2 cores	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13080 (RAN-180)	0.1	518m^2	0.007 per m^2	AP2 lithic scatter	35 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13081 (RAN-181)	0.01	57m^2	0.2 per m^2	AP2 lithic scatter	9 flakes	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13082 (RAN-183)	0.5	2,130m^2	0.02 per m^2	AP2 lithic scatter AP12 Quarry AH16 Other (rock cairn)	33 flakes 6 cores 1 historic rock cairn 1 lithic reduction locus	Good	No	Not Eligible	None
CA-SBR-13083 (RAN-186)	0.003	13m^2	0.7 per m^2	AP2 lithic scatter	11 flakes	Good	No	Not Eligible	None
CA-SBR-13084 (RAN-188)	0.1	542m^2	0.06 per m^2	AP2 lithic scatter	32 flakes 1 shatter	Fair	No	Not Eligible	None
CA-SBR-13085 (RAN-190)	0.3	1,305 m^2	0.008m^2	AP2 Lithic scatter AP12 Quarry	8 flakes 2cores	Good	No	Not Eligible	None
CA-SBR-13086 (RSS-005)	0.7	2,711m^2	0.007 artifacts per m^2	AP2 Lithic scatter	19 flakes 1 assayed cobble	Fair	No	Not Eligible	None
CA-SBR-13087 (RSS-006)	0.05	185m^2	0.03 artifacts per m^2	AP2 Lithic scatter	6 flakes	Good	No	Not Eligible	None
CA-SBR-13088 (RSS-008)	0.5	1,983m^2	0.036 artifacts per m^2	AP2 Lithic scatter	96 flakes 4 lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13089 (RSS-009)	0.07	246m^2	0.02 artifacts per m^2	AP2 Lithic scatter	5 flakes 1 biface	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13090 (RSS-011)	1.31	5,287m^2	0.04 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	208 flakes, 4 cores, 1 core/tool, 1 scraper 1 expedient tool. 4 lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13091 (RSS-013)	0.31	1,249m^2	0.03 artifacts per m^2	AP2 Lithic scatter	55 flakes 1 flake tool 2 lithic reduction loci	Fair	No	Not Eligible	None
CA-SBR-13092 (RSS-014)	4	15,103m^2	0.03 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	590 flakes 1 hammerstone fragment 2 flake tools 1 scraper 1 core 12 lithic reduction loci	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13093 (RSS-017)	5.16	20,869m^2	0.037 artifacts per m^2	AP 2 Lithic scatter AP 8 Cairns /rockfeatures AP11 Hearth / pits AP 16 Other (cleared circles)	750 flakes 2 scraper, 2 flake tools, 3 biface, 1 unifacial, 2 assayed cobbles, 1 multi-core, 22 collapsed cairns, 2 cleared circles, 1 hearth 21 lithic reduction loci	Good	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13094 (RSS-018)	2	7,508m^2	0.02 artifacts per m^2	AP 2 Lithic scatter	146 flakes, 1 core, 1 scraper, 1 flake tool	Good	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13108/H (SGB-112/H)	25.24	Undeter-mined	Undetermined	AP2 Lithic Scatter AP12 Quarry AH 4 Privies / dumps / trash scatters AH16 Other (rock cairn)	198 flakes, 2 core tools, 1 flake tool 1 biface fragment 6 cores 1,000+ historic artifacts consisting of 300 pieces of bottle glass 150 cans 40 pieces of ceramic tableware wood and metal construction artifacts metal frames masonry 9 historic refuse scatter loci 14 lithic reduction loci	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13109 (SGB-114)	1.13	4,549m^2	0.006 artifacts per m^2	AP2 Lithic Scatter AP16 Other (groundstone)	27 flakes 1 bifacial tool 1 core tool 1 metate fragment	Fair	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13110 (SGB-118)	0.05	197m^2	0.05 artifacts per m^2	AP 2 Lithic Scatter	11 flakes	Fair	No	Not Eligible	None
CA-SBR-13111 (SGB-120)	0.44	1,089m^2	0.05 artifacts per m^2	AP 2 Lithic Scatter	55 flakes	Fair	No	Not Eligible	None
CA-SBR-13112 (SGB-127)	0.53	2,135m^2	0.007 artifacts per m^2	AP 2 Lithic Scatter	15 flakes 1 utilized flake	Fair	No	Not Eligible	None
CA-SBR-1908	119.06	481,827.63m^2	0.013 artifacts per m^2	AP2 Lithic scatter, AP8 Cairns/rock features AP11 Hearth/pits AP12 Quarry, AH4Privies / dumps / trash scatter	6,310 artifacts including 306 locus, 1historic trash scatter 234 point provenienced artifacts	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-3076 (EJK-021)	3	11,677m^2	0.002 artifacts per m^2	AP2 Lithic scatter	30 flakes 1 biface 1 Edge Modified Flake	Poor	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-4681 (RAN 102)	6.2	25,121m^2	0.002 artifacts per m^2	AP2 Lithic scatter AP11 Hearth/pits AP12 Quarry	333 flakes 16 cores 1 flake tool 14 lithic reduction loci	Good	No	Not Eligible	None
CA-SBR-5600 (RAN-189)	4.6	18,753m^2	0.004 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	200 flakes, 12 cores 1 biface 8 lithic reduction loci	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-6528 (RSS-020)	12.06	48,841m^2	0.01 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	530 flakes 1 projectile point (pinto shoulderless), 8 bifaces, 2 unifaces, 1 drill, 1 assayed boulder, 1 multi-directional core 1 Lithic reduction locus	Fair	No	Not Eligible	None

Table 5.7-4
Archaeological Sites Within Phase 2 Area
(Continued)

Site Designation	Acres	Area	Overall Site Density	Site Classification(s)*	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-6521	7	28,188m^2	0.01 artifacts per m^2	AP 2 lithic scatter AP12 Quarry AH16 Other (cairns)	281 flakes 5 cores, 2 core fragments, 1 biface, 2 tested cobbles, 2 rock cairn features 11 Lithic reduction loci	Good	No	Not Eligible	None

Notes:
*CARIDAP = California Archaeological Identification and Data Acquisition Program: Sparse Lithic Scatters.
**Sites with multiple loci tend to have higher densities per loci than the overall density expresses.

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Pisgah Substation Triangle Area

A total of 6 new archaeological sites were identified and 2 previously recorded sites were located within the Pisgah Substation Triangle Area; of these, 6 are prehistoric sites and 1 is historic. The 2 updated sites (CA-SBR-6512 and -6513) were found to have a greater extent than previously recorded, which required both sites to be combined as a single site. Three prehistoric sites are assumed eligible and further evaluation through an extended Class III limited subsurface testing plan for sites located in non-desert pavement is recommended to determine eligibility for both the National Register and the California Register under Criteria D/4. The remaining sites are recommended not eligible. All three sites assumed eligible meet the CARIDAP criteria for further evaluation. The table below provides an outline of archaeological findings in the Pisgah Substation Triangle area, recommended evaluations and management resources. See Confidential Technical Report Appendix Z – Section 5 – *Report of Findings* for individual, detailed site descriptions and evaluations.

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Table 5.7-5
Archaeological Sites within the Pisgah Substation Triangle Area

Site Designation	Acres	Area	Overall Site Density**	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13098 (SGB-024)	0.2	16.5 m^2	0.8 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	13 Flakes	Good	No	Not Eligible	None
CA-SBR-13099 (SGB-032)	0.08	341 m^2	0.05 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	20 Flakes 1 Core 1 Edge Modified Flake	Good	No	Not Eligible	None
CA-SBR-13100 (SGB-034)	0.1	524 m^2	0.2 artifacts per m^2	AP2 Lithic Scatter	120 flakes and shatter	Fair	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13101 (SGB-036H)	0.007	9,413 sq. feet	0.003 artifacts per sq. foot	AH4 Privies/dumps/trash scatters	18 bottles/cans	Good	Yes	Not Eligible	None
CA-SBR-13102 (SGB-037)	0.03	126 m^2	0.1 artifacts per m^2	AP2 Lithic Scatter	13 flakes	Poor	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13103 (SGB-038)	0.2	1,020 m^2	0.05 artifacts per m^2	AP2 Lithic Scatter	50 flakes 1 biface 1 cobble tool	Fair	Yes	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-5
Archaeological Sites within the Pisgah Substation Triangle Area
(Continued)

Site Designation	Acres	Area	Overall Site Density**	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-6512 and CA-SBR-6513 (SGB-028)	31	125,949m2	0.003 artifacts per m2	AP2 Lithic Scatter AP12 Quarry	23 lithic reduction loci 410 flakes 1 hammerstone 3 cores 3 biface	Good	No	Not Eligible	None

Notes:
*CARIDAP = California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatter.
**Sites with multiple loci tend to have higher densities per loci than the overall density expresses.

Access Roads Corridors and Bridge Crossing

A total of 8 new archaeological sites were identified within proposed Access Corridors. Of these, 4 are historic, 3 are prehistoric, and 1 is multi-component. All sites are recommended not eligible. The table below provides an outline of archaeological finds in the Access Road Corridors, recommended evaluations and management resources. See Appendix Z – Section 5 – *Report of Findings* for individual, detailed site descriptions and evaluations.

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Table 5.7-6
Archaeological Sites Within Access Road Corridors

Site Designation	Acres	Area	Overall Site Density**	Site Classification	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-12995 (DRK-045)	0.1251	506m^2	0.02 artifacts per m^2	AP2 Lithic Scatter	1 Biface, 3 choppers, 1 Edge Modified Flake , 1 scraper, 1 hammer stone, 1 core, 1 flake	Good	No	Not Eligible	None
CA-SBR-12996H (DRK-110H)	0.5	20,883ft^2	0.002 artifacts per ft^2	AH4 Privies /dumps/ trash scatters	Primarily consists of sanitary meat/veg. cans and hole-in-top, low density of glass and ceramics	Good	No	Not Eligible	None
CA-SBR-12997/H (DRK-111/H)	0.08	324	0.003 artifacts per ft^2	AH4 Privies / dumps/ trash scatters AP2 Lithic Scatter	Historic can scatter (matchstick, hole-in-top, sanitary) and 1 glass marble. Lithic scatter (11 banded red/blk chert flakes and 1 Edge Modified Flake	Good	Unlikely-desert pavement	Not Eligible	None

Table 5.7-6
Archaeological Sites Within Access Road Corridors
(Continued)

Site Designation	Acres	Area	Overall Site Density**	Site Classification	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
P-36-014519 (DRK-112H)	0.002	7	N/A	AH16 Other (Rock Cairn)	Historic/Modern cairn that measures 55ft. (N/S) x 5ft.6" (E/W) x 1ft.5" (H) and contains two layers of small to large sub-rounded to sub-angular cobbles	Good	No	Not Eligible	None
P-36-014520 (DRK-113H)	0.002	7	N/A	AH16 Other (Rock Cairn)	Historic/Modern rock cairn that measures 19" (N/S) x 21"(E/W) x 7"(H) and has one layer of small to large sub-rounded to sub-angular cobbles	Good	No	Not Eligible	None
CA-SBR-12998 (DRK-114)	0.002	9	0.8 artifacts per m^2	AP 2 Lithic Scatter	7 debitage	Good	Unlikely-Desert Pavement	Not Eligible	None

Table 5.7-6
Archaeological Sites Within Access Road Corridors
(Continued)

Site Designation	Acres	Area	Overall Site Density**	Site Classification	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-12999H (DRK-115H)	0.03	1403ft^2	0.9 artifacts per m^2	AH 4 Privies / dumps/ trash scatters	26 cans were identified including matchstick cans, sanitary cans, tobacco tins, a spice tin, machine parts and metal fragments	Fair	No	Not Eligible	None
CA-SBR-13000 (DRK-116)	0.008	32m^2	0.8 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	2 choppers, 4 Edge Modified Flake s, 1 scaper, 1 biface, 1 core, 30 flakes	Good	No	Not Eligible	None

Notes:
*CARIDAP = California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatter.
**Sites with multiple loci tend to have higher densities per loci than the overall density expresses.

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Archaeological Sites within the 200-Foot Buffer

A total of 5 new archaeological sites were identified within the 200-foot buffer. Of these, 4 are prehistoric and 1 historic. All sites are recommended not eligible. The table below provides an outline of archaeological findings within the 200-foot buffer, recommended evaluations and management resources. See Appendix Z – Section 5 – *Report of Findings* for individual, detailed site descriptions and evaluations.

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Table 5.7-7
Archaeological Sites Within the 200-Foot Archaeological Buffer

Site Designation	Acres	Area	Overall Site Density**	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-12990 (DRK-001)	0.1	545m^2	0.6 artifacts per m2	AP2 Lithic scatter AP12 Quarry	34 flakes 1 core	Good	No	Not Eligible	None
CA-SBR-12992H (DRK-021H)	1	48,502 sq ft	0.02 artifacts per ft^2	AH4 Privies / dumps / trash scatters	Historic can scatter	Good	No	Not Eligible	None
CA-SBR-12994 (DRK-026)	0.1	596m^2	0.04 artifacts per m^2	AP2 Lithic scatter	27 flakes 1 scraper 6 edge modified flakes	Good	No	Not Eligible	None
CA-SBR-13120 (KRM-131)	0.3	1,443m2	0.013 artifacts per m^2	AP2 Lithic Scatter AP12 Quarry	15 flakes 1 biface 1 edge modified flake 3 cores	Poor	No	Not Eligible	None
CA-SBR-13056 (RAN-108)	0.254	1,568m^2	0.004 artifacts per m^2	AP2 Lithic scatter AP12 Quarry	6 flakes and 1 core	Fair	No	Not Eligible	None

Notes:
*CARIDAP = California Archaeological Resource Identification and Data Acquisition Program: Sparse Lithic Scatter.
**Sites with multiple loci tend to have higher densities per loci than the overall density expresses.

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Archaeological Sites within Not A Part (NAP) Areas

A total of 2 new archaeological sites were identified within those parcels that fall within the NAP sections, in which ROE was granted. See Section 1 (Introduction) for further detail regarding NAP areas. The 2 newly-identified sites are prehistoric and 1 is assumed eligible for listing on both the National Register and the California Register under Criteria D/4. The table below provides an outline of archaeological findings within the NAP area and recommended evaluations. See Confidential Technical Report Appendix Z – Section 5 – *Report of Findings* for individual detailed site descriptions and evaluations.

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Table 5.3-8
Archaeological Sites Within the NAP Areas

Site Designation	Acres	Area	Overall Site Density**	Site Classification(s)	Cultural Constituents	Integrity	Potential for Subsurface Deposition	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13095 (SGB-007)	0.2	849 m^2	0.02 artifacts per m^2	AP2 Lithic scatter AP3 Ceramic scatter	33 Flakes	1 Ceramic Sherd	Yes	Assumed Eligible	Out of the APE - None
CA-SBR-13113 (SM-027)	0.06	239m^2	0.02 artifacts per m^2	AP2 Lithic Scatter	6 Flakes	Good	No	Not Eligible	None

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Isolates

A total of 247 isolated archaeological resources were identified during the course of the Class III Intensive Field Survey. Isolates are typically considered ineligible resources under NRHP, CRHR, and/or local registers, because such finds generally, have low-likelihood for subsurface deposition, represent single, isolated events, and/or are not in situ and lack context. As a result, data potential is considered exhausted through recordation.

The table below provides a list of all isolates recorded (Figure 6.3.4-1 Appendix Z – Confidential Appendix A).

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-064407	AP16 Isolate	5 CCS Flakes	No	No	10/5/2008
P-36-014638 (DRK-ISO-005)	AP16 Isolate	1 Flake CCS Chert	No	No	8/7/2008
P-36-014639 (DRK-ISO-008)	AP16 Isolate	1 Flake CCS Chert	No	No	8/7/2008
P-36-014640 (DRK-ISO-010)	AP16 Isolate	1 Flake CCS Chert	No	No	8/8/2008
P-36-01641 (DRK-ISO-011)	AP16 Isolate	1 Biface CCS Chert	No	No	8/9/2008
P-36-014642 (DRK-ISO-016)	AP16 Isolate	1 Biface fragment and shatter CCS Chert	No	No	8/12/2008
P-36-014643 (DRK-ISO-022)	AP16 Isolate	1 Biface CCS Chalcedony	No	No	8/19/2008
P-36-014644 (DRK-ISO-117)	AP16 Isolate	1 Flake CCS Chert	No	No	9/19/2008
P-36-014645 (DRK-ISO-118)	AP16 Isolate	1 Flake CCS Chert	No	No	9/19/2008
P-36-014646 (DRK-ISO-119)	AP16 Isolate	1 Flake, biface fragment (tip) CCS Chert	No	No	9/19/2008
P-36-014647 (DRK-ISO-132)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/5/2008
P-36-014648 (DRK-ISO-138)	AP16 Isolate	4 Flakes CCS Jasper	No	No	10/7/2008
P-36-014649 (DRK-ISO-144)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/8/2008
P-36-014650 (DRK-ISO-147)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/10/2008
P-36-014651 (DRK-ISO-148)	AP16 Isolate	1 Flake CCS Chert	No	No	10/10/2008
P-36-014652 (DRK-ISO-149)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/10/2008
P-36-014653 (DRK-ISO-151)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/10/2008
P-36-014654 (DRK-ISO-154)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/10/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014655 (DRK-ISO-157)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/15/2008
P-36-014656 (DRK-ISO-158)	AP16 Isolate	1 Flake Basalt	No	No	10/15/2008
P-36-014657 (DRK-ISO-161)	AP16 Isolate	4 Flakes CCS Jasper	No	No	10/16/2008
P-36-014658 (DRK-ISO-162)	AP16 Isolate	3 Flakes CCS Jasper 1 Biface tip CCS Jasper	No	No	10/17/2008
P-36-014659 (DRK-ISO-164)	AP16 Isolate	1 Biface CCS Jasper 1Flake CCS Jasper	No	No	10/17/2008
P-36-014660 (DRK-ISO-165)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/17/2008
P-36-014661 (DRK-ISO-169)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/20/2008
P-36-014662 (DRK-ISO-172)	AP16 Isolate	1 Flake CCS Chert	No	No	10/20/2008
P-36-014663 (DRK-ISO-181)	AP16 Isolate	1 Core CCS Jasper 3 Flakes CCS Jasper 1 Flake Rhyolite	No	No	10/28/2008
P-36-014664 (EJK-ISO-001)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/25/2008
P-36-014665 (EJK-ISO-003)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/26/2008
P-36-014666 (EJK-ISO-007)	AP16 Isolate	2 Flakes CCS Chalcedony 1 Flake CCS Jasper	No	No	10/26/2008
P-36-014667 (EJK-ISO-008)	AP16 Isolate	2 Flakes CCS Jasper 1 Flake CCS Chalcedony	No	No	10/26/2008
P-36-014668 (EJK-ISO-010)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/28/2008
P-36-014669 (EJK-ISO-011)	AP16 Isolate	2 Flakes CCS Jasper 2 Flakes CCS Chalcedony	No	No	10/28/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014670 (EJK-ISO-014)	AP16 Isolate	1 Flakes CCS Chert 1 Flake CCS Chalcedony 1 Flake CCS Jasper	No	No	10/28/2008
P-36-014671 (EJK-ISO-017)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/30/2008
P-36-014672 (EJK-ISO-018)	AP16 Isolate	2 Flakes CCS Chalcedony 2 Flakes CCS Jasper	No	No	10/30/2008
P-36-014673 (EJK-ISO-019)	AP16 Isolate	1 Flake CCS Chert	No	No	10/30/2008
P-36-014674 (EJK-ISO-020)	AP16 Isolate	3 Flakes CCS Chalcedony 1 Flake CCS Jasper	No	No	10/30/2008
P-36-014675 (KRM-ISO-001)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/5/2008
P-36-014676 (KRM-ISO-004)	AP16 Isolate	5 debitage CCS	No	No	8/6/2008
P-36-014677 (KRM-ISO-005)	AP16 Isolate	1 scraper tool CCS Chalcedony	No	No	8/7/2008
P-36-014678 (KRM-ISO-006)	AP16 Isolate	2 Flakes CCS Chert	No	No	8/7/2008
P-36-014679 (KRM-ISO-007)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/8/2008
P-36-014680 (KRM-ISO-009)	AP16 Isolate	1 Core CCS Chalcedony	No	No	8/8/2008
P-36-014681 (KRM-ISO-010)	AP16 Isolate	3 flakes CCS Chalcedony/Chert	No	No	8/8/2008
P-36-014682 (KRM-ISO-011)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/8/2008
P-36-014683 (KRM-ISO-012)	AP16 Isolate	2 Flakes CCS Chert	No	No	8/8/2008
P-36-014684 (KRM-ISO-013)	AP16 Isolate	1 Debitage, 1 Biface CCS Chert	No	No	8/8/2008
P-36-014685 (KRM-ISO-014)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/8/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014686 (KRM-ISO-015)	AP16 Isolate	2 Flakes CCS Chalcedony	No	No	8/8/2008
P-36-014687 (KRM-ISO-016)	AP16 Isolate	1 Flake CCS Chert	No	No	8/9/2008
P-36-014688 (KRM-ISO-017)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/9/2008
P-36-014689 (KRM-ISO-018)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/9/2008
P-36-014690 (KRM-ISO-019)	AP16 Isolate	5 Flakes CCS Chalcedony Chert/Chalcedony	No	No	8/9/2008
P-36-014691 (KRM-ISO-020)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/9/2008
P-36-014692 (KRM-ISO-021)	AP16 Isolate	1 Preform CCS Chert	No	No	8/9/2008
P-36-014693 (KRM-ISO-022)	AP16 Isolate	2 Flakes CCS Chert	No	No	8/9/2008
P-36-014694 (KRM-ISO-025)	AP16 Isolate	Distal end of Projectile Point CCS Jasper	No	No	8/13/2008
P-36-014695 (KRM-ISO-027)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/19/2008
P-36-014893 (KRM-ISO-130)	AP16 Isolate	1 Early Stage Biface CCS Chalcedony 1 Flake CCS Chalcedony	No	No	10/6/2002
P-36-014894 (KRM-ISO-132)	AP16 Isolate	2 Flakes CCS Chalcedony	No	No	10/6/2008
P-36-014696 (KRM-ISO-134)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/2/2008
P-36-014697 (KRM-ISO-136)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/9/2008
P-36-014698 (KRM-ISO-138)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/9/2008
P-36-014699 (KRM-ISO-139)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/9/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014700 (KRM-ISO-140)	AP16 Isolate	1 Flake CCS Chert	No	No	10/9/2008
P-36-014701 (KRM-ISO-142)	AP16 Isolate	2 Flakes CCS Chalcedony 2 Flakes CCS Chert	No	No	10/9/2008
P-36-014702 (KRM-ISO-143)	AP16 Isolate	3 Flakes CCS Chalcedony	No	No	10/9/2008
P-36-014703 (KRM-ISO-144)	AP16 Isolate	2 Flakes CCS Chalcedony 1 Flake CCS Chert	No	No	10/9/2008
P-36-014704 (KRM-ISO-145)	AP16 Isolate	2 Flakes CCS Chalcedony	No	No	10/9/2008
P-36-014705 (KRM-ISO-146)	AP16 Isolate	1 Flake CCS Chert 1 Flake CCS Chalcedony	No	No	10/9/2008
P-36-014706 (KRM-ISO-147)	AP16 Isolate	1 Flake CCS Chert	No	No	10/9/2008
P-36-014707 (KRM-ISO-148)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/9/2008
P-36-014874 (KRM-ISO-151)	AP16 Isolate	3 Flakes CCs Chalcedony	No	No	10/15/2008
P-36-014895 (KRM-ISO-152)	AP16 Isolate	1 Flake CCs Jasper	No	No	10/15/2008
P-36-014708 (KRM-ISO-155)	AP16 Isolate	2 Flakes CCS Chalcedony 1 Flake CCS Jasper	No	No	10/15/2008
P-36-014709 (KRM-ISO-156)	AP16 Isolate	4 Flakes CCS Chalcedony 1 Flake CCS Chert	No	No	10/15/2008
P-36-014710 (KRM-ISO-157)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/15/2008
P-36-014711 (KRM-ISO-158)	AP16 Isolate	1 Flake 1 Shatter CCS Jasper	No	No	10/15/2008
P-36-014712 (KRM-ISO-159)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/15/2008
P-36-014713 (KRM-ISO-161)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/27/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014714 (KRM-ISO-163)	AP16 Isolate	1 Debitage CCS Jasper	No	No	10/28/2008
P-36-014715 (KRM-ISO-166)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/28/2008
P-36-014716 (KRM-ISO-171)	AP16 Isolate	1 Biface, 2 Flakes, 1 Shatter CCS Jasper	No	No	11/6/2008
P-36-019824 (KRM-ISO-172)	AP16 Isolate	1 Flake CCS Japer	No	No	11/6/2008
P-36-014717 (KRM-ISO-173)	AP16 Isolate	1 Flake CCS Chalcedony 1 Biface CCS Jasper	No	No	11/6/2008
P-36-014718 (LTL-ISO-010)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/28/2008
P-36-014719 (LTL-ISO-013)	AP16 Isolate	4 flakes, 1 EMF CCS Jasper	No	No	10/28/2008
P-36-014720 (LTL-ISO-020)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/30/2008
P-36-014721 (LTL-ISO-021)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/30/2008
P-36-014722 (RAN-ISO-001)	AP16 Isolate	1 CCS Flake	No	No	8/5/2008
P-36-014723 (RAN-ISO-002)	AP16 Isolate	1 Complete Quartz Crystal	No	No	8/5/2008
P-36-014896 (RAN-ISO-003)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/5/2008
P-36-014724 (RAN-ISO-004)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/5/2008
P-36-014725 (RAN-ISO-005)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/5/2008
P-36-014726 (RAN-ISO-006)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/5/2008
P-36-014727 (RAN-ISO-007)	AP16 Isolate	1 Flake CCS Chert	No	No	8/5/2008
P-36-014728 (RAN-ISO-008)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/6/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014729 (RAN-ISO-009)	AP16 Isolate	1 Scraper CCS Jasper	No	No	8/6/2008
P-36-014730 (RAN-ISO-010)	AP16 Isolate	1 Quartz Mano	No	No	8/6/2008
P-36-014731 (RAN-ISO-012)	AP16 Isolate	1 Scraper CCS Chert	No	No	8/7/2008
P-36-014732 (RAN-ISO-013)	AP16 Isolate	1 Flake CCS Chert	No	No	8/7/2008
P-36-014733 (RAN-ISO-014)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/8/2008
P-36-014734 (RAN-ISO-015)	AP16 Isolate	1 Flake CCS Chert	No	No	8/8/2008
P-36-014735 (RAN-ISO-016)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/9/2008
P-36-014736 (RAN-ISO-017)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/9/2008
P-36-014737 (RAN-ISO-018)	AP16 Isolate	1 Projectile Point CCS Chalcedony	No	No	8/9/2008
P-36-014738 (RAN-ISO-019)	AP16 Isolate	1 Chopper CCS Chert	No	No	8/10/2008
P-36-014739 (RAN-ISO-020)	AP16 Isolate	1 Flake CCS Chert/Jasper	No	No	8/10/2008
P-36-014740 (RAN-ISO-021)	AP16 Isolate	1 Core CCS Chert	No	No	8/10/2008
P-36-014741 (RAN-ISO-022)	AP16 Isolate	1 Core CCS Chalcedony	No	No	8/10/2008
P-36-014742 (RAN-ISO-023)	AP16 Isolate	1 Exhausted Core CCS	No	No	8/11/2008
P-36-014743 (RAN-ISO-024)	AP16 Isolate	1 Piece of Debitage CCS Chert	No	No	8/11/2008
P-36-014744 (RAN-ISO-027)	AP16 Isolate	1 CCS chopper	No	No	8/18/2008
P-36-014745 (RAN-ISO-028)	AP16 Isolate	1 Piece of Debitage Quartz	No	No	8/22/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014746 (RAN-ISO-029)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/24/2008
P-36-014747 (RAN-ISO-030)	AP16 Isolate	1 CCS Biface CCS Jasper	No	No	8/24/2008
P-36-014748 (RAN-ISO-031)	AP16 Isolate	1 Cottonwood projectile point CCS Chert	No	No	8/24/2008
P-36-014749 (RAN-ISO-032)	AP16 Isolate	1 Flake CCS Chert	No	No	8/24/2008
P-36-014750 (RAN-ISO-033)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/24/2008
P-36-014751 (RAN-ISO-034)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/24/2008
P-36-014752 (RAN-ISO-036)	AP16 Isolate	1 Bifacial flake CCS Chert	No	No	8/26/2008
P-36-014753 (RAN-ISO-091)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/1/2008
P-36-014754 (RAN-ISO-092)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/1/2008
P-36-014755 (RAN-ISO-097)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/1/2008
P-36-014756 (RAN-ISO-098)	AP16 Isolate	1 Flake CCs Chalcedony	No	No	10/3/2008
P-36-014757 (RAN-ISO-099)	AP16 Isolate	1 E MF CCS Jasper	No	No	10/3/2008
P-36-014758 (RAN-ISO-100)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/4/2008
P-36-014759 (RAN-ISO-103)	AP16 Isolate	1 Flake CCS Chert	No	No	10/5/2008
P-36-014760 (RAN-ISO-104)	AP16 Isolate	1 Flake Basalt	No	No	10/7/2008
P-36-014761 (RAN-ISO-105)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/7/2008
P-36-014762 (RAN-ISO-106)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/7/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014763 (RAN-ISO-109)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/7/2008
P-36-014764 (RAN-ISO-111)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/7/2008
P-36-014765 (RAN-ISO-113)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/7/2008
P-36-014977 (RAN-ISO-119)	AP16 Isolate	1 Flake CCS Chert	No	No	10/18/08
P-36-014766 (RAN-ISO-124)	AP16 Isolate	1 Flake CCS Chert	No	No	10/18/2008
P-36-014767 (RAN-ISO-125)	AP16 Isolate	1 Flake CCS Chert	No	No	10/18/2008
P-36-014768 (RAN-ISO-126)	AP16 Isolate	1 Core 1 Flake CCS Jasper	No	No	10/18/2008
P-36-014769 (RAN-ISO-129)	AP16 Isolate	1 Flake Metasedimentary	No	No	10/18/2008
P-36-014770 (RAN-ISO-130)	AP16 Isolate	1 Core 2 Flakes CCS Jasper	No	No	10/18/2008
P-36-014771 (RAN-ISO-132)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/19/2008
P-36-014772 (RAN-ISO-136)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/19/2008
P-36-014773 (RAN-ISO-137)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/20/2008
P-36-014774 (RAN-ISO-140)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/20/2008
P-36-014775 (RAN-ISO-141)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/20/2008
P-36-014776 (RAN-ISO-143)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/20/2008
P-36-014777 (RAN-ISO-144)	AP16 Isolate	1 Flake CCS	No	No	10/21/2008
P-36-014778 (RAN-ISO-145)	AP16 Isolate	2 Flakes 1 Bifacial flake, 1 Core CCS Jasper	No	No	10/21/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014779 (RAN-ISO-148)	AP16 Isolate	2 Flakes CCS Jasper 1 Core CCS Chalcedony	No	No	10/21/2008
P-36-014780 (RAN-ISO-149)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/21/2008
P-36-014781 (RAN-ISO-150)	AP16 Isolate	1 Flake CCS Chert	No	No	10/21/2008
P-36-014782 (RAN-ISO-151)	AP16 Isolate	5 Flakes CCS Jasper	No	No	10/21/2008
P-36-014783 (RAN-ISO-152)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/21/2008
P-36-014784 (RAN-ISO-153)	AP16 Isolate	5 Flakes CCS Jasper	No	No	10/21/2008
P-36-014785 (RAN-ISO-156)	AP16 Isolate	1 Core 3 Flakes CCS Jasper	No	No	10/21/2008
P-36-014786 (RAN-ISO-157)	AP16 Isolate	1 Core CCS Jasper	No	No	10/21/2008
P-36-014787 (RAN-ISO-158)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/22/2008
P-36-014788 (RAN-ISO-160)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/23/2008
P-36-014789 (RAN-ISO-161)	AP16 Isolate	1 Core Quartzite	No	No	10/23/2008
P-36-014790 (RAN-ISO-162)	AP16 Isolate	1 Biface Fragment CCS Jasper	No	No	10/23/2008
P-36-014791 (RAN-ISO-165)	AP16 Isolate	1 Core 1 Flake Refit CCS Jasper	No	No	10/26/2008
P-36-014792 (RAN-ISO-166)	AP16 Isolate	1 Flake 1 Biface CCS Jasper/Chalcedony	No	No	10/26/2008
P-36-014793 (RAN-ISO-167)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/26/2008
P-36-014794 (RAN-ISO-172H)	AH16 Isolate	1 Complete amethyst Bottle base mark (Ehmann Olive Oil/Ehmann Olive Oil/Oroville, California)	No	No	10/26/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014795 (RAN-ISO-174)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/28/2008
P-36-014796 (RAN-ISO-176)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	10/28/2008
P-36-014797 (RAN-ISO-178)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/28/2008
P-36-014798 (RAN-ISO-184)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/28/2008
P-36-014799 (RAN-ISO-185)	AP16 Isolate	1 Biface, 2 Flakes CCS Jasper	No	No	10/28/2008
P-36-014800 (RAN-ISO-187)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/30/2008
P-36-014801 (RAN-ISO-191)	AP16 Isolate	1 Core CCS Jasper	No	No	10/22/2008
P-36-014802 (RAN-ISO-192)	AP16 Isolate	1 Flake CCS	No	No	10/26/2008
P-36-014803 (RSS-ISO-001)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/8/2008
P-36-014804 (RSS-ISO-003)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/8/2008
P-36-014805 (RSS-ISO-004)	AP16 Isolate	4 Flakes CCS Jasper	No	No	10/9/2008
P-36-014806 (RSS-ISO-007)	AP16 Isolate	3 Flakes and 1 Core fragment CCS Jasper	No	No	10/15/2008
P-36-014807 (RSS-ISO-010)	AP16 Isolate	5 Flakes CCS Jasper	No	No	10/16/2008
P-36-014808 (RSS-ISO-012)	AP16 Isolate	5 Flakes CCS Jasper	No	No	10/17/2008
P-36-014809 (RSS-ISO-019)	AP16 Isolate	1 Biface fragment CCS Jasper	No	No	10/21/2008
P-36-014979 (RSS-ISO-022)	AP16 Isolate	5 Flakes CCS Jasper	No	No	10/24/2008
P-36-014810 (SGB-ISO-001)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/5/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014811 (SGB-ISO-005)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/6/2008
P-36-014812 (SGB-ISO-008)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/6/2008
P-36-014813 (SGB-ISO-009)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/7/2008
P-36-014814 (SGB-ISO-011)	AP16 Isolate	1 Sherd Southwest Grey with Black geometric pattern (too small to identify) 2 Flake CCS Jasper	No	No	8/8/2008
P-36-014815 (SGB-ISO-012)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/8/2008
P-36-014816 (SGB-ISO-014)	AP16 Isolate	5 Flakes CCS Jasper	No	No	8/10/2008
P-36-014817 (SGB-ISO-015)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/11/2008
P-36-014818 (SGB-ISO-016)	AP16 Isolate	2 Flakes CCS Jasper	No	No	8/11/2008
P-36-014819 (SGB-ISO-018)	AP16 Isolate	2 Flakes CCS Jasper	No	No	8/13/2008
P-36-014820 (SGB-ISO-019)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/13/2008
P-36-014821 (SGB-ISO-020)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/13/2008
P-36-014822 (SGB-ISO-021)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/13/2008
P-36-014823 (SGB-ISO-022)	AP16 Isolate	1 Biface CCS Jasper	No	No	8/13/2008
P-36-014824 (SGB-ISO-023)	AP16 Isolate	1 Piece of Debitage CCS Jasper	No	No	8/18/2008
P-36-014825 (SGB-ISO-025)	AP16 Isolate	2 Flakes CCS Jasper	No	No	8/18/2008
P-36-014826 (SGB-ISO-026)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/18/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014827 (SGB-ISO-027)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/18/2008
P-36-014828 (SGB-ISO-029)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/19/2008
P-36-014829 (SGB-ISO-030)	AP16 Isolate	4 Sherds Brownware	No	No	8/20/2008
P-36-014830 (SGB-ISO-031)	AP16 Isolate	3 Flakes and 1 shatter CCS Jasper	No	No	8/20/2008
P-36-014831 (SGB-ISO-033)	AP16 Isolate	3 Flakes CCS Jasper	No	No	8/20/2008
P-36-014832 (SGB-ISO-035)	AP16 Isolate	4 Flakes CCS Jasper 1 Flake Obsidian	No	No	8/21/2008
P-36-014833 (SGB-ISO-039)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/22/2008
P-36-014834 (SGB-ISO-040)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/22/2008
P-36-014835 (SGB-ISO-042)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/24/2008
P-36-014836 (SGB-ISO-043)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/24/2008
P-36-014837 (SGB-ISO-044)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/24/2008
P-36-014838 (SGB-ISO-045)	AP16 Isolate	2 Flakes CCS Jasper	No	No	8/25/2008
P-36-014839 (SGB-ISO-095)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/2/2008
P-36-014840 (SGB-ISO-096)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/2/2008
P-36-014841 (SGB-ISO-098)	AP16 Isolate	5 Flakes CCS Jasper/ Chalcedony	No	No	10/3/2008
P-36-014842 (SGB-ISO-100)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/3/2008
P-36-014843 (SGB-ISO-101)	AP16 Isolate	2 Flakes,1 Core CCs Jasper	No	No	10/4/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014844 (SGB-ISO-102)	AP16 Isolate	2 Flakes, 1 Biface CCS Jasper	No	No	10/4/2008
P-36-014845 (SGB-ISO-103)	AP16 Isolate	2 Flakes 1 Projectile point base fragment (unidentified) CCS Jasper	No	No	10/4/2008
P-36-014846 (SGB-ISO-105)	AP16 Isolate	3 Flakes CCS Jasper/Chalcedony	No	No	10/4/2008
P-36-014847 (SGB-ISO-106)	AP16 Isolate	3 Flakes CCS Jasper/Chalcedony/Chert	No	No	10/4/2008
P-36-014848 (SGB-ISO-107)	AP16 Isolate	1 Projectile point base fragment CCS Jasper (unidentified)	No	No	10/4/2008
P-36-014849 (SGB-ISO-108)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/4/2008
P-36-014850 (SGB-ISO-109)	AP16 Isolate	2 Flakes CCS Jasper/Chalcedony	No	No	10/4/2008
P-36-014851 (SGB-ISO-110)	AP16 Isolate	2 Flakes Jasper/Chalcedony	No	No	10/04/2008
P-36-014852 (SGB-ISO-111)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/4/2008
P-36-014853 (SGB-ISO-113)	AP16 Isolate	2 Flakes CCS Jasper	No	No	10/5/2008
P-36-014854 (SGB-ISO-115)	AP16 Isolate	3 Flakes 1 Core CCS Jasper/Chalcedony	No	No	10/6/2008
P-36-014855 (SGB-ISO-116)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/6/2008
P-36-014856 (SGB-ISO-117)	AP16 Isolate	4 Flakes 1 Core CCS Jasper	No	No	10/6/2008
P-36-014857 (SGB-ISO-119)	AP16 Isolate	5 Flakes CCS Jasper	No	No	10/6/2008
P-36-014858 (SGB-ISO-122)	AP16 Isolate	1 Micro Flake CCS Chert	No	No	10/6/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014859 (SGB-ISO-123)	AP16 Isolate	4 Flakes CCS Jasper	No	No	10/6/2008
P-36-014860 (SGB-ISO-124)	AP16 Isolate	1 Flake CCS Jasper	No	No	10/6/2008
P-36-014861 (SGB-ISO-128)	AP16 Isolate	3 Flakes CCS Jasper	No	No	10/7/2007
P-36-014862 (SM-ISO-001)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/6/2008
P-36-014863 (SM-ISO-002)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/6/2008
P-36-014864 (SM-ISO-003)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/6/2008
P-36-014865 (SM-ISO-006)	AH16 Isolate	3 Timbers and wire w/cable attached	No	No	8/7/2008
P-36-014866 (SM-ISO-008)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/8/2008
P-36-014867 (SM-ISO-013)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/9/2008
P-36-014868 (SM-ISO-018)	AP16 Isolate	1 Flake CCS Chert	No	No	8/9/2008
P-36-014888 (SM-ISO-019)	AP16 Isolate	3 Flakes CCS Jasper	No	No	8/9/2008
P-36-014889 (SM-ISO-021)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/9/2008
P-36-014890 (SM-ISO-022)	AP16 Isolate	1 Flake CCS Chert	No	No	8/9/2008
P-36-014869 (SM-ISO-023)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/9/2008
P-36-014870 (SM-ISO-024)	AP16 Isolate	2 Flakes CCS Jasper	No	No	8/10/2008
P-36-014871 (SM-ISO-025)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/10/2008
P-36-014872 (SM-ISO-026)	AP16 Isolate	3 Flakes CCS Jasper/Chalcedony	No	No	8/10/2008

Table 5.7-9
Archaeological Isolates Within the Project APE and 200-Foot Buffer
(Continued)

Site Designation	Site Classification(s)	Cultural Constituents	Potential for Subsurface Deposition	Recommended Eligible	Date Recorded
P-36-014873 (SM-ISO-028)	AP16 Isolate	1 Flake CCS Chalcedony	No	No	8/10/2008
P-36-014891 (SM-ISO-029)	AP16 Isolate	1 Flake CCS Chert	No	No	8/10/2008
P-36-014892 (SM-ISO-030)	AP16 Isolate	1 Flake CCS Jasper	No	No	8/10/2008

Key:
CCS- Cryptocrystalline Silicate, EMF- Edge Modified Flake

Historic Built Environment Survey

On August 19 and October 27 and 28, 2008, an intensive historic architecture survey was conducted to account for the properties that appeared to be older than 45 years (1963 or earlier) within the historic architecture APE, which included the Project APE and a ½ -mile radius. The Project APE is equivalent to 100 percent of the Project site, linear facility routes, ancillary project areas, plus the ½-mile built environment regulatory buffer. Because the Project is proposed on federally administered land under the management of the BLM and required federal permits, cultural resources were considered in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. Section 106 requires federal agencies to consider the effects of their actions on properties listed in or eligible for the NRHP.

Following completion of the survey, URS Architectural Historian Kirsten Erickson recorded the properties that appeared to be older than 45 years on the appropriate Department of Parks and Recreation (DPR) 523 series forms, and evaluated the properties for eligibility per the criterion of the NRHP. Properties known not to be older than 45 years were noted, but not formally recorded or evaluated. Results of the survey are depicted on Figures 5.4.1-2, Appendix Z - Confidential Appendix A.

The Project APE for built environment includes the project site, linear facility routes, ancillary project areas (*i.e.,* Pisgah Triangle area), and ½-mile built environment buffers, which totals 20,289 acres (8,767 acre APE plus 11,522 for the ½-mile built environment buffer). Kirsten Erickson, URS Architectural Historian, conducted fieldwork on August 19, 2008 and October 27 and 28, 2008. The approximate collective percentage of the above areas surveyed for built resources is 98 percent of the APE; the remaining 2 percent was not surveyed due to steep terrain and/or no ROE access.

During the built environment survey, ten resources within the Project APE were relocated and/or newly identified, recorded and/or updated, and evaluated for eligibility to the NRHP and/or CRHR through completion of DPR 523 forms (Appendix Z – Confidential Appendix D).

Built environment field survey methodology was developed through a combination of historical research and through the methods outlined above. This information allowed for a thorough examination of the Project APE and ½-mile regulatory buffer. Data used to survey specific localities included previously recorded resource information, newly identified built environment resource information derived from maps and aerial photographs (historic and modern), as well as results of the Class III intensive pedestrian archaeological survey.

URS staff examined standard sources of information that identified known and potential historical resources to determine whether any buildings, structures, objects, districts, or sites had been previously recorded or evaluated in or near the project study area. On July 28, 2008, URS Archaeologist Dustin Kay performed a records search at the SBAIC, which is the CHRIS cultural resources database repository for San Bernardino County. Robin Laska, SBAIC Coordinator, searched all archived records of previously recorded cultural resources and previous investigations completed for the Project area and within a one-mile search radius. Information provided included location maps for all previously recorded trinomial and primary prehistoric and historical archaeological sites and isolates, site record forms and updates for all cultural resources previously identified, previous investigation boundaries and NADB citations for associated reports, historic maps, and historic addresses and resources listed in various state and federal inventories. These inventories included the NRHP, CRHR, California Landmarks, and California Places of Historic Interest.

The records review identified two previously recorded built environment resources that have been determined eligible for the NRHP and CRHR:

- National Old Trails Highway 66/Route 66 [CA-SBR-2910H].
- Atlanta and Pacific/Atchison, Topeka, and Santa Fe Railroad [CA-SBR-6693H].

As part of the historic architecture survey on September 15, 2008, Ms. Erickson (URS Architectural historian) made efforts to contact Ms Rynerson Rock with the County of San Bernardino, County Land Use Services, Mr. Brent Morrow with the City of Barstow Community Development Department, and the Mojave River Valley Museum to identify cultural resources within a 1-mile radius of the Project APE. Follow-up phone voicemails were left for Ms. Rock, Mr. Morrow, and the Mojave River Valley Museum on March 26, 2008. To date, no responses have been received from the local agencies and historical society.

In addition, Ms. Erickson conducted site-specific and primary and secondary research at the following locations: University of California at Riverside, Rivera and Science libraries; SBAIC; San Bernardino County Recorder’s office; San Bernardino County Assessor’s office; Harry Reid Center for Environmental Studies; and, numerous online resources. URS also contacted Mr. Thomas Taylor, Manager of Biological and Archaeological Services for Southern California Edison, who provided site-specific information about the Pisgah Substation and the 12-kilovolt and 220-kilovolt SCE transmission lines in the Project Area. Copies of the coorespondences can be found in Appendix Z of the Technical Report in Appendix C.

Historic maps were obtained from the University of California at Riverside Science Library and SBAIC. Maps used included: the 1955 15-minute U.S. Geological Survey quadrangles; five maps depicting the Old National Trails Highway; Punnett Brothers Map of San Bernardino County (1914); Kremmerer’s Map of San Bernardino County (1925): and, Thomas Brothers Settlers and Miner’s Map of San Bernardino County (1932). These maps were reviewed to identify possible unrecorded historic structures and archaeological sites within the APE and one-mile search radius. Copies of the historic maps and aerial photographs are included in the Appendix Z - Confidential Appendix E and F.

In addition to the historical research and literature review, during the Class III intensive field survey, archaeological crews collected locational data and prepared preliminary documentation of built and/or historic resources warranting review and evaluation by an architectural historian. Staff archaeologists relocated and recorded newly identified built environment/historic resources in the Project APE during the Class III intensive field survey. Ms. Erickson then finalized the research and reporting records and evaluated the following eight resources:

- Southern California Edison 220-kilovolt North transmission line
- Southern California Edison 220-kilovolt South transmission line
- Southern California Edison 12-kilovolt power line

- Hector Road
- Pisgah Substation
- Pisgah Crater Road
- Mojave Pipeline
- Pacific Gas and Electric Pipeline

Ms. Erickson subsequently prepared a historic context report that discussed the themes of transportation, utilities, military activities, and mining in the Central Mojave Valley, relevant to the history of the Project area. Also evaluated were the identified built environment resources using NRHP and CRHR criteria, and findings were recorded on DPR 523 series forms. The DPRs of the properties are provided in Appendix Z – Confidential Appendix D). A description of each resource is provided below.

Historic Built Environment Resources with the Solar One APE

Table 5.7-10
Built Environment Resources with the Project APE and Half-Mile Buffer

Solar One Phase 1

Resource Name	Year Constructed	Description of Resource	Recommended Eligible	Project Area
CA-SBR-13118H (Hector Road)	late 1930s to early 1950s	one-lane, graded dirt road	No	Solar 1 Phase 1 Solar 1 Phase 2
Pacific Gas and Electric Pipeline	prior to 1955	natural gas pipeline	No	Solar 1 Phase 2 Pisgah Triangle Access Road ½-mile buffer
Mojave Pipeline	prior to 1955	natural gas pipeline	No	Solar 1 Phase 2 Pisgah Triangle Access Road ½-mile buffer
CA-SBR-2910H (National Old Trails Highway; also U.S. Route 66)	1912	remnants of historic road	No	Solar 1 Phase 2 Pisgah Triangle Access Roads
CA-SBR-13114H (SCE 12-kilovolt power line)	1961	pine T-post utility pole transmission line	No	Pisgah Triangle ½-mile buffer
CA-SBR-13115H (SCE 220-kilovolt north transmission line)	1936-1939	single-circuit, steel lattice tower transmission line	Yes	Pisgah Triangle ½-mile buffer

Table 5.7-10
Built Environment Resources with the Solar 1 APE and Half-Mile Buffer
(Continued)

Resource Name	Year Constructed	Description of Resource	Recommended Eligible	Project Area
CA-SBR-13116H (SCE 220-kilovolt south transmission line)	1939-1941	single-circuit, steel lattice tower transmission line	Yes	Pisgah Triangle ½-mile buffer
CA-SBR-13117H (Pisgah Substation)	1940	SCE switching station including switch gear, bus bars, and 3 structures used for relay and station battery equipment and storage	Yes	Pisgah Triangle
CA-SBR-13119H (Pisgah Crater Road)	late 1930s to early 1950s	asphalt paved road	No	Pisgah Triangle ½-mile buffer
CA-SBR-6693H (Atlantic & Pacific Railroad/Atchison, Topeka, & Santa Fe Railroad)	1882-1883	historic railroad and associated bridge structures	Yes	½-mile buffer
CA-SBR-2910H (U.S. Route 66; also National Old Trails Highway)	1930s	historic highway	Yes	½-mile buffer

The survey for historic built environment resources identified one previously unrecorded historic property within the Solar One Phase 1 of the Project APE (Table 5.7-9; Figure 5.4.1-1 Appendix Z –Confidential Appendix A). This property is Hector Road, which also is located in the Solar One Phase 2 of the Project APE. Hector Road does not appear to be individually eligible for the NRHP or CRHR because it lacks historical significance. Hector Road was recorded and evaluated on the appropriate DPR 523 series forms in Appendix Z - Confidential Appendix D and a brief description is provided below.

A wood pole power line is located adjacent to Hector Road in the Solar One Phase 1 Project area south of the Burlington Northern Santa Fe Railroad. This power line is not historic-age (45 years old or older) and was not evaluated.

CA-SBR-13118H (Hector Road)

Four segments of Hector Road were recorded within the project areas. The Hector Road interchange from I-40 provides access to the project area. Hector Road extends for a short distance south of Interstate 40 to U.S. Route 66. North of Interstate 40, Hector Road has been realigned, and much of the historic segment of the road between I-40 and the Burlington Northern Santa Fe Railroad is not within the Solar 1 project area. In the vicinity of the I-40 interchange the road is two-lanes and paved. North of the I-40 interchange, Hector Road is reduced to one-lane, graded, dirt roadway. An improved railroad crossing has been constructed at Hector Road, which is locked and is only used by local traffic with access permission.

From the Burlington Northern Santa Fe Railroad, Hector Road continues northward about one mile to the northwest corner of Section 3, Township 8 North, Range 6 East, and then continues eastward along the section line for three miles. At the northeast corner of Section 1, Township 8 North, Range 6 East, Hector Road turns to the southeast and continues across sections 6 and 8 until its junction with the SCE 220-kV transmission line road. This segment of the road is a one-lane, graded dirt road that appears to be maintained and frequently used. The route of Hector Road from the railroad to the transmission line road has not been modified since its original construction date of between the late 1930s and early 1950s. Sometime after 1955, Hector Road was extended about 0.5 mile southeast to a road that leads to the Black Butte manganese mine.

Based on site investigations and historic research, Hector Road is not eligible for listing in the NRHP and CRHR. It was likely constructed to provide access to mines in the project vicinity. The road also could have been used to transport construction materials to the SCE 220-kV (CA-SBR-13115H and CA-SBR-13116H) transmission line and the Pisgah Substation (CA-SBR-13117H) from the railroad. Hector Road is a modest example of a typical one-lane dirt graded rural road. It is not associated with any distinctive or significant events, persons, design/construction, and does not have the potential to yield important information about the past. The road is representative of typical construction, which has been well-documented in California and the West.

Solar One Phase 2

The intensive survey identified three previously unrecorded historic-age properties within the Solar One Phase 2 project area (Table 5.7-9; Figure 5.4.1-2 Appendix Z – Confidential Appendix A). These properties are Hector Road (CA-SBR-13117H), the Pacific Gas and Electric Pipeline, and the Mojave Pipeline. The previously recorded National Old Trails Highway (CA-SBR-2910H) is also in this area. The following is a summary of the historic-period properties that have been recorded and evaluated on DPR 523 series forms in Appendix Z – Confidential Appendix D. Hector Road also is located in Solar One Phase 1 and was discussed above, so the information will not be repeated in this section.

Pacific Gas and Electric and Mojave Pipelines

The Pacific Gas and Electric Pipeline and the Mojave Pipeline are natural gas pipelines that run through the Solar One Phase 2 project area. Both of these pipelines were constructed prior to 1955, but there are no exposed portions, other than occasional milepost marker in the Project APE. The Advisory Council on Historic Preservation has exempted federal agencies from taking into account the effects of their undertakings on historic natural gas pipelines (Advisory Council on Historic Preservation 2002). A brief history of these pipelines is provided in Section 3. The two pipelines would not be affected by the proposed project, and they are recommended not eligible for the NRHP or CRHR. DPR 523 forms were not completed for either pipeline.

CA-SBR-2910H (National Old Trails Highway)

The National Old Trails Highway in the project area includes eight remnant segments of a batched mix oil road. The condition of the road segments is poor—most of the road surface is crumbled and cracked, and in places has eroded. Some segments are buried in sand, but may be partially intact. The National Old Trails Highway was designated by highway “booster” organizations in 1912, and by the late 1920s much of the highway was either oiled or surfaced with gravel. In 1926, the National Old Trails Highway was designated as U.S. Route 66, but in the 1930s, it was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66. Both the National Old Trails Highway and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H. Because remnants of both the 1912 alignment of the National Old Trails Highway and the 1930s alignment of U.S. Route 66 are located within the Project APE, separate update forms were completed for the National Old Trails Highway and U.S. Route 66. In the 1970s, the Bureau of Land Management recorded a segment of the 1912-era National Old Trails Highway as part of the California Desert Project, and a segment of the 1930s U.S. Route 66 within the Eastern Mojave Planning Unit. The CA-SBR-2910H site form was updated during a survey for the All American Pipeline replacement project in 2001, in which the 1930s alignment was recorded. As a whole, the National Old Trails Highway is significant as an early automobile transportation route across the Mojave Desert and as an early route for the historically significant U.S. Route 66 and is considered eligible for the NRHP and CRHR under Criterion A/1.

The eight segments of National Old Trails Highway in the Project APE are isolated, segmented, in generally poor condition, and retain little integrity. Research did not reveal any associations with distinctive or significant person, event, persons, design, or construction, and all data potential has been accounted for during the recordation process. These segments of National Old Trails Highway in the Project APE is a typical example of an early automobile roadway and data potential is considered exhausted through recordation. Therefore, the eight segments of National Old Trails Highway within the APE are recommended as non-contributing elements to the existing historic property for the National Register and not a historic resource pursuant to California Register under any of the criterion for eligibility.

The National Old Trails Highway in the study area is isolated, segmented and in generally poor condition. These eight segments retain little integrity and are recommended to be non-contributing elements to the historic property.

Pisgah Substation Triangle Area

The intensive survey identified seven previously unrecorded historic age properties within the Pisgah Substation Triangle Area (Table 5.7-9; Figure 5.4.1-1 Appendix Z – Confidential Appendix A). These properties include the CA-SBR-13114H Southern California Edison (SCE) 12-kV transmission line, CA-SBR-13115H (SCE 220-kV north) transmission line, CA-SBR-13116H (SCE 220-kV south) transmission line, Pisgah Substation, Pisgah Crater Road, Mojave Pipeline, and Pacific Gas and Electric Pipeline. Of the seven previously unrecorded historic-age properties, the SCE 220-kV north and south transmission lines and the Pisgah Substation appear to be eligible for the NRHP and CRHR. The SCE 12-kV transmission line, Pisgah Crater Road, Mojave Pipeline, and Pacific Gas and Electric Pipelines have all been recommended as ineligible. The following is a summary of the historic-period properties that have been recorded and evaluated on DPR 523 series forms (Appendix E). The previously recorded NRHP-eligible National Old Trails Highway also is within the Pisgah Substation Triangle Area. The National Old Trials Highway and the two pipelines were discussed above; please refer to the above discussion.

Two additional steel tower transmission lines are located adjacent to the SCE 12kV transmission line in the Pisgah Substation Triangle Area. These transmission lines are not historic-age (45 years old or older) and were not evaluated.

CA-SBR-13114H (Southern California Edison 12-Kilovolt Transmission Line)

The SCE 12-kilovolt transmission line was constructed in 1961 as a rural distribution line. The line within the Project Area consists of fifteen 40-foot-tall utility poles, each 0.75 feet in diameter. The poles have a single T-post on the top with 3 ceramic insulators and 3 transmission lines. The poles are creosote-treated pine. Each pole features an identification tag and an embossed nail on the left for height (40) and an embossed date nail (61) on the right. In addition, there is an associated 207-foot-long historic transmission road and sparse historic trash in the vicinity of the transmission line.

The transmission line corridor is modest example of a pine T-post utility pole transmission line. It is not associated with any distinctive or significant events, persons, design/construction, and does not have the potential to yield important information about the past. The transmission line is representative of typical power line construction, which has been well-documented in California and the West. Based on site investigations and historic research, the SCE 12-kilovolt transmission line is recommended as not eligible for listing in the NRHP and CRHR.

CA-SBR-13114H and CA-SBR-13116H (Southern California Edison 220-Kilovolt North and South Transmission Lines)

The SCE 220-kilovolt North and South Transmission Lines are single-circuit transmission lines with lattice steel, wedge A-frame and metal-waisted tower structures. The evenly-spaced tower structures are approximately 75-feet-tall and include 3 conductor wires, 2 static wires, and insulators. Each tower structure has four legs, which are anchored in concrete footings. The transmission lines are located in a rural setting on property managed by the BLM. The transmission lines originate at the SCE switchyard at the Hoover Dam and terminate in Chino, California. Two 4.7-mile segments of the transmission lines were recorded within the Pisgah Substation Triangle area and the historic built environment 0.5-mile buffer.

Construction the Hoover Dam began in 1931 and was completed by 1935. Power production for community use began in 1936 when power was delivered to the cities of Los Angeles, Pasadena, Glendale, and Burbank through three parallel transmission lines constructed by the Los Angeles Bureau of Power and Light (currently Los Angeles Department of Water and Power). The transmission lines were determined to be eligible for the NRHP and were formally nominated for listing in the NRHP in 2000, but apparently were not listed (Federal Highway Administration 2005; Hughes 1993; Myers 1983).

The second company to distribute Hoover Dam power was the Nevada-California Corporation. Power was conveyed by a 132-kilovolt transmission line that had been originally constructed in 1930 and 1931 to deliver power to the dam site during construction (which has been recorded as CA-SBR-10315H]). The transmission line includes two-legged, prefabricated steel towers with angle cross arms, in contrast the four-legged lattice towers used in the SCE North transmission line. This transmission line also is known as the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line; it has been determined eligible for the NRHP and is listed in the CRHR (Hatheway 2006; Myers 1983).

The Metropolitan Water District of Southern California was the next to distribute electrical power in the area in 1938. This transmission line, known as the Metropolitan Water District Line, used technology similar to that used by SCE for 220-kilovolt transmission lines in southern California. Utility companies in southern California, such as the Pacific Light and Power Company (which merged with SCE in 1917) and SCE, were known as innovators in the development of high voltage systems. In 1926, Stanford University established a high-voltage laboratory and worked with Pacific Gas and Electric and SCE in research and development. Through this collaboration, insulators for California's 220-kilovolt lines were developed. The Metropolitan Water District Line has been determined eligible for the NRHP under Criterion A for its association with Hoover Dam (Hughes 1993; Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North Transmission Line was constructed between 1936 and 1939, using the same design and technology SCE had been using for its existing high-voltage transmission lines in southern California (including its Vincent 220-kilovolt line), and the design used by the Metropolitan Water District for its Hoover Dam line. The transmission line began receiving power from Hoover Dam in 1939, after the completion of Hoover generating units A-6 and A-7 (Myers 1983; Schweigert and Labrum 2001).

When World War II began in Europe, SCE planners anticipated an increase in demand for power in southern California. SCE began construction on a second transmission line, the SCE South 220-Kilvolt South Transmission Line (SCE South or Hoover-Chino No. 2), in 1939. SCE North and SCE South diverge from the SCE switchyard at the Hoover Dam but meet near Hemenway Wash in Nevada and run approximately parallel to each other from north of Boulder City, Nevada to Chino, California. SCE North and SCE South are parallel within the Project APE. Both SCE North and SCE South delivered electricity that was essential to war-time industries in Southern California. These industries included the Douglas, Vultee, and Northrup aircraft plants, Consolidated Steel, the Long Beach Naval Shipyard, Kaiser Steel, Alcoa, Columbia Steel, as well as automobile factories, tire plants, oil refineries, ordnance works, and military bases and depots (Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North and South Lines are associated with the early operation of Hoover Dam and both played a significant role in providing electricity essential to World War II industries located in southern California. The Los Angeles Bureau of Power and Light transmission lines, the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line, and the Metropolitan Water District Line, all of which provide Hoover Dam power to southern California, have all been determined eligible for the NRHP, and the Edison Company Boulder Dam-San Bernardino Electrical Transmission Line is also listed in the CRHR (Hatheway 2006; Myers 1983; Schweigert and Labrum 2001).

The SCE 220-Kilovolt North and South Lines were previously recorded in Nevada (site numbers 26CK6249 and 26CK6250) during the Boulder City/U.S. 93 Corridor Study, and were determined eligible for the NRHP by the Federal Highway Administration and Nevada State Historic Preservation Office (Federal Highway Administration 2005). Both the Southern California Edison 220-kilovolt North and South Lines are in-use and regularly maintained in the Solar 1 project area, but retain sufficient historical integrity to be considered for register listing. Because of the association of the transmission lines to the Hoover Dam and their significance in the World War II effort, we recommend that the Southern California Edison 220-Kilovolt North and South Lines are eligible for the NRHP under and CRHR under Criterion A/1.

The transmission lines were constructed using the same design and technology SCE used for its existing high-voltage transmission lines in southern California. SCE and other southern California utilities companies were known as innovators in high-voltage systems (Hughes 1993). Further study would be needed to determine the significance of the design to southern California utilities and how many examples of this type remain to determine if the SCE North and South transmission lines are eligible under Criterion C/3.

Research did not reveal any associations with any important persons (Criterion B/2) and the transmission line does not have the potential to yield important information (Criterion D/4).

CA-SBR-13117H (Pisgah Substation)

CA-SBR-13117H (Pisgah Substation) is a Southern California Edison switching station that was constructed in 1940 during the construction of the SCE South 220-Kilvolt South Transmission Line and is considered a component of the transmission line (Personal Communication, Thomas Taylor, Manager, Biological and Archaeological Resources, Southern California Edison, 18 September 2008). It shares its name with the railroad siding of Pisgah and Pisgah Crater, which are located in the vicinity. A switching station is an intermediate station, which has incoming and outgoing power lines of the same voltage. Unlike other substations, a switching station does not transfer power from a higher voltage to a lower voltage, but instead works to control increases and decreases in voltage.

In addition to the equipment associated with the function of the substation, including switch gears and bus bars, the Pisgah Substation has three buildings, which house the relay station and battery equipment. The largest of these buildings is a rectangular brick building that faces southeast. It has steel-frame fixed and casement windows. The main entrance is a single entry door with 15 lights, which is accessed by concrete steps with a metal railing. The hipped roof is clad with asphalt shingles and clay tile along the ridge lines.

The other two buildings are smaller and appear to be used for storage. The building located at the north corner of the substation is a wood-framed box-shaped structure with a hipped roof that has exposed rafter ends and is clad with clay tile. There is a wood roll-up door on the southeast side of the building, suggesting that is it used to store vehicles or larger equipment. The other building is located adjacent to the wood-framed building and is a brick, box-shaped structure with a hipped roof that has exposed rafter ends and is clad with clay tile. The windows are steel frame casements and the building is accessed by a single entry wood door. All of the buildings are in good condition and appear to be in-use.

Because the Pisgah Substation is a component of the transmission line, it is eligible for the NRHP under and is eligible for the CRHR under Criterion A/1. Research did not reveal any associations with distinctive or significant persons. The substation is of a typical design for its era and is not a rare surviving example (Personal Communication, Thomas Taylor, Manager, Biological and Archaeological

Resources, Southern California Edison, 18 September 2008). Further study of the substation has no potential to yield important information about the past.

CA-SBR-13119H (Pisgah Crater Road)

CA-SBR-13119H (Pisgah Crater Road) runs between the SCE 220-kilovolt transmission line road to the Pisgah Crater, a young volcanic cinder cone located south of the Project Area. U.S.G.S. 15-minute topographic quadrangles indicate that this road was constructed sometime after 1955 because the map only depicts the road between Pisgah Crater south of U.S. Route 66 and a small segment north of U.S. Route 66 that terminates at the Burlington Northern Santa Fe Railroad. The segment of Pisgah Crater Road that is historic-age (45 years old or older) is paved with asphalt and is approximately 24 feet wide. The Pisgah Crater currently is being mined for aggregate and is located on private land. The road does not appear to be regularly maintained and likely is only sporadically used to access the mine.

Much of Pisgah Crater has been destroyed by mining. No records were found to indicate that Pisgah Crater was ever a well-known tourist destination for U.S. Route 66 travelers like the better-known Amboy Crater, located east of the Pisgah Crater within the Bureau of Land Management-administered Mojave National Preserve. Research did not reveal any association with distinctive or significant persons, and the roadway is of a common design. Further study of the road is unlikely to yield important information about the past. Therefore, Pisgah Crater Road is recommended as not eligible for listing the NRHP or CRHR or as a historical resource for the purposes of CEQA.

Access Road Corridors and Bridge Crossing

The intensive survey identified one previously recorded and two previously unrecorded historic properties within the access road corridors (Table 5.7-9; Figure 5.4.1-1 Appendix Z – Confidential Technical Report / Confidential Appendix A – Maps and Figures). These properties include the National Old Trails Highway, Mojave Pipeline, and Pacific Gas and Electric Pipeline. The National Old Trails Highway and the two pipelines were discussed above and will not be repeated here. DPR 523 series update form for the National Old Trails Highway is located in Appendix E.

Historic Built Environment within ½-Mile Buffer

The survey identified six previously unrecorded historic properties within ½ mile of the Solar 1 project area (Table 5.7-9; Figure 6.4.1-1 Appendix Z – Confidential Technical Report / Confidential Appendix A – Maps and Figures). Of the six previously unrecorded historic properties, the Southern California Edison (SCE) 220-kilvolt north and south transmission lines appear to be eligible for the NRHP and CRHR. The SCE 12-kilovolt transmission line, the Mojave Pipeline, the Pacific Gas and Electric Pipeline, and Pisgah Crater Road have been previously discussed and the information will not be repeated in this section.

A wood pole power line also is located adjacent to U.S. Route 66 within the ½ mile buffer. This power line is not historic-age (45 years old or older) and was not evaluated.

In addition to the six previously unrecorded historic properties within the ½ mile buffer, two previously recorded historic properties also are within this area. These properties are the Atlantic & Pacific/Atchison, Topeka, and Santa Fe Railroad [CA-SBR-6693H] and U.S. Route 66 [CA-SBR-2910H]. DPR 523 series update forms were completed for both of these resources to record these sites (refer to forms in Appendix E).

CA-SBR-6693H (Atlantic & Pacific/Atchison, Topeka, & Santa Fe Railroad)

The Burlington, Northern, Santa Fe Railway (historically the Atlantic & Pacific/Atchison, Topeka & Santa Fe Railroad) is located within the Project APE and ½-mile built environment buffer. The Southern Pacific Railroad constructed a single track rail between the communities of Mojave and Needles to intercept the Atlantic & Pacific Railroad (A&P) tracks in Needles to protect its California railroad interests. The Southern Pacific constructed the Mojave to Needles branch between 1882 and 1883, working east from their station in Mojave.

The railroad has been previously determined eligible for the NRHP and the CRHR under Criterion A/1 for its association with the history of transportation in California. Although much of the railroad has been upgraded for continued use and few historical materials remain in place, it retains integrity of location and the level of significance established by previous recordings. Thirteen previously unrecorded bridge structures were identified during the Class III intensive field survey along the railroad within the Project APE and ½ mile built environment buffer. These bridge structures were recorded and documented on DPR 523 update forms (Appendix Z – Confidential Appendix D). Five of the bridge structures retain sufficient historical integrity to be considered contributing elements to the railroad. The other 8 are either modern replacement bridges or have been highly modified.

CA-SBR-2910H (U.S. Route 66)

U.S. Route 66 occurs in the historic built environment 1/2-mile buffer, this route was originally constructed in the 1930s, north of the highway's original alignment, which was known as the National Old Trails Highway. Highway booster groups designated the National Old Trails Highway in 1912, and by the late 1920s much of the highway was either oiled or surfaced with gravel. In 1926, the National Old Trails Highway was designated as U.S. Route 66, but in the 1930s it was abandoned in favor for a route to the south, which is the current alignment of U.S. Route 66.

Both the National Old Trails Highway and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H. Because remnants of both the 1912 alignment of the National Old Trails Highway and the 1930s alignment of U.S. Route 66 are located within the Project APE, separate update forms were completed. U.S. Route 66 has been previously evaluated as eligible for the NRHP under Criterion A as one of the first all-weather highways in the United States. The segment of U.S. Route 66 in the study area retains historical integrity and the level of significance established by previous documentation.

U.S. Route 66 is an approximately 9.2-mile segment of two-lane paved roadway that serves as a frontage road for Interstate 40. This segment of U.S. Route 66 is in fair condition and shows evidence of maintenance and repair. There are no historic buildings associated with U.S. Route 66 along this segment of the road. Historical buildings associated still exist in the town of Ludlow, located about 12 miles east of Pisgah and about 11 miles east of the Project, and in Newberry Springs, about 15 miles west of the I-40 Hector exit, and about 13 miles west of the project area. This segment of U.S. Route 66 is relatively pristine, although modern intrusions have compromised its historical setting, including I-40, power lines, transmission lines, and an electrical substation. The portions of U.S. Route 66 in the ½ mile built environment APE contribute to the NRHP-eligible and CRHR-eligible U.S. Route 66.

There are 4 previously unrecorded bridge structures along U.S. Route 66 within the ½-mile built environment buffer. These bridge structures were recorded and documented on DPR 523 update forms (Appendix Z – Confidential Appendix D). All four of the bridge structures retain sufficient historical integrity to be considered contributing elements to the highway.

5.7.2 Native American Consultation

The Native American Heritage Commission (NAHC) was contacted on July 22, 2008 requesting a search of the Native American Sacred Lands File (SLF) as an aid in determining the presence of Native American sacred sites within the Project APE. A list of Native American contacts that may have knowledge of known cultural resources or sacred sites within the Project APE was also requested.

The NAHC responded on July 24, 2008, and indicated a records search of the SLF "failed to indicate the presence of Native American cultural resources in the immediate Project Area." In addition to the response letter, the NAHC also provided a Native American contact list. Letters offering formal consultation were issued by the BLM Barstow Field Office on November 5, 2008. As of the date of this report, no correspondence has been received from the tribes (Appendix Z - Appendix B).

5.7.3 Environmental Consequences

5.7.3.1 Significance Criteria

The Class III Intensive Field Survey was conducted in accordance with CEQA, Public Resources Code, Section 21000 *et seq.*, and the CCR, Title 14, Chapter 3, Section 15000. Consideration of significance as an "historical resource" is measured by cultural resource provisions considered under CCR Sections 15064.5 and 15126.4. Generally, a historical resource (these include the historic built environment as well as historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CCR Section 15064.5, and include resources that:

1. Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Are associated with lives of persons important in our past;

3. Embody the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4. Have yielded, or may be likely to yield, information important in prehistory or history.

CCR Section 15064.5 and Section 21084.1 further states that a resource not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to PRC Section 5020.1(k), or identified in an historical resources survey can still be considered a historical resource (as defined in PRC Section 5020.1[j] and 5024.1) by a lead agency.

Under CCR Section 15064.5(b), a project potentially would have significant impacts if it would cause a substantial adverse change in the significance of an historical resource (*i.e.,* a cultural resource eligible to CRHR, or archaeological resource defined as a unique archaeological resource which does not meet CRHR criteria), or would disturb human remains. The types of substantial adverse changes include physical demolition, destruction, relocation, or alteration of the resource.

CCR Section 15064.5 also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are also detailed under PRC Section 5097.98.

Impacts to "unique archaeological resources" are also considered under CEQA, as described under PRC 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that – without merely adding to the current body of knowledge – there is a high probability that it meets one of the following criteria:

- The archaeological artifact, object, or site contains information needed to answer important scientific questions and there is a demonstrable public interest in that information.
- The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type.
- The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources which do not qualify for listing on the CRHR receive no further consideration under CEQA.

In many cases, determination of resource eligibility to the NRHP or CRHR (or its uniqueness) can be made only through extensive research. As such, the best alternative to preserve historic resources is the no action alternative; however, because this alternative is not always feasible, all projects must consider alternatives or mitigation measures to lessen the effects to these resources. To the maximum extent possible impacts to resources should be avoided. If it proves impossible to avoid cultural resources, formal eligibility evaluation must be undertaken. If the resource meets the criteria of eligibility to the CRHR, it will be formally addressed under CCR Sections 15064.5 and 15126.4.

5.7.3.2 Management Considerations/Recommendations

The Class III intensive field survey identified a total of 401 cultural resources within the Project APE and appropriate regulatory buffers; of those, 391 are archaeological sites and 10 are built environment resources.

Of the 391 archaeological resources; 143 of these are archaeological sites and 247 are isolated finds. Fourteen (14) sites occur in Phase 1; 107 sites occur in Phase 2; 7 sites occur in the Pisgah Substation Triangle survey area; 8 sites occur in access road corridors and bridge crossings; 5 sites occur within the 200-foot archaeological buffer; and, 1 site is in the NAP area that was surveyed beyond the APE and 200-foot regulatory buffer.

A total of 46 sites (1 is in the NAP area) are assumed eligible for the NRHP under Criterion D: Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4). They are also CRHR potentially significant because they have yielded or are likely to yield information important to prehistory or history (Section 15064.5). Of the 46 sites, 41 are prehistoric, 2 are historic, and 3 are multi-component archaeological sites. The remaining 97 archaeological sites are recommended not eligible under NRHP and/or CRHR and, therefore, do not constitute historic properties or significant cultural resources (see Section 6 of the Confidential Technical Report for detail evaluations).

A total of 247 isolated archaeological finds occur with the Project APE and 200 foot archaeological buffer. Isolates are typically considered ineligible resources under NRHP and/or CRHR, because they generally have low-likelihood for subsurface deposition, represent single isolated events and/or are not in situ, and lack context. As a result, data potential is exhausted through recordation. The 97 archaeological sites are not recommended eligible for listing in the NRHP and/or CRHR because of the low density of "non-unique" artifacts, lack of integrity, low probability for subsurface deposition, and data potential is considered exhausted through recordation. Therefore, a recommendation of no adverse effect on Historic Properties or significant cultural resources is made for the 247 isolates and 97 archaeological sites. The isolates and sites are detailed in tabular summaries below.

The results of this study indicate that the Project may have an adverse affect 46 (1 is in NAP) archaeological resources that are assumed eligible for listing under the NRHP and/or the CRHR. In order to validate NRHP and/or CRHP eligibility recommendation, an extended Class III limited subsurface testing program is recommended for the 45 archaeological sites within the APE and 200 foot archaeological buffer.

The built environment assessment identified 10 historic resources. Two of these resources have been previously recorded and were determined eligible for listing in the NRHP and CRHP (Atlantic & Pacific/Atchison, Topeka, & Santa Fe Railroad and National Old Trails Highway/U.S. Route 66). Three (3) of the 8 newly recorded built environment resources are recommended as eligible for the NRHP and CRHR (Southern California Edison North and South 220-Kilovolt Transmission Lines and Pisgah Substation). The remaining 5 newly recorded built environment resources are not considered eligible for NRHP or CRHR (Hector Road, Pisgah Road, Southern California Edison 12-Kilovolt Transmission Line, Mojave Pipeline, and Pacific Gas and Electric Pipeline).

Based on the Solar One POD, of the 46 assumed eligible archaeological resources 45 of these are subject to direct impacts from construction activities associated with the development of the Project. With regard to the built environment resources, the 2 eligible and 3 recommended eligible built resources are also subject to direct and indirect impacts, but management recommendations have been provided to avoid adverse affects to these resources.

It should be noted that the final determination of NRHP, and by extension CRHR-eligibility, for cultural resources on federal land is the responsibility of the federal agency, in this case the BLM. As the BLM is responsible for making the final determination, the recommendations in this document are intended to provide the BLM with information in making decisions regarding Project-related affects, as well as to provide the CEC with information to assess impacts to significant cultural resources within the Project APE.

5.7.3.2.1 Archaeological Sites Assumed Eligible

The table below provides a list of the 46 archaeological resources that are assumed eligible, but have not been determined eligible by the lead agency. Therefore, an extended Class III limited subsurface testing program is recommended for the 45 assumed eligible archaeological sites within the Project APE to provide the lead agency with additional information needed to determine NRHP and CRHR eligibility.

These archaeological sites cover a total combined acreage of approximately 32.8 acres; 0.71 acres in Phase 1, 31.6 acres in Phase 2, and 0.33 acres in the Pisgah Substation Triangle area; 0.2 acres within the NAP areas. Thirty-nine (39) archaeological site conform to the CARIDAP criteria for determining eligibility. The CARIDAP criterion for sparse lithic scatter is defined as:

- Containing only flaked-stone and lack other classes of archaeological materials (*e.g.*, groundstone, fire-affected rock, bone, or shellfish, pottery).
- Lack substantial subsurface deposit with over 50% visibility.
- Exhibit surface densities equal to or less than 3 flaked-stone items per square meter and overall site area is less than 10,000 m^2 (Jackson *et al.*, 1988).

Table 5.7-11
Archaeological Sites Recommended for Extended Class III Limited Subsurface Testing

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13031 (KRM-024)	AP13 Trails / Linear Features	Phase 1	N/A	Assumed Eligible	Mitigate through further documentation
CA-SBR-13032 (KRM-028)	AP13 Trails / Linear Features	Phase 1	N/A	Assumed Eligible	Mitigate through further documentation
CA-SBR-13053 (RAN-011)	AP2 Lithic Scatter	Phase 1	0.04	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13096 (SGB-013)	AP2 Lithic Scatter	Phase 1	0.3	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13097 (SGB-017)	AP2 Lithic Scatter	Phase 1	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-11
Table of Archaeological Sites Recommended for Extended Class III Limited Subsurface Testing (Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13104 (SGB-041)	AP2 Lithic Scatter	Phase 1	0.1	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13106 (SGB-099)	AP2 Lithic Scatter AP11 Hearth/pits	Phase 1	0.04	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13107 (SGB-104)	AP2 Lithic Scatter	Phase 1	0.03	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13002/H (DRK-134/H)	AH4 Privies / dumps / trash scatters AP2 Lithic Scatter	Phase 2	0.3	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13003 (DRK-136)	AP2 Lithic Scatter	Phase 2	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13004 (DRK-139)	AP2 Lithic Scatter	Phase 2	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13007 (DRK-142)	AP2 Lithic Scatter AP12 Quarry	Phase 2	7	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13009 (DRK-150)	AP2 Lithic Scatter	Phase 2	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13011 (DRK-153)	AP2 Lithic Scatter	Phase 2	0.4	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13012H (DRK-155H)	AH4 Privies / dumps / trash scatters	Phase 2	0.4	Assumed Eligible	Extended Class III Limited Subsurface Testing

Table 5.7-11
Table of Archaeological Sites Recommended for Extended Class III Limited Subsurface Testing (Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13014H (DRK-163H)	AH4 Privies / dumps / trash scatters	Phase 2	0.9	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13016 (DRK-167)	AP2 Lithic Scatter	Phase 2	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13017H (DRK-168H)	AH4 Privies / dumps / trash scatters	Phase 2	0.5	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13022 (DRK-175)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.7	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13023/H (DRK-176/H)	AH4 Privies / dumps / trash scatters AP2 Lithic Scatter AP16 Other (Groundstone)	Phase 2	0.3	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13123/H (EJK-002)	AP2 lithic scatter.	Phase 2	0.5	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13028 (KRM-002)	AP2 Lithic scatter	Phase 2	0.6	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13121 (KRM-133)	AP2 lithic scatter AP12 Quarry	Phase 2	4	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13036 (KRM-153)	AP2 lithic scatter	Phase 2	1	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-11
Table of Archaeological Sites Recommended for Extended Class III Limited Subsurface Testing (Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13037 (KRM-154)	AP13 Trails/linear earthworks AP2 Lithic scatter	Phase 2	0.1	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13038 (KRM-160)	AP2 lithic scatter AP12 Quarry	Phase 2	5	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13045 (LTL-012)	AP2 lithic scatter	Phase 2	0.004	Assumed Eligible	Extended Class III Limited Testing to determine if there is subsurface deposition CARIDAP*
CA-SBR-13048 (LTL-017)	AP 2 lithic scatter	Phase 2	0.09	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13051 (LTL-022)	AP2 lithic scatter	Phase 2	0.03	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13052 (LTL-023)	AP2 lithic scatter	Phase 2	0.09	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13057 (RAN-107)	AP2 lithic scatter	Phase 2	0.4	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13058 (RAN-110)	AP2 lithic scatter	Phase 2	0.4	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13065 (RAN-131)	AP 2 Lithic scatter	Phase 2	0.03	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13072 (RAN-168)	AP2 lithic scatter	Phase 2	0.06	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-11
Table of Archaeological Sites Recommended for Extended Class III Limited Subsurface Testing (Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13073 (RAN-169)	AP2 lithic scatter	Phase 2	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13074 (RAN-170)	AP2 lithic scatter	Phase 2	0.5	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13075 (RAN-171)	AP2 lithic scatter AP15 Habitation debris AP16 Other (Abrader)	Phase 2	0.08	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13079 (RAN-179)	AP2 lithic scatter AP12 Quarry	Phase 2	0.1	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13080 (RAN-180)	AP2 lithic scatter	Phase 2	0.1	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13081 (RAN-181)	AP2 lithic scatter	Phase 2	0.01	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13093 (RSS-017)	AP 2 Lithic scatter AP 8 Cairns/ rockfeatures AP11 Hearth/pits AP 16 Other (cleared circles)	Phase 2	5.16	Assumed Eligible	Extended Class III Limited Subsurface Testing
CA-SBR-13109 (SGB-114)	AP 2 Lithic Scatter AP16 Other (Groundstone)	Phase 2	1.13	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13100 (SGB-034)	AP2 Lithic Scatter	Pisgah Substation Triangle Area	0.1	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*

Table 5.7-11
Table of Archaeological Sites Recommended for Extended Class III Limited Subsurface Testing (Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13102 (SGB-037)	AP2 Lithic Scatter	Pisgah Substation Triangle Area	0.03	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13103 (SGB-038)	AP2 Lithic Scatter	Pisgah Substation Triangle Area	0.2	Assumed Eligible	Extended Class III Limited Subsurface Testing CARIDAP*
CA-SBR-13095 (SGB-007)	AP2 Lithic scatter AP3 Ceramic scatter	NAP	0.2	Assumed Eligible	None- No Effect Out of APE

5.7.3.2.2 Archaeological Sites Recommended Not Eligible

The table below provides a list of 97 sites that are recommended not eligible for NRHP and CRHR. These sites have low density of "non-unique" artifacts, do not appear to have the potential for subsurface deposition, lack integrity, and data potential is considered exhausted through recordation. These sites are ubiquitous, and have been well documented throughout Southern California Desert regions and the Mojave. It is unlikely that these resources have the potential to yield additional data beyond that which has been documented through the recordation process in this study.

Table 5.7-12
Archeological Sites Recommended Not Eligible

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13054 (RAN-025)	AP2 Lithic Scatter AP12 Quarry	Phase 1	0.3	Not Eligible	None
P-36-014578 (RAN-035H)	AH16 Other (Historic cairn / land / mine claim)	Phase 1	N/A	Not Eligible	None
CA-SBR-13105 (SGB-097)	AP2 Lithic Scatter	Phase 1	0.2	Not Eligible	None
CA-SBR-4558H	AH9 Mines/quarries/ tailings AH4 Privies/dumps/trash scatters AH2 Foundations/ structure pads AH6 Water conveyance system AH10 Machinery AH16 Other	Phase 1		Not Eligible	None
CA-SBR-13120 (KRM-131)	AP2 Liithic scatter AP12 Quarry	Phase 2		Not Eligible	None
CA-SBR-13034 (KRM-137)	AP2 lithic scatter	Phase 2	0.1	Not Eligible	None
CA-SBR-13035 (KRM-141)	AP2 lithic scatter	Phase 2	0.07	Not Eligible	None
CA-SBR-13122 (KRM-165)	AP2 Lithic scatter	Phase 2		Not Eligible	None
CA-SBR-13066 (RAN-138)	AP2 Lithic scatter AP12 Quarry	Phase 2	0.60	Not Eligible	None
CA-SBR-13067 (RAN-139)	AP 2 lithic scatter AP12 Quarry	Phase 2	0.14	Not Eligible	None
CA-SBR-13068 (RAN-146)	AP2 lithic scatter AP12 Quarry	Phase 2	0.006	Not Eligible	None
CA-SBR-13069 (RAN-154)	AP2 lithic scatter	Phase 2	0.05	Not Eligible	None
CA-SBR-13070 (RAN-155)	AP2 lithic scatter AP12 Quarry	Phase 2	1.6	Not Eligible	None
CA-SBR-13071 (RAN-163)	AP 2 lithic scatter AP12 Quarry	Phase 2	0.4	Not Eligible	None

Table 5.7-12
Table of Archeological Sites Recommended Not Eligible
(Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13085 (RAN-190)	AP2-lihic scatter AP12 Quarry	Phase 2	0.3	Not Eligible	None
CA-SBR-13108/H (SGB-112/H)	AP 2 Lithic Scatter AP12 Quarry AH 4 Privies / dumps / trash scatters AH16 Other (Rock Features)	Phase 2	25.24	Not Eligible	None
CA-SBR-13110 (SGB-118)	AP 2 Lithic Scatter AP12 Quarry	Phase 2	0.05	Not Eligible	None
CA-SBR-12999H (DRK-115H)	AH4 Privies/Dumps/ Trash scatters	I-40 Temporary Access Road Corridor	0.04	Not Eligible	None
CA-SBR-13101 (SGB-036H)	AH4 Privies/ Dumps/Trash Scatters	Pisgah Substation Triangle Area	0.0007	Not Eligible	None
CA-SBR-12997/H (DRK-111/H)	AH 4 Privies / dumps/ trash scatters AP 2 Lithic Scatter	I-40 Temporary Access Road Corridor	0.08	Not Eligible	None
P-36-014519 (DRK 112H)	AH16 Other (Rock Cairn)	I-40 Temporary Access Road Corridor	0.002	Not Eligible	None
P-36-014520 (DRK 113H)	AH16 Other (Rock Cairn)	Access Roads Corridor	0.002	Not Eligible	None
CA-SBR-12998 (DRK 114)	AP 2 Lithic Scatter	Access Roads Corridor	0.002	Not Eligible	None
CA-SBR-12990 (DRK-001)	AP2 Lithic scatter AP12 Quarry	200ft Buffer	0.1	Not Eligible	None
CA-SBR-13056 (RAN-108)	AP2 Lithic scatter AP12 Quarry	200ft Buffer	0.254	Not Eligible	None
CA-SBR-13113 (SM-027)	AP2 Lithic scatter	200ft Buffer	0.06	Not Eligible	None
CA-SBR-12991 (DRK-012)	AP2 Lithic scatter AP12 Quarry	Phase 1	0.8	Not Eligible	None
CA-SBR-12993 (DRK-023)	AP2 Lithic Scatter	Phase 1	0.01	Not Eligible	None

Table 5.7-12
Table of Archeological Sites Recommended Not Eligible
(Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13001 (DRK-133)	AP2 Lithic Scatter	Phase 2	0.05	Not Eligible	None
CA-SBR-13005 (DRK-140)	AP2 Lithic Scatter	Phase 2	1.1	Not Eligible	None
CA-SBR-13006 (DRK-141)	AP2 Lithic Scatter	Phase 2	0.2	Not Eligible	None
CA-SBR-13008 (DRK-145)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.4	Not Eligible	None
CA-SBR-13010 (DRK-152)	AP2 Lithic Scatter	Phase 2	0.3	Not Eligible	None
CA-SBR-13013 (DRK-160)	AP2 Lithic Scatter	Phase 2	0.2	Not Eligible	None
CA-SBR-13015 (DRK-166)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.6	Not Eligible	None
CA-SBR-13018 (DRK-170)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.4	Not Eligible	None
CA-SBR-13019 (DRK-171)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.04	Not Eligible	None
CA-SBR-13020 (DRK-173)	AP2 Lithic Scatter AP12 Quarry AP16 Other (Groundstone)	Phase 2	8	Not Eligible	None
CA-SBR-13021 (DRK-174)	AP2 Lithic Scatter AP12 Quarry	Phase 2	1	Not Eligible	None
CA-SBR-13024 (DRK-177)	AP2 Lithic Scatter	Phase 2	0.06	Not Eligible	None
CA-SBR-13025 (DRK-178)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.5	Not Eligible	None
CA-SBR-5796 (DRK-180)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.8	Not Eligible	None
CA-SBR-13026 (DRK-182)	AP2 Lithic scatter AP12 Quarry	Phase 2	0.5	Not Eligible	None
CA-SBR-13027 (DRK-184)	AP2 Lithic Scatter AP12 Quarry	Phase 2	0.03	Not Eligible	None
CA-SBR-13124/H (EJK-004)	AP2 lithic scatter.	Phase 2	2	Not Eligible	None

Table 5.7-12
Table of Archeological Sites Recommended Not Eligible
(Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13125 (EJK-005)	AP2 Lithic scatter	Phase 2	0.06	Not Eligible	None
CA-SBR-13126 (EJK-009)	AP2 lithic scatter AP12 Quarry	Phase 2	26	Not Eligible	None
CA-SBR-13029 (KRM-003)	AP 2 lithic scatter	Phase 2	0.2	Not Eligible	None
CA-SBR-13030 (KRM-008)	AP 2 lithic scatter	Phase 2	0.5	Not Eligible	None
CA-SBR-13033 (KRM-135)	AP2 lithic scatter AP12 Quarry	Phase 2	14	Not Eligible	None
CA-SBR-13039 (KRM-164)	AP2 lithic scatter	Phase 2	1	Not Eligible	None
CA-SBR-13040 (KRM-167)	AP2 lithic scatter. AP8 cairn/rock feature AP12 Quarry	Phase 2	3.3	Not Eligible	None
CA-SBR-13041 (KRM-170)	AP2 lithic scatter. AP8 cairn/ rock feature AP12 Quarry	Phase 2	21	Not Eligible	None
CA-SBR-13042 (LTL-008)	AP2 lithic scatter AP12 Quarry	Phase 2	0.7	Not Eligible	None
CA-SBR-13043 (LTL-009)	AP2 lithic scatter	Phase 2	1.1	Not Eligible	None
CA-SBR-13044 (LTL-011)	AP2 lithic scatter AP12 Quarry	Phase 2	0.1	Not Eligible	None
CA-SBR-13046 (LTL-015)	AP 2 lithic scatter AP12 Quarry	Phase 2	0.5	Not Eligible	None
CA-SBR-13047 (LTL-016)	AP 2 lithic scatter AP12 Quarry	Phase 2	0.3	Not Eligible	None
CA-SBR-13049 (LTL-018)	AP 2 lithic scatter	Phase 2	2	Not Eligible	None
CA-SBR-13050 (LTL-019)	AP 2 lithic scatter	Phase 2	0.03	Not Eligible	None
CA-SBR-13055 (RAN-101)	AP2 lithic scatter AP11 Hearths / pits AP12 Quarry	Phase 2	0.7	Not Eligible	None

Table 5.7-12
Table of Archeological Sites Recommended Not Eligible
(Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13059 (RAN-114)	AP2 lithic scatter AP12 Quarry	Phase 2	10	Not Eligible	None
CA-SBR-13060 (RAN-116)	AP2 lithic scatter AP12 Quarry	Phase 2	0.4	Not Eligible	None
CA-SBR-13061 (RAN-118)	AP2 lithic scatter AP12 Quarry	Phase 2	6	Not Eligible	None
CA-SBR-13062 (RAN-120)	AP2 Lithic scatter AP12 Quarry	Phase 2	12.16	Not Eligible	None
CA-SBR-13063 (RAN-123)	AP2 lithic scatter	Phase 2	0.01	Not Eligible	None
CA-SBR-13064 (RAN-128)	AP2 lithic scatter AP12 Quarry	Phase 2	0.8	Not Eligible	None
CA-SBR-13076 (RAN-173)	AP2 lithic scatter AP12 Quarry	Phase 2	10	Not Eligible	None
CA-SBR-13077 (RAN-175)	AP2 lithic scatter	Phase 2	0.01	Not Eligible	None
CA-SBR-13078 (RAN-177)	AP2 lithic scatter	Phase 2	0.2	Not Eligible	None
CA-SBR-13082 (RAN-183)	AP2 lithic scatter AP12 Quarry AH16 Other (rock cairn)	Phase 2	0.5	Not Eligible	None
CA-SBR-13083 (RAN-186)	AP2 lithic scatter	Phase 2	0.003	Not Eligible	None
CA-SBR-13084 (RAN-188)	AP2 lithic scatter	Phase 2	0.1	Not Eligible	None
CA-SBR-13086 (RSS-005)	AP2 Lithic scatter	Phase 2	0.7	Not Eligible	None
CA-SBR-13087 (RSS-006)	AP2 Lithic scatter	Phase 2	0.05	Not Eligible	None
CA-SBR-13088 (RSS-008)	AP2 Lithic scatter	Phase 2	0.5	Not Eligible	None
CA-SBR-13089 (RSS-009)	AP2 Lithic scatter	Phase 2	0.07	Not Eligible	None
CA-SBR-13090 (RSS-011)	AP2 Lithic scatter AP12 Quarry	Phase 2	1.31	Not Eligible	None

Table 5.7-12
Table of Archeological Sites Recommended Not Eligible
(Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13091 (RSS-013)	AP2 Lithic scatter	Phase 2	0.31	Not Eligible	None
CA-SBR-13092 (RSS-014)	AP2 Lithic scatter AP12 Quarry	Phase 2	4	Not Eligible	None
CA-SBR-13094 (RSS-018)	AP 2 Lithic scatter	Phase 2	2	Not Eligible	None
CA-SBR-13111 (SGB-120)	AP 2 Lithic Scatter	Phase 2	0.44	Not Eligible	None
CA-SBR-13112 (SGB-127)	AP 2 Lithic Scatter	Phase 2	0.53	Not Eligible	None
CA-SBR-1908	AP2 Lithic scatter AP8 Cairns/rock features AP11 Hearths/pits AP12 Quarry AH4 Privies/dumps/trash scatters	Phase 2	119.06	Not Eligible	None
CA-SBR-3076 (EJK-021)	AP 2 Lithic scatter	Phase 2	3	Not Eligible	None
CA-SBR-4681 (RAN 102)	AP 2 Lithic scatter AP11 Hearth/pits AP12 Quarry	Phase 2	6.2	Not Eligible	None
CA-SBR-5600 (RAN-189)	AP 2 Lithic scatter AP12 Quarry	Phase 2	4.6	Not Eligible	None
CA-SBR-6528 (RSS-020)	AP 2 Lithic scatter	Phase 2	12.06	Not Eligible	None
CA-SBR-6521	AP 2 lithic scatter AP12 Quarry AH16 Other (Cairn)	Phase 2	7	Not Eligible	None
CA-SBR-13098 (SGB-024)	AP2 Lithic Scatter AP12 Quarry	Pisgah Substation Triangle Area	0.2	Not Eligible	None

Table 5.7-12
Table of Archeological Sites Recommended Not Eligible
(Continued)

Site Designation	Site Classification	Project Location	Acres	NRHP/CRHR Recommendations	Management Recommendations
CA-SBR-13099 (SBG-032)	AP2 Lithic Scatter AP12 Quarry	Pisgah Substation Triangle Area	0.08	Not Eligible	None
CA-SBR-6512 and CA-SBR-6513 (SGB-028)	AP2 Lithic Scatter AP12 Quarry	Pisgah Substation Triangle Area	31	Not Eligible	None
CA-SBR-12995 (DRK-045)	AP2 Lithic Scatter AP15 Habitation debris	Access Roads Corridor	0.1	Not Eligible	None
CA-SBR-12996H (DRK-110H)	AH 4 Privies /dumps/ trash scatters	I-40 Temporary Access Roads Corridor	0.5	Not Eligible	None
CA-SBR-13000 (DRK-116)	AP2 Lithic scatter AP12 Quarry	I-40 Temporary Access Road Corridor	0.008	Not Eligible	None
CA-SBR-12992H (DRK-021H)	AH4 Privies / dumps / trash scatters	200-foot Buffer	1	Not Eligible	None
CA-SBR-12994 (DRK-026)	AP2 Lithic scatter	200-foot Buffer	0.1	Not Eligible	None

5.7.3.3 Direct and Indirect Effects

Direct impacts are typically associated with construction activities and have the potential to alter, diminish, or destroy all or part of the character and quality of historic architecture and archaeological resources. Indirect impacts are related to the primary consequences of the project and may cause a change in the character or use of the built environment by the introduction of undesirable auditory or visual intrusions.

Direct impacts may include site destruction/disturbance of all or part of the cultural resource, isolation of resource from its natural setting, and/or the introduction of physical, chemical or visual elements that are out-of-character with the resource and its setting. Indirect impacts may include new access routes that would increase the potential for vandalism/looting of sites.

5.7.3.3.1 Archaeological Resources

Based on the Solar One POD for the Project, of the 46 archaeological sites assumed eligible 45 of these would be subject to direct and indirect impacts from construction activities associated with the development of the Project. Of these, 40 sites are prehistoric, 2 are historic, and 3 are multi-component archaeological sites (see Table 7.1-1 above). In order to provide the lead agency with sufficient data necessary to make a decision with regard to eligibility of these resources to the NRHP and CRHR, an extended Class III limited subsurface testing program is recommended.

The Mitigation Measures outlined below provide a program for managing cultural resources that may be inadvertently discovered during ground-disturbing construction-related activities, which would require evaluation and eligibility determinations. It also includes a monitoring program to measure their effectiveness. The CEC and BLM are responsible for implementation, compliance, and approval of the proposed Mitigation Measures.

5.7.3.3.2 Built Environment

The Class III intensive field survey identified two previously recorded resources and three newly recorded resources that are recommended as eligible for the NRHP and CRHR. The two previously recorded resources are National Old Trails Highway/U.S. Route 66 and the Atlantic & Pacific/Atchison, Topeka, & Santa Fe Railroad, and the newly recorded resources are SCE 220-Kilovolt North and South Transmission Lines and Pisgah Substation.

CA-SBR-2910H (National Old Trails Highway and U.S. Route 66)

Abandoned segments of the National Old Trails Highway occurs within the Project APE. It includes eight remnant segments of a batched mix oil road. The condition of the road segments is poor—most of the road surface is crumbled and cracked, and in places has eroded. Some segments are buried in sand, but may be partially intact.

The National Old Trails Highway was designated by highway “booster” organizations in 1912, and by the late 1920s much of the highway was either oiled or surfaced with gravel. In 1926, the National Old Trails Highway was designated as U.S. Route 66, but in the 1930s it was abandoned in favor of a route to the south, which is the current alignment of historical U.S. Route 66.

Both the National Old Trails Highway and 1930s alignment of U.S. Route 66 have been recorded under site number CA-SBR-2910H. Because remnants of both the 1912 alignment of the National Old Trails Highway and the 1930s alignment of U.S. Route 66 are located within the Project APE and ½ mile buffer, separate update forms were completed for each. In the 1970s, the Bureau of Land Management recorded a segment of the 1912-era National Old Trails Highway as part of the California Desert Project, and a segment of the 1930s U.S. Route 66 within the Eastern Mojave Planning Unit. The CA-SBR-2910H site form was updated during a survey for the All American Pipeline replacement project in 2001, in which the 1930s alignment was recorded.

As a whole, the National Old Trails Highway is significant as an early automobile transportation route across the Mojave Desert and as an early route for the historically significant U.S. Route 66. It is eligible for the NRHP and/or CRHR under Criterion A/1, respectively. Further study may yield important information about the highway, and it also may be eligible for the NRHP and/or CRHR under Criterion D/4, respectively. Research did not reveal any associations with distinctive or significant persons. The road is a typical example of an early automobile roadway and most areas are in poor condition. The highway is not eligible for the NRHP and/or CRHR under Criterion B/2 or Criterion C/3.

The abandoned segments of National Old Trails Highway in the Project APE are isolated, from U.S. Route 66, non-contiguous in generally poor condition, and data potential is considered exhausted through recordation. These eight segments retain little historical integrity and are recommended to be non-contributing elements to U.S. Route 66 because of their poor condition.

The approximately 9.2-mile-long segment of U.S. Route 66 (CA-SBR-2910H) occurring within the ½ mile built environment buffer is an active frontage road for Interstate 40. The highway is listed in the NRHP and CRHR with contributing and non-contributing segments. There are no historical buildings associated with U.S. Route 66 in the Project area, although historical buildings associated with U.S. Route 66 are found in the nearby towns of Ludlow, located about 12 miles east of Pisgah, and in Newberry Springs, about 15 miles west of the Hector Road off-ramp. Interstate 40 is located to the north of the highway in the project vicinity. The south side of the highway is open, undeveloped, native desert. Four historic bridge structures were recorded in the ½ mile built environment buffer and all appear to be contributing elements to the highway.

U.S Route 66 is adjacent to the Project APE and this portion is intact and retains historical integrity of design. However, modern intrusions have compromised its historical setting, including Interstate 40, power lines, transmission lines, and an electrical substation. The Project would not have direct impacts on the highway, but the Solar One facilities would likely be visible from the roadway, which would have an indirect, visual impact. However, the visual impacts would not result in significant impacts to the highway because its setting has already been altered by modern utilities and infrastructure.

CA-SBR-6693H (Atlantic & Pacific/Atchison, Topeka, & Santa Fe Railroad)

CA-SBR-6693H (The Atlantic & Pacific/Atchison, Topeka, & Santa FE Railroad) has been previously determined to be eligible for the NRHP and the CRHR under Criterion A/1 for its association with the history of transportation in California. Although much of the railroad has been upgraded for continued use and few historical materials remain in place, it retains integrity of location and the level of significance established by the previous recordings. There are thirteen previously unrecorded bridge structures on the railroad within the Project APE and ½ mile built environment buffer. These bridge structures were recorded and documented on DPR 523 update forms (refer to Appendix Z - Confidential Appendix D). Five of the bridge structures retain sufficient historical integrity to be considered contributing elements to the railroad. The other 8 are either modern replacement bridges or have been highly modified.

The project POD is designed around this resource, no portions, other than a span bridge railroad crossing will occur within the railroad ROW the project development is not expected to result in any proximity impacts that that could impair the historical qualities that make the railroad eligible for the NRHP and CRHR. The Project POD is compatible with the utilitarian and industrial nature of these resources and would not result in a significant impact, nor would there be an adverse effect on the viewshed of this property.

Southern California Edison 220-Kilovolt North and South Transmission Lines

The Southern California Edison 220-Kilovolt North and South Lines were previously recorded in Nevada (site numbers 26CK6249 and 26CK6250) during the Boulder City/U.S. 93 Corridor Study, and were determined eligible for the NRHP by the Federal Highway Administration and Nevada State Historic Preservation Office (Federal Highway Administration 2005). Both the Southern California Edison 220-kilovolt North and South Lines are in-use and regularly maintained in the Solar 1 project area, but retain sufficient historical integrity to be recommended eligible for the NRHP and CRHR. Because of the association of the transmission lines to the Hoover Dam and their significance in the World War II effort, we recommend that the Southern California Edison 220-Kilovolt North and South Lines are eligible for the NRHP and/or under Criterion A/1.

The transmission lines were constructed using the same design and technology SCE has used for its existing high-voltage transmission lines in southern California. SCE and other southern California utilities companies were known as innovators in high-voltage systems (Hughes 1993). Further study would need to be conducted to determine the significance of the design to southern California utilities and how many examples of this type remain extant to determine if the SCE North and South transmission lines are eligible under Criterion C/3. Our research did not reveal any associations with any important persons (Criterion B/2) and the transmission line does not have the potential to yield important information (Criterion D/4).

CA-SBR-13117H (Pisgah Substation)

The Pisgah Substation is a switching station associated with the Southern California Edison 220-Kilovolt North and South Lines. Because it is a component of the transmission line, it is eligible for the NRHP and CRHR under Criterion A/1. Research did not reveal any association with distinctive or significant persons, and the substation is of a typical design for its era and is not a rare surviving example (Personal Communication, Thomas Taylor, Manager, Biological and Archaeological Resources, Southern California Edison, 18 September 2008). Further study of the substation does not have the potential to yield important information about the past.

The proposed project includes the expansion of the substation. The existing 210-by-333-foot (1.6 acres) substation would be expanded by approximately 35 acres to accommodate the facilities necessary to receive electric power generated by the Project. At this stage in project planning, final engineering plans have not been completed and the details of the substation modifications have not been finalized. However, modification of the substation would not result in demolition of or alterations to the historical buildings and no direct impacts to the buildings are expected. Wiring would be replaced, but regular repairs and upgrades to the equipment have occurred since the initial construction, and the proposed replacement of wiring for the Project is not expected to result in significant impacts or an adverse effect.

The substation footprint would be enlarged substantially and the current setting of the substation would not be altered, which includes historic and modern transmission lines and I-40. The Pisgah Substation has been recommended as eligible for the NRHP and CRHR under Criterion A/1 for its association with the SCE 220-kilovolt transmission lines. The substation does not possess architectural or design significance. The setting has been modified since its initial construction. Because the substation is significant for its historical associations rather than its architecture, the setting is not a character-defining element of the substation. The expansion of the substation would not impair the historical qualities that make the substation eligible for the NRHP and CRHR, and no adverse effects are anticipated.

5.7.3.4 Cumulative Impacts

A cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project to cultural resources listed or eligible for inclusion in the NRHP and/or CRHR. (Pub. Resources Code § 21083; Cal.Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and 15355). NRHP eligibility recommendations are included in this report; however, final determination is made by BLM and SHPO. Final determination of CRHR eligibility is decided by CEC for this Project. These determinations have not yet been made by either agency. It is additionally noted that, at this time, no projects area permitted in areas adjacent to the Solar One Project APE. Assessment of cumulative impacts is, therefore, limited to those associated with existing impacts, such as road and railroad constructions, and those of the Solar One Project.

There are no existing approved projects in the Project vicinity to determine cumulative impacts at this time. There are several pending permits for renewable energy projects, although none are currently permitted. There are approximately 22 pending renewable energy permits in the region; of these, 18 are for Solar Energy, 2 are for Wind Energy, and 2 are for both Solar and Wind. The pending permits encompass approximately 138,000 acres for Solar and 51,900 acres for Wind. The existing Solar One Permit also includes the proposed SES Solar Three, LLC Project, which is adjacent to Solar One west of the Project APE.

As described in Section 5.7, Cultural Resources, the Project has the potential to effect NRHP and CRHR cultural resources within the APE and regulatory buffers. Two of which have been determined eligible: CA-SBR-2910H and CA-SBR-6693H. SBR-2910H is the National Old Trails Highway/Route 66. CA-SBR-6693H is the railroad line that was originally built in 1883 for the Atlantic and Pacific Railroad Company. From 1890, the railroad was operated by the Atchinson, Topeka & Santa Fe Railroad until its merger in 1996 with the Burlington Northern Santa Fe Railway. The Project POD has been designed to avoid both of these resources. Mitigation measures (avoidance) have been provided to avoid these resources during construction-related activities (Appendix Z - Section 7). There are no cumulative impacts identified for these eligible cultural resources in relation to this Project combined with other projects in the area.

Three of the newly recorded built environment resources are recommended as eligible for the NRHP and/or CRHR and include the Southern California Edison North and South 220-Kilovolt Transmission Lines (North CA-SBR-13115H and South CA-SBR-13116H) and the Pisgah Substation (CA-SBR-13117H). In addition there were 45 archaeological sites identified within the Project APE that are assumed eligible for NRHP and/or CHRR. An extended Class III limited subsurface testing program is recommended for these 45 sites to acquire additional data to support the lead agencies in making their final eligibility determinations.

Therefore, there are 48 cultural (3 built and 45 archaeological) resources within the Project APE for which eligibility determinations have not yet been made by the lead agencies. As a result, a cumulative impact analysis cannot be completed at this time until determinations are made by the agencies.

Cumulative impacts will need to be readdressed once the eligibility of these resources has been determined by the lead agencies.

It is possible that there may be a loss to historic properties (cultural resources that have been determined eligible) due to the Solar One Project which could result in cumulatively significant impacts. However, these impacts may be reduced to below the level of significance through recordation, data recovery, partial preservation, and public interpretation in accordance with federal and state guidelines.

5.7.4 Extended Class III Limited Subsurface Testing

A total of 46 (1 is in NAP) archaeological within the Project APE are assumed eligible for NRHP and CRHR listing under Criterion D/1. An extended Class III limited subsurface testing program is recommended for the 45 archaeological sites within the APE and 200-foot regulatory buffer to provide both the BLM and CEC sufficient data necessary in determining eligibility of these resources and to identify if there would be adverse effects on any of the resources.

Sites that are defined as sparse lithic scatters under the CARIDAP Program should be tested and surface collections of temporal or material source diagnostic artifacts should be made under the guidelines of this program. The CARIDAP Program provides testing methods that include a minimum necessary number of Subsurface Exploratory Excavation Units (SEEU), 50 x 50 centimeter (cm) in size (square or diameter) with the total number based on site size. The minimum number of SEEU's is defined as follows:

- Site measures less that a 100 m^2 = minimum one (1) unit;
- Site measures between 100 and 500 m^2 = minimum two (2) units;
- Site measures between 500 and 2000 m^2 = minimum four (4) units;
- Site measures between 2000 and 5000 m^2 = minimum six (6) units;
- Site measures between 5000 and 10000 m^2 = minimum eight (8) units.

Sites that are not identified as meeting the CARIDAP definition should be tested using a combination of 1x1 meter units and 50 cm diameter SEEUs based on site size, density, and composition.

Artifacts collected during this process should be point provenienced and collected for further analysis in an archaeological laboratory. Testing may include protein residue analysis and a small sample test for obsidian hydration to determine the source of the materials. The result of this survey identified one isolated finding as an obsidian flake. The isolate is not considered eligible, although sourcing this material may provide additional information important to the prehistory of this region. Artifacts collected during an extended Class III limited testing plan should be prepared for curation in appropriate archival quality materials, cataloged, and prepared for final curation.

A geomorphological assessment is recommended to better understand the prehistoric and paleo-environments. The surface and subsurface data collected from testing should then be utilized in conjunction with the geomorphological findings to determine a predictive model regarding the potential for subsurface deposits, and for future use in identifying potential areas of archaeological sensitivity.

5.7.5 Mitigation Measures

Measures to ensure avoidance of cultural resources and measures to avoid direct and indirect impacts to nearby cultural resources, are described below. These measures are intended to follow extended Class III subsurface testing. These mitigation measures would apply to cultural resources in the Project APE during construction-related activities. With implementation of these measures, no significant impacts to known cultural resources would be anticipated. These measures are considered highly effective in avoiding adverse impacts to known and/or previously unknown cultural resources within the Project APE. In addition, the Mitigation Measures provide for treatment/data recovery of known and/or previously unknown cultural resources to less than significant levels if avoidance is not feasible.

The effectiveness of the monitoring program will be measured through monthly and end of construction final monitoring reports based on completed daily monitoring logs and non-compliance forms. The components and protocols of the monitoring program will be formalized in a CEC/BLM approved Cultural Resources Monitoring and Mitigation Plan/Historic Properties Treatment Plan and a Worker Environmental Awareness Program.

CUL-1. Avoidance

CUL-1: In the event cultural resources are encountered prior to or during construction activities, including subsurface excavation, construction activities in the immediate vicinity of the identified resource shall be halted and a qualified archaeologist shall identify the nature and boundary of the finds and assess whether the proposed activities will impact a cultural resource. Routes of any access roads that must be built or graded that are outside of areas previously surveyed for cultural resources will be subjected to archaeological survey prior to construction. In the event the resource is identified as a potentially significant cultural resource, planned construction activities shall be modified to avoid the resource if feasible. If it is not feasible to avoid the resource, the archaeologist shall identify the proper course of testing, excavation, recovery, and documentation in consultation with BLM (with SHPO concurrence) and CEC to be undertaken in order to reduce Project related impacts to a less than significant level. In the event that archaeological resources are discovered during the course of construction, activities related to the Project, grading, and/or excavation activities within 100 feet of the potentially significant resource should be monitored by a qualified archaeologist.

CUL-2. Physical Demarcation and Protection

CUL-2: In instances where a Project facility must be placed within 100 feet of a known cultural resource previously found eligible for inclusion on the NRHP and/or the CRHR, the cultural resource will be temporarily fenced or otherwise demarcated on the ground, and the area will be designated environmentally sensitive. Construction equipment will be directed away from the cultural resource and construction personnel will be directed to avoid entering the area. Where cultural resource boundaries are unknown, the protected area will include a buffer zone with a 100-foot radius. In some cases, additional archaeological work may be required to demarcate the boundaries of the cultural resource to ascertain whether the cultural resource can be avoided. Fencing shall be placed along NAP areas in order to visually demarcate those areas not previously surveyed as avoidance areas.

CUL-3. Preconstruction Assessment and Training

CUL-3: One or more qualified professional archaeologists shall be retained to monitor all ground-disturbing activities associated with the multiple Project areas. Ground disturbing activities include clearing, grubbing, grading, and trenching within the Project APE. The archaeological monitor(s) shall visit the Project prior to commencement of construction activities to become familiar with site conditions. The archaeological monitor(s) shall attend pre-construction meetings and work with the BLM, CEC, the client, and construction management staff to suspend or redirect construction activities if cultural materials are encountered. The archaeological monitor(s) shall also provide training to appropriate construction personnel on the site to explain the importance of and legal basis for the protection of significant archaeological resources.

CUL-4. Archaeological Monitoring

CUL-4: The archaeological monitors shall be equipped with a cellular telephone to ensure rapid communication with URS senior cultural resources staff to promptly report any cultural finds or discuss any problems as they are encountered in the field. Archaeological monitors shall keep a daily monitoring log of construction activities, observations, types of equipment used, problems encountered, and any new archaeological discovery (including the cultural material observed and location). Photographs shall be taken as necessary to supplement the documentation. These logs shall be signed and dated by the archaeological monitor(s) and included within the monitoring report.

The archaeological monitor(s) shall observe all ground-disturbing activities within the Project APE and regulatory buffers. The archaeological monitor(s) will be authorized to temporarily halt ground-disturbing activities in the immediate vicinity of a discovery in the event that cultural resources are uncovered during construction. Similarly, if the construction staff or others identify cultural resources during construction activities, they shall halt construction in the immediate vicinity, and immediately notify the archaeological monitor(s) and Project supervisor. The archaeological monitor(s) shall then immediately notify URS senior cultural resources staff. The archaeological monitor(s) shall use staking and flagging tape to delineate the area of the find and protect the resources from construction activities. Construction activities shall not take place within the delineated discovery area until the archaeological monitor(s), in consultation with URS senior cultural resources staff and the BLM/CEC can inspect and evaluate the significance of the find and implement mitigation measures, if needed. During this time, construction activities may be redirected to other areas outside of the flagged area.

After all ground-disturbing activities are complete, a cultural resources compliance monitoring report shall be prepared by URS cultural resources staff. The report shall include the daily monitoring logs as an appendix. The report shall also include the level of effort involved in monitoring cultural resources, a description of activities monitored, and the number and types of new cultural resources discoveries, including assessment and treatment action.

CUL-5. Resource Recordation

CUL-5: The archaeological monitor(s) shall follow accepted professional standards in recording any discovery and shall submit applicable Department of Parks and Recreation forms to the senior cultural resource staff for review. If the discovery is deemed not significant by URS senior cultural resources staff, construction activities may proceed. Should a potentially significant cultural resource be encountered during monitoring, evaluation of this resource to determine significance will be required. Significant cultural resources impacted by the Project would require additional mitigation, which may include data recovery.

CUL-6. Treatment Plan/Data Recovery and Evaluation

CUL-6: In the event that a newly identified potentially significant resource cannot be avoided during the placement of project components, further archaeological work will be undertaken as appropriate to assess the importance/significance of the resource prior to the Project implementation. The work shall be conducted in formal compliance with Section 106 of NHPA and CEQA Sections 15064.5 and 15126.4.

If a newly discovered cultural resource is determined to be eligible for listing in the NRHP and/or CRHR avoidance shall be recommended. If avoidance is not feasible, a general research design and treatment plan, shall be developed and approved by the BLM and CEC prior to onset of construction related activities.

The treatment plan should include an emergency excavation strategy designed to recover a representative data sample of the site. The treatment plan shall include an excavation strategy based on the research design, field data collection methods, artifact analysis and processing , and procedures and guidelines for final curation of the collection(s).

CUL-7. Provisions for Encountering Human Remains

CUL-7: If human remains are encountered, State Health and Safety Code Section 7050.5 state that no further disturbance shall occur until the County Coroner has made necessary findings as to origin and disposition of the remains pursuant to Public Resources Code Section 5097.98. The following actions must be taken in the event that human remains are discovered on Federal/Private/State land:

- Stop work immediately and contact the County Coroner and BLM Field Office Archaeologist. BLM also requires that a 300 foot radius surrounding the discovery be cleared.
- The Coroner has two working days to examine human remains after being notified by the responsible person. If the remains are determined to be prehistoric of Native American origin, the BLM will notify the Native American Heritage Commission, ;
- The Native American Heritage Commission will immediately notify the person it believes to be the most likely descendent of the deceased Native American. With the permission of the landowner or agency or an authorized representative, the MLD may inspect the site of the discovery; and
- The most likely descendent makes recommendations to the owner, or representative, for the treatment or disposition, with proper dignity, of the human remains and grave goods.

If the commission is unable to identify a descendent, or the descendent identified fails to make a recommendation, or the landowner rejects the recommendations of the descendent and mediation provided for in subdivision (k) of Section 5097.94 fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with the Native American burial(s) with appropriate dignity on the property in a location not subject to further subsurface disturbance.

With regard to human remains discovered on Federal Lands (BLM), protocols set-forth by the National Graves and Repatriation Act (NAGRPA) must be followed by the federal agency responsible. The BLM will comply with all NAGPRA protocols regarding excavation and inadvertent discoveries of human remains. See LORS listed below for NAGPRA.

CUL-8. Laboratory Analysis and Curation

CUL-8: Cultural material removed during the course of monitoring or other mitigation measures shall be bagged and catalogued in the field and analyzed. Cultural materials shall be analyzed to characterize the resource(s) and their association to existing regional chronologies. The materials, and the contexts from which they were sampled, shall also be evaluated with regard to the eligibility criteria for inclusion on the NRHP and/or CRHR.

The objectives of laboratory processing and analysis are to determine to the extent possible the date, function, cultural affiliation and significance of the archaeological site(s), and to prepare artifacts for permanent curation. Artifacts shall be processed (*i.e.,* cleaned, catalogued, and analyzed) according to the Secretary of the Interior's Standards and Guidelines for curation (36 CFR 79). Artifacts shall be gently washed using tap water and a soft toothbrush. Delicate and/or unstable materials, such as decayed metal and organic material, shall be carefully dry-brushed with a soft toothbrush. After drying, artifacts shall be analyzed, catalogued, and rebagged according to provenience and type. Artifacts shall have acid-free paper labels with full provenience information, including the state site number, catalog number, shovel test pit or test unit number, stratum, and date. All artifact information shall be entered into a customized computer-based application.

All artifacts, monitoring logs, and photographs shall be placed in appropriately labeled boxes for secure temporary storage of the consulting firm until a final curation facility is determined. As part of mitigation requirements, final curation shall be at a 36 CFR 79 compliant facility acceptable to the BLM and CEC and funded by the client.

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Table 5.7-13
Mitigation Monitoring Program

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
CUL-1: Construction Operations Have the Potential to Affect known Cultural Resources.	CUL-1 Avoidance In the event cultural resources are encountered prior to or during construction activities, including subsurface excavation, construction activities in the immediate vicinity of the identified resource shall be halted and a qualified archaeologist shall identify the nature and boundary of the finds and assess whether the proposed activities will impact a cultural resource. Routes of any access roads that must be built or graded that are outside of areas previously surveyed for cultural resources will be subjected to archaeological survey prior to construction. In the event the resource is identified as a potentially significant cultural resource, planned construction activities shall be modified to avoid the resource if feasible. If it is not feasible to avoid the resource, the archaeologist shall identify the proper course of testing, excavation, recovery, and documentation to be undertaken in order to reduce Project related impacts to a less than significant level. In the event that archaeological resources are discovered during the course of construction, activities related to the Project, grading, and/or excavation activities within 100 feet of the potentially significant resource should be monitored by a qualified archaeologist.	Lead Agency approves designated environmentally sensitive area (ESA) Documentation that project engineer is aware and has ground checked ESA location(s) with an archaeologist present	Known archaeological resources are not adversely affected by construction activity	BLM and CEC	Prior to and during construction

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
CUL-2 Construction Operations Have the Potential to Affect known Cultural Resources.	CUL-2 Physical Demarcation and Projection In instances where a Project facility must be placed within 100 feet of a known cultural resource previously found eligible for inclusion on the NRHP and/or the CRHR, the cultural resource will be temporarily fenced or otherwise demarcated on the ground, and the area will be designated environmentally sensitive. Construction equipment will be directed away from the cultural resource and construction personnel will be directed to avoid entering the area. Where cultural resource boundaries are unknown, the protected area will include a buffer zone with a 100-foot radius. In some cases, additional archaeological work may be required to demarcate the boundaries of the cultural resource to ascertain whether the cultural resource can be avoided. Fencing shall be placed along NAP areas to demarcate avoidance areas.	Report of the completion of demarcation and approval by lead agency in the conditions of certification	Known cultural resources are not adversely affected by construction activity	BLM and CEC	Prior to and during construction
CUL-3 Construction Operations Have the Potential to Affect known and/or previously unknown Cultural Resources.	CUL-3 Preconstruction Assessment and Training A qualified professional archaeologist shall be retained to monitor all ground-disturbing activities associated with the Project. Ground disturbing activities include clearing, grubbing, grading, and trenching within the Project APE. The archaeological monitor shall visit the Project prior to commencement of construction activities to become familiar with site conditions. The archaeological monitor shall attend pre-construction meetings and work with the BLM, CEC, the client, and construction management staff to suspend or redirect construction activities if cultural materials are encountered. The archaeological monitor shall also provide training to appropriate construction personnel on the site to explain the importance of and legal basis for the protection of significant archaeological resources.	Report shall be filed with the Lead agency upon completion of this task. Report shall contain the name and qualifications of the archaeologist as well as a description of the training	Known and/or previously unknown cultural resources are not adversely affected by construction activity	BLM and CEC	Prior to and during construction.

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
CUL-4: Previously Unknown Archaeological Resources May Be Damaged or Destroyed During Project Construction	CUL-4 Archaeological Monitoring The archaeological monitor(s) shall be equipped with a cellular telephone to ensure rapid communication with URS senior cultural resources staff to promptly report any cultural finds or discuss any problems as they are encountered in the field. Archaeological monitor(s) shall keep a daily monitoring log of construction activities, observations, types of equipment used, problems encountered, and any new archaeological discovery (including the cultural material observed and location). Photographs shall be taken as necessary to supplement the documentation. These logs shall be signed and dated by the archaeological monitor(s) and included within the monitoring report. The archaeological monitor(s) shall observe all ground-disturbing activities within the Project APE and regulatory buffers. The archaeological monitor(s) will be authorized to temporarily halt ground-disturbing activities in the immediate vicinity of a discovery in the event that cultural resources are uncovered during construction. Similarly, if the construction staff or others identify cultural resources during construction activities, they shall halt construction in the immediate vicinity, and immediately notify the archaeological monitor(s) and Project supervisor. The archaeological monitor(s) shall then immediately notify URS senior cultural resources staff. The archaeological monitor(s) shall use staking and flagging tape to delineate the area of the find and protect the resources from construction activities. Construction activities shall not take place within the delineated discovery area until the archaeological monitor, in consultation with URS senior cultural resources staff and the CEC can inspect and evaluate the significance of the find and implement mitigation measures, if needed. During this time, construction	BLM and CEC review and approve monthly monitoring reports. BLM and CEC receive immediate notification of new discoveries.	Known and/or previously unknown cultural resources are mitigated to less than significant levels prior to construction activity. .	BLM and CEC	During construction.

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	activities may be redirected to other areas outside of the flagged area. After all ground-disturbing activities are complete, a cultural resources compliance monitoring report shall be prepared by URS cultural resources staff. The report shall include the daily monitoring logs as an appendix. The report shall also include the level of effort involved in monitoring cultural resources, a description of activities monitored, and the number and types of new cultural resources discoveries, including assessment and treatment action.				
CUL-5: Previously Unknown Cultural Resources May Be Damaged or Destroyed During Project Construction	<u>CUL-5 Resource Recordation</u> The archaeological monitor shall follow accepted professional standards in recording any discovery and shall submit applicable Department of Parks and Recreation forms to the senior cultural resource staff for review. If the discovery is deemed not significant by URS senior cultural resources staff, construction activities may proceed. Should a potentially significant cultural resource be encountered during monitoring, evaluation of the resource to determine significance will be required. Significant cultural resources impacted by the Project would require additional mitigation, which may include data recovery.	Cultural resources are documented on DPR forms and submitted to senior archaeologist for review and recommendation. DPRs are sent to BLM and CEC for review and to CHRIS at SBCM.	Known and/or previously unknown cultural resources are not adversely affected by construction activity. Known and/or previously unknown cultural resources are mitigated to less than significant levels prior to construction activity.	BLM and CEC	Prior to and during construction

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
CUL-6: Previously Unknown Archaeological Resources May Be Damaged or Destroyed During Project Construction	CUL-6 Treatment Plan/Data Recovery and Evaluation In the event that a newly identified potentially significant resource cannot be avoided during the placement of any project component, further archaeological work will be undertaken as appropriate to assess the importance/significance of the resource prior to Project implementation. The work shall be conducted in compliance with Section 106 of NHPA and CEQA Section 15064.5 and 15126.4. If a newly discovered cultural resource is determined to be eligible for listing in the NRHP and/or CRHR avoidance shall be recommended. If avoidance is not feasible, a general research design and treatment plan, shall be developed and approved by the BLM and CEC prior to onset of construction related activities. The treatment plan should include an emergency excavation strategy designed to recover a representative data sample of the site. The treatment plan shall include an excavation strategy based on the research design, field data collection methods, artifact analysis and processing , and procedures and guidelines for the final curation of the collection(s).	BLM and CEC review and approve research design and data recovery plan.	Known and/or previously unknown cultural resources are mitigated to less than significant levels prior to construction.	BLM and CEC	Prior to and during construction

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
CUL-7: Human remains could be Inadvertently Exposed and/or Damaged During Project Construction.	*CUL-7. Provisions for Encountering Human Remains* If human remains are encountered prior to or during Project Construction, State Health and Safety Code Section 7050.5 state that no further disturbance shall occur until the County Coroner has made necessary findings as to origin and disposition of the remains pursuant to Public Resources Code Section 5097.98. The Monitoring/reporting actions must be taken in the event that human remains are discovered on Federal/Private/State land. With regard to human remains discovered on Federal Lands (BLM), protocols set-forth by the National Graves and Repatriation Act (NAGRPA) must be followed by the Federal Agency responsible. The BLM will comply with all NAGPRA protocols regarding excavation and inadvertent discoveries of human remains.	1. Stop work immediately and contact the County Coroner. The coroner must be notified immediately of the find and the BLM archaeologist shall be notified concurrently. 2. The Coroner has two working days to examine human remains after being notified by the responsible person. If the remains are determined to be prehistoric of Native American origin, the BLM will notify the Native American Heritage Commission,. 3. The Native American Heritage Commission will immediately notify the person it believes to be the most likely descendent (MLD) of the deceased Native American. With the permission of the landowner or agency or an authorized representative, the MLD may inspect the site of the	Human Remains are not disturbed prior to or during Project construction.	BLM and CEC	Prior to and during construction

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
		discovery; and 4.The most likely descendent makes recommendations to the owner, or representative, for the treatment or disposition, with proper dignity, of the human remains and grave goods. If the commission is unable to identify a descendent, or the descendent identified fails to make a recommendation, or the landowner rejects the recommendations of the descendent and the mediation provided for in subdivision (k) of Section 5097.94 fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with the Native American burial(s) with appropriate dignity on the property in a location not subject to further subsurface disturbance.			

Table 5.7-13
Mitigation Monitoring Program
(Continued)

Impact	Mitigation Measure	Monitoring / Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
CUL-8: Previously Unknown Cultural Resources May Be Damaged or Destroyed During Project Construction	CUL-8 Laboratory Analysis and Curation Cultural material removed during the course of monitoring or other mitigation measures shall be bagged and catalogued in the field, and analyzed. Cultural materials shall be analyzed to characterize the resource(s) and their association to existing regional chronologies. The materials, and the contexts from which they were sampled shall also be evaluated with regard to the eligibility criteria for inclusion on the NAHP and CRHR. The objectives of laboratory processing and analysis are to determine to the extent possible the date, function, cultural affiliation and significance of the archaeological sites, and to prepare artifacts for permanent curation. Artifacts shall be processed (i.e., cleaned, catalogued, and analyzed) according to the Secretary of the Interior's Standards and Guidelines for curation (36 CFR 79). Artifacts shall be gently washed using tap water and a soft toothbrush. Delicate and/or unstable materials, such as decayed metal and organic material, shall be carefully dry-brushed with a soft toothbrush. After drying, artifacts shall be analyzed, catalogued, and rebagged according to provenience and type. Artifacts shall have acid-free paper labels with full provenience information, including the state site number, catalog number, shovel test pit or test unit number, stratum, and date. All artifact information shall be entered into a customized computer-based application. All artifacts, monitoring logs, and photographs shall be placed in appropriately labeled boxes for temporary storage of the monitoring firm. As part of mitigation requirements, final curation shall be at a 36 CFR 79 compliant facility acceptable to the BLM and CEC and funded by the client.	Final monitoring report is submitted to BLM and CEC for review and approval. Artifacts recovered during Testing and/or Data Recovery are prepared for curation and submitted to a repository determined by BLM. Documentation of final curation facility is provided to BLM, CEC, and CHRIS at SBCM.	Cultural Resources/artifacts are properly curated and available for future research.	BLM and CEC	Prior to, and during construction

5.7.6 LORS Compliance

With implementation of the mitigation measures outlined above, the Project would be consistent with all applicable laws, ordinances, regulations, and standards (LORS). Cultural resources potentially affected by the Project are subject to compliance with the provisions outlined in CEQA, CRHR, Section 106 and NRHP. If a cultural resource is discovered during construction and cannot be avoided, a program of site evaluation would be undertaken to ascertain site significance under CEQA, CRHR, Section 106 and NRHP. All applicable LORS are summarized below in Table 5.7-14:

Table 5.7-14
Summary of Federal and State LORS

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Federal				
National Historic Preservation Act of 1966 as amended, Public Law 102-575	Requires identification, evaluation, preservation, and mitigation of effects to historic properties that are listed or eligible for inclusion on the National Register of Historic Places.	Section 5.7.11.1	BLM; State Historic Preservation Office	James Shearer Archaeologist Barstow Field Office 2601 Barstow Road Barstow, CA 92310 760-252-6034
Archaeological Resources Protection Act of 1979 as amended, Public Law 96-95	Provides for the protection of archaeological resources and sites that are on public lands and Indian lands.	Section 5.7.11.1	BLM	James Shearer
Federal Land Policy and Management Act of 1976 as amended, Public Law 94-579	Establishes goals and policies in administration of public lands by the Bureau of Land Management to include preservation of historic and archaeological resources.	Section 5.7.11.1	BLM	James Shearer
Native American Graves Protection and Repatriation Act, Public Law 101-601	Requires federal agencies and institutions that receive federal funding to return Native American cultural items and human remains to their respective peoples. Cultural items include funerary objects, sacred objects, and objects of cultural patrimony.	Section 5.7.11.7	BLM	James Shearer

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Antiquities Act of 1906, as amended	Prescribes penalties for the theft or destruction of archaeological resources on public lands and establishes procedures for issuance of permits for the conduct of research on cultural resources on public land.	Section 5.7.11.1	BLM	James Shearer
Executive Order No. 11593: Protection And Enhancement Of The Cultural Environment, 1971	Requires Federal agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained; in addition, institutes procedures to assure that Federal plans and programs contribute to the preservation and enhancement of non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.	Section 5.7.11.1	BLM	James Shearer
National Environmental Policy Act of 1969, as amended, Public Law 91-190	Requires the analysis of the effect of federal undertakings on the environment to include the effect on cultural resources.	Section 5.7.11.1	BLM	James Shearer

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Public Law 106-45 An Act of 1999 HR 66	To preserve the cultural resources of the Route 66 corridor and to authorize the Secretary of the Interior to provide assistance	Section 5.7.11.1	BLM	James Shearer
State Jurisdiction				
The Warren-Alquist Act 1974, as amended	Requires cultural, historic, and aesthetic resources be taken into account in consideration of an Application for Certification. Requires that a portion of any such resources on public land be set aside for public access.	Section 5.7.11.1	CEC	Michael McGuirt Heritage Resources Analyst California Energy Commission Energy Facilities Siting Division Environmental Office 1516 9th Street, MS 40 Sacramento, CA 916-814-5512 916-654-4870
CEQA of 1970, as amended	Applies to discretionary projects causing a significant effect on the environment and a substantial adverse change in the significance of an historical or archaeological resource.	Section 5.7.11.1	CEC	Michael McGuirt
California PRC Section 5020-5029.5	Establishes the CRHR criterion, and creates the California Historic Landmarks Committee and authorizes the Department of Parks and Recreation to designate registered Historical Landmarks and registered Points of Historical Interest; establishes criteria for the protection and preservation of historic resources.	Section 5.7.11.1	CEC; State Historic Preservation Office; Department of Parks and Recreation	Michael McGuirt Milford Wayne Donaldson Fellow of the American Institute of Architects, State Historic Preservation Officer California Department of Parks and Recreation Office of Historic Preservation 1416 9th Street, Room 1442 Sacramento, CA 95814 P.O. Box 942896 Sacramento, CA 94296-0001

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Senate Bill 922 (Ducheny 2005)	Exempts from California Public Records Act Native American graves, cemeteries, archaeological site information, and sacred places in the possession of the Native American Heritage Commission and other state or local agencies.	Section 5.7.11.1	CEC	Michael McGuirt Larry Myers Native American Heritage Commission Executive Secretary 915 Capitol Mall, Room 364 Sacramento, CA 95814 916-653-4082
Senate Bill 18 (Burton 2004)	Protection and preservation of Native American Traditional Cultural Places during city and county general plan development.	Section 5.7.11.1	CEC	Michael McGuirt
Senate Concurrent Resolution Number 87 (1994)	Provides for the identification and protection of traditional Native American resource gathering sites on state land.	N/A	CEC	Michael McGuirt
Administrative Code, Title 14, Section 4307	No person shall remove, injure, deface, or destroy any object of paleontological, archaeological, or historical interest or value.	Section 5.7.10.1	CEC	Michael McGuirt
Government Code, Sections 6253, 6254, 6254.10	Disclosure of archaeological site information is not required for records that relate to archaeological site information maintained by the Department of Parks and Recreation, the State Historical Resources Commission, or the State Lands Commission.	N/A	CEC	Michael McGuirt

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
Health and Safety Code, Section 7050.5	Requires construction or excavation be stopped near human remains until a coroner determines whether the remains are Native American; requires the coroner to contact the NAHC if the remains are Native American.	Section 5.7.11.7	CEC; County Coroner	Michael McGuirt Gary Penrod San Bernardino County Sheriff Coroner 175 South Lena Road San Bernardino, CA 92415 909-387-2978
Health and Safety Code, Section 7051	Establishes removal of human remains from internment, or from a place of storage while awaiting internment or cremation, with the intent to sell them or to dissect them with malice or wantonness as a public offense punishable by imprisonment in a state prison.	Section 5.7.11.7	CEC; County Coroner	Michael McGuirt Gary Penrod
Health and Safety Code, Section 7052	States that willing mutilation of, disinterment of, removal from a place of disinterment of, and sexual penetration of or sexual contact with any remains known to be human are felony offenses.	Section 5.7.11.7	CEC; County Coroner	Michael McGuirt Gary Penrod
Penal Code, Title 14, Section 622.5	Misdemeanor offense for any person, other than the owner, who willfully damages or destroys archaeological or historic features on public or privately owned land.	Section 5.7.11.1	CEC	Michael McGuirt

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
PRC 5097-5097.6	Provides guidance for state agencies in the management of archaeological, paleontological, and historical sites affected by major public works project on state land.	Section 5.7.11	CEC	Michael McGuirt
PRC 5097.9-5097.991	Establishes regulations for the protection of Native American religious places; establishes the Native American Heritage Commission; California Native American Remains and Associated Grave artifacts shall be repatriated; notification of discovery of Native American human remains to a most likely descendent.	Section 5.7.11.1 Section 5.7.11.7	CEC	Michael McGuirt
CCR Section 1427	Recognizes that California's archaeological resources are endangered by urban development; the Legislature finds that these resources need preserving; it is a misdemeanor to alter any archaeological evidence found in any cave, or to remove any materials from a cave.	Section 5.7.11.1	CEC	Michael McGuirt
Senate Concurrent Resolution Number 43	Requires all state agencies to cooperate with programs of archaeological survey and excavation, and to preserve known archaeological resources whenever reasonable.	Section 5.7.11.1	CEC	Michael McGuirt
LOCAL JURISDICTION				

LORS	Requirements	Conformance Section	Administering Agency	Agency Contact
County of San Bernardino General Plan, Section V Conservation Element	Goal CO 3: The County will preserve and promote its historic and prehistoric cultural heritage. Goal CO 4: Protect Cultural and Paleontological resources within the Mountain Region. Goal CO 6: Protect Cultural and Paleontological resources within the Desert Region.	Section 5.7.11.1	San Bernardino County Planning Department	Julie Rynerson Rock Director San Bernardino Office 385 N Arrowhead Avenue San Bernardino CA 92415 (909) 387-8311
City of Barstow General Plan Cultural Resources Element	Goal IV.1: The City shall actively support cultural facilities and activities. Goal IV.2: Strive to preserve and protect important features and sites (historic, archaeological and paleontological) as defined under this Element's Cultural Resources Management Plan, from degradation and destruction.	Section 5.7.11.1	City of Barstow Planning Department	Mike Massimini Associate City Planner City Hall 220 E. Mountain View St. Suite A Barstow, CA 92311 760-255-5152
City of Barstow Municipal Code, Title 19, Chapter 31	Establishes policies regarding City's historic resources district, the city's preservation officer, and alternations and use of historic resources.	Section 5.7.11.1	City of Barstow Planning Department	Mike Massimini Associate City Planner City Hall 220 E. Mountain View St. Suite A Barstow, CA 92311 760-255-5152

5.7.5.1 Federal

This project is a federal undertaking and requires conformance with the NEPA. NEPA requires the federal government to use all practicable means to preserve important historic, cultural, and natural aspects of our national heritage. In addition to compliance with NEPA, the Project is required to be in conformance with Section 106 and 110 of the NHPA, as amended. Section 106 requires federal agencies with either direct or indirect jurisdiction over a proposed undertaking to take into account the effect of the undertaking on any historic property that is NRHP –listed or NRHP–eligible. Section 110 requires federal agencies to assume the responsibility for the preservation of historic properties under their control. Historic properties are defined as prehistoric and historic sites, buildings, structures, districts, and objects included in, or eligible for inclusion in the NRHP, as well as artifacts, records, and remains related to such properties (NHPA §301[5]). 36 CFR §800 stipulates that the SHPO must be consulted to determine the eligibility of a historic property for listing in the NRHP. Under 36 CFR §60.4, cultural resources may be eligible for nomination to the NRHP if they "... possess integrity of location, design, setting, materials, workmanship, feeling and association..." and if these resources are either associated with (A) "significant themes in our Nation's history," (B) "significant persons in our Nation's history," or if they (C) "embody distinctive construction characteristics or works of a master," or if they (D) "have yielded or have the potential to yield information important to history or prehistory". These resources can be significant at either the state or national level. Table 5.7-14 summaries the federal-level LORS.

5.7.5.2 State

According to California PRC §5020.1, a historic resource includes objects, buildings, structures, sites, areas, places, records, or manuscripts which are historically or archaeologically significant, or are significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. PRC§5024.1 established the CRHR, in which historical resources can be nominated by state and local agencies as well as private groups and citizens in an effort to protect historic properties from substantial adverse change. A historic resource may be eligible for the CRHR if it meets the requirements of PRC§5024.1(c):

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

2. Is associated with the lives of persons important in our past

3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

4. Has yielded, or may be likely to yield, information important to prehistory or history.

PRC§5024.1(e)(4) further establishes that the CRHR may include any historical resources or historic districts designated or listed as city or county landmarks or historic properties or districts pursuant to any city or county ordinance as long as the nominating process is in accordance with the California Register criteria. Table 5.7-14 summarizes the cultural resources state-level LORS that may be applicable to the Project.

5.7.5.3 Local

The County of San Bernardino has specific LORS, which establish guidance for the treatment of cultural resources identified in the County of San Bernardino. These regulations are codified in Title 8, Division 5, Chapter 3, Article 3, §85.03001, §85.030305, §85.030310, and §85.030315 (Readopted Ordinance 3341; Amended Ordinance 3420). Furthermore, additional County policies that may be applicable are described in Title 6, Division 3, Chapter 11, §63.1120 and Title 8, Division 12, Chapter 3, §812.03175. Table 5.7-14 summarizes the local-level LORS.

5.7.5.4 Agencies and Agency Contacts

Agencies with jurisdiction to issue applicable permits and/or enforce LORS related to cultural resources are shown in Table 5.7-15.

Table 5.7-15
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	Bureau Of Land Management	Rolla Queen	22835 Calle San Juan De Los Lagos Moreno Valley, CA 92553	951-697-5386
2	Bureau Of Land Management	James Shearer	2601 Barstow Road Barstow, CA 92310	760-252-6034
3	California Energy Commission	Michael McGuirt	1516 9th Street Sacramento, CA 95814-5512	916-654-4870
4	State Historic Preservation Office Department of Parks and Recreation Office of Historic Preservation	Milford Wayne Donaldson, FAIA	1416 9th Street, Room 1442-7 Sacramento, CA 95814 P.O. Box 942896 Sacramento, CA 94296-0001	916-653-6624
5	San Bernardino County Sheriff/Coroner	Gary Penrod	175 South Lena Road San Bernardino, CA 92415	909-387-2978
6	Native American Heritage Commission	Larry Myers Executive Secretary	915 Capitol Mall, Room 364 Sacramento, CA 95814	916-653-4082
7	County of San Bernardino Land Use Services Department	Julie Rynerson Rock	385 N. Arrowhead Avenue – 1st Floor San Bernardino, CA 92415-0182	909-387-8311
8	City of Barstow	Brent Marrow Planning Director	City Hall 220 E Mountain View, Suite A Barstow, CA 92311	760-255-5160

5.7.5.5 Permits Required and Permitting Schedule

As shown in Table 5.7-16, all Cultural Resource work was conducted under BLM Permits listed below. URS fieldwork authorization permit is in effect until December 2009.

Table 5.7-16
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Bureau of Land Management	State wide permit CA-0611 issued to URS	April 27, 2006
Bureau of Land Management	Fieldwork Authorization to Conduct Specific Cultural Resources Work FA-680-08-26	July 2008 to December 2009

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TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 13. The *Prehistoric Context* section of the AFC (pp. 5.7-8–5.7-13, vol. 1, AFC) provides the broad prehistory of the region. Please develop a summary of the local archaeology in the vicinity of the project area.

Response: The information requested is also included in the revised Section 5.7 of the AFC Pages 5.7-19 to 5.7-21.

This summary provides a discussion of prior archaeological research specifically relating to the Project APE as well as the main elements of material culture found therein, and in the vicinity of the APE, as related to the prehistoric cultural context described above. Summaries of cultural resource investigations previously conducted in the Project APE and its environs are discussed, particularly those that relate to the prehistory and ethnography of the region. This information was compiled during the record check conducted by the San Bernardino Archaeological Information Center (SBAIC). Generally, prehistoric archaeology within the Project APE exhibits a similar pattern of site types and distribution as that identified elsewhere in the Central Mojave Desert. Site types and their distribution are directly correlated with geographical regions and resource procurement (e.g. water, plant, animal, stone, and wood) and the area of prehistoric use/habitation is also related to travel and trade routes, most of which are oriented west to east connecting coastal groups with inland groups situated along the Mojave and Colorado Rivers. Previous archaeological research in and around the proposed Project APE has identified a variety of such sites, representing a wide range of cultural sequences.

In the early to late 1950s, Ruth D. Simpson (1958 and 1960) surveyed the eastern portion of the Calico Mountains and ancient Manix Lake shoreline, identifying numerous lithic artifacts such as large flakes and cores that range in age from ethnohistoric through what was then called the Amargosa and Pinto Basin horizons; rock alignments of unknown age were also identified during this study at Troy Lake (Simpson 1960:26-29). Subsequent work by Simpson at Troy Lake (No Date: 45) confirms findings made at Manix Lake which conclude that the Lake Mojave and Pinto Basin sites represent the oldest cultural remains in the area. Much of her conclusions pertaining to the prehistory of this area were derived from the analysis of private collections. The Troy Lake Playa area assemblage includes scrapers, numerous hammerstones, groundstone, 2 pipe fragments, 2 stone pendants, and projectile points (Lake Mojave, Pinto, Elko, and Desert-side notch), with stone material types being cryptocrystalline silicates (jasper, chert, and chalcedony), rhyolite, basalt, and granitic. Simpson likewise concluded that along the higher elevations and outer periphery of the playa, sites were noted as widely distributed sparse surface quarries/lithic scatters consisting of crude choppers, bifaces/bifacial cores, and cores. She observed that these artifacts were heavily patinated and well-imbedded in the desert pavement suggesting that these sites represent an older complex dating to the Troy Lake stand within the Pleistocene Period (Simpson 1958, 1962, 1964). Unfortunately, these sites lack datable materials, other than relative dating of desert pavement, which is problematic due the extreme conditions in such desert environments. Simpson's overall assessment of the Troy Lake findings is that the area was used as a seasonal/temporary encampment over the course of thousands of years. Temporal specimens indicated these sites were occupied as early as 8,000 B.P (based on projectile point types), although Simpson suggest it may extend as far back as the Pleistocene period (10-20,000 B.P).

Therefore, between approximately 8,000 B.P. up until European Contact, the Project APE has been utilized by various Native American groups. The stone tool assemblages derived directly from---and in many locations, appears to reflect the progression of technology of stemmed points. However, the presence of groundstone indicates the increased dietary reliance on mesquite, acorns, Indian rice grass/bunchgrass, seeds, and other processed plant resources, and the dart, atlatl and bow and arrow appear as projectile technology (Pinto, Gypsum, and Cottonwood Triangular points). In the Project APE, the cultural traditions/complexes include the Lake Mojave, Pinto, Gypsum, Rose Springs, and Late Prehistoric, and indicate a seasonal/temporary use of the region for over 6,000 years, with a proposed 1,000 year period of abandonment between the middle and late Holocene, a time when the climate changed to hotter drier conditions (Sutton *et al*, 2007).

Since 1958, approximately 18 studies have been conducted in the Project APE and have identified the same types of sites presented by Simpson. Barker, Rector, and Wilke (1979) reported on a large stratified random sample survey (not a complete survey) for the Allen-Warner Valley Energy Project that went from Boulder City, Nevada to Palmdale California, with two alignments close to the Proposed Project Site. They report the presence of sites attributable to the Rose Spring Complex, discussed above, with metate fragments, pottery, and lithic artifacts (Barker, Rector, and Wilke 1979: V-8 through V-15), as well as quarry sites, rock alignments, trails, and isolates. Sutton and Parr (1989) conducted a survey in the Hidden Valley of the Cady Mountains. They discovered a total of 31 new cultural sites, including trails, lithic scatters, rock shelters, camps, a quarry, a roasting feature, a special purpose site, food processing sites, and three historic sites. The sites are assigned a range of Elko to Late Prehistoric age by Sutton and Parr (1989:12).

A cultural resource survey and subsequent report by McGuire (1990) describes the results of the 387-mile Mojave natural gas pipeline corridor which traversed portions of Kern and San Bernardino Counties in California and Mohave County in Arizona. A portion of the route was located considerably south of the Proposed APE. They identified a total of 66 sites along the route, 49 prehistoric and 17 historic-era sites. Resources in proximity to the Solar I Project APE include one historic site that also had a major prehistoric component, including Late Prehistoric projectile points, flakes, hearths, and trash mounds, as well as two quarries, and two lithic reduction areas. A similar pipeline project survey by McGuire and Glover (1991) from Adelanto, California to Ward Valley, California revealed the presence of 54 cultural resource sites, including 47 prehistoric and 7 historic resources. Site types included flaked stone scatters, small feature areas, quarry sites, and historic sites, such as mining features, railroad lines, military complexes, and historic homesteads (McGuire and Glover 1991: i).

Padon and Breece (1991:1) conducted a survey for another pipeline project at the extant community of Hector, California, adjacent to the Solar I APE, with negative results. Clark (1998:3) surveyed in the same general location and identified a series of widely spaced flaking material and a bifacial tool in the vicinity. One additional survey in the area was conducted by McCorkle Apple in 1993 for the Fort Cady Boric Acid Mining Facility. Results of the survey revealed a total of 24 cultural resource sites, including lithic reduction areas, flake and tool scatters, sparse lithic scatters, and historic sites, primarily debris scatters and transportation-related sites. The last research of note in the area was a Class I literature review conducted by Rowe (2006). SES initially proposed the Solar One Power Generation Facility in that year, and the original project had identified two potential locations totaling 51,520 acres. The record search identified 20 previously conducted studies in the area, 38 previously recorded sites and 34 previously identified isolates within the APE and a 1-mile radius. Based on the record search results, a field survey was recommended for the project site.

As derived from previous research and archaeological investigation of the area, the general artifact assemblage for this portion of the Mojave Valley includes; debitage, cores, bifaces/bifacial cores, projectile points, scrapers, drills, edge modified flakes, shaped and unshaped manos, slab metates and mortars, and to a lesser extent ceramics (buff/gray and brown wares). The types of projectile points reported in this area include; Lake Mojave/Silver Lake, Pinto, Elko, Desert side notched, and Cottonwood Triangular. Features frequently reported in the Project area include trails, cleared circles, cairns, rock circles/hearths, and low-lying rock piles. The prehistoric site types observed in this region can be characterized as widely distributed low density surface quarries and lithic scatters, temporary encampments, tool maintenance, transportation, rock features, and isolated/single use localities. The stone tool materials observed in sites within the Project area is predominately cryptocrystalline silicates (jasper, chalcedony, and chert), rhyolite, basalt, and limited obsidian, all of which being locally available with the exception of the few obsidian findings.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 14. Please clarify whether this information (cultural resources listed under a city or county ordinance, cultural resources recognized by a local heritage society or museum) was sought, and, if so, what the results were of any such inquiry.

Please provide the DPR 523 series forms for the previously recorded cultural resources in the project area.

Response: The information regarding cultural resources listed under a city or county ordinance or by a local heritage society or museum was sought. This discussion is provided below and found on Page 5.7-135 of the revised Section 5.7, Cultural Resources provided as Attachment CUL-1 for this information. The correspondences that were sent are found in the Confidential Class III Technical Report Appendix C

As part of the historic architecture survey, Ms. Erickson on September 15, 2008, contacted Ms. Rynerson Rock with the San Bernardino County Land Use Services, Mr. Morrow and Mr. Cooper with the City of Barstow Community Development Department, and Mojave River Valley Museum on September 15, 2008 to identify cultural resources within a one-mile radius around the Project footprint listed pursuant to ordinance or recognized by a local historical society or museum. Follow-up voicemail messages were left for Ms. Rock, Mr. Morrow, and the Mojave River Valley Museum on March 27, 2008. To date, no responses have been received from the local agencies and historical society.

The DPR 523 series forms for the previously recorded cultural resources in the project APE and 1-mile search radius are provided in the Class III Technical Report as Confidential Appendix H. Of the previous investigations, many were completed before the advent/availability of global position system (GPS) data collection and standardized archaeological data-recording processes, therefore much of the previously recorded information is provided on forms other than the standard DPR 523 series forms.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 15. Applicant refers to the survey of "Project APE." The survey does not appear to include 100 percent of the project site, linear facility routes, ancillary project areas, and appropriate regulatory buffers.

Please declare the approximate collective percentage of the above areas that were subject to survey, graphically depict the "areas of steep terrain" (p. 5.7-55, vol. 1, AFC) that were not subject to survey, and calculate the approximate percentage of the above areas that the latter areas represent, provide the rationale for not surveying the Caltrans ROW, and specify those portions of section 36, T. 9 N., R. 5 E. and section 1, T. 8 N., R. 5 E., (SBBM) that are not clearly in phase 1 or 2 of Solar One, but are noted as areas of private land for which the applicant has yet to gain access (Figure 6.3-1, App. A, vol. 1, Confidential Cultural Resources Technical Report) as being part of the project site and as being presently unsurveyed.

Please clarify whether the areas now shown as "Not a Part" are slated to become a part of the project site, and, if so, when the applicant envisions surveying them.

Response: This information has been globally changed throughout the revised Section 5.7 of the AFC provided as Attachment CUL-1 and in the technical report (provided under separate cover). Figure 5.7-1 in attachment depicts the survey coverage, as described below.

The Project APE referenced refers to 100 percent of the Project site, linear facility routes, and ancillary project areas, which are contained within the APE, as well as the appropriate regulatory buffers (Figure 5.7-1).

The approximate collective percentage of the above Project APE and regulatory buffers that were surveyed for archaeological and built resources is 98 percent of the APE and the remaining 2 percent not surveyed was due to areas of steep terrain and/or areas in without right-of-entry (ROE) access.

Areas of steep terrain (greater than 45°angle) where access was not feasible due to unsafe/unstable surfaces were not surveyed. These areas total less than 11 acres and occur within the northeastern Project APE along the south-southwest facing slope of the Cady Mountains (See Attached Figure 5.7-1). The areas of steep terrain not surveyed have an extremely low likelihood to contain cultural resources based on the angle and decomposition of volcanic rocks eroding downslope. Areas that were situated within or atop steep terrain with the potential for cultural resources were investigated (e.g., caves and ridge tops).

The southern boundary of the Project APE abuts the Caltrans right of way (ROW) fence. The regulatory buffer(s) in some areas extends into the Caltrans ROW, and this area was not surveyed due to the boundary (fence) preventing access, safety concerns due to proximity to I-40, and because of no right of entry (ROE). A Caltrans encroachment permit is pending; it is undetermined when this permit will be authorized and when the Caltrans ROW will be surveyed.

There are three Not a Part (NAP) areas within the Project APE, which include areas found in T 8N/R 5E Sections 1, 9, 13, and T 9N/R 5E Section 36 (7.5' USGS Hector quadrangle 1993 Revised, 1982 Provisional). The Project Proponent (SES) does not have a Plan of Development (POD) for the NAP areas. SES requested right-of-entry (ROE) from the private landowners to survey their parcels. The survey data is provided for the purpose of reporting on cultural resources (where authorized) within the regulatory buffers that extend into this area (Figure 5.7-1). The private parcels in which landowners refused ROE have no regulatory buffer because survey of these areas was not authorized.

There is one private parcel in T 8N/R 5E Section 16 USGS 7.5' Hector Quad that is part of the Project. This parcel is owned by PG&E and survey of this area was not authorized, therefore this parcel cannot be surveyed. It is assumed that this parcel will not be granted ROE and will not be surveyed in the future.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 16. Applicant refers to the survey of "Project footprint." Please declare that the above phrase is equivalent to 100 percent of the project site, linear facility routes, ancillary project areas, and appropriate regulatory buffers. (Built-environment survey coverage pp. 5.7-129 - 5.7-136, vol.1, AFC).

Response: The Project APE referenced refers to 100 percent of the Project site, linear facility routes, ancillary project areas, which are contained within the APE, as well as the appropriate regulatory buffers (Figure 5.7-1). Refer to pages 5.7-5 – 5.7-6 of the revised Section 5.7, Cultural Resources provided as Attachment CUL-1

Project "footprint" has been removed from the section and report and is now referred to as Project APE throughout the text for clarification.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 17. Absent the data above on the extent of the archaeological survey coverage, staff cannot assess whether the technical report is substantially adequate for the purpose of complying with the Data Adequacy regulations. The present technical report also does not conform to the ARMR format. Please provide a new draft technical report that will closely adhere to the instruction of subsection VI.A.3 of ARMR, and incorporate the direction of subsection XI.A.2 of ARMR. (Technical report of results of new archaeological surveys. Vol.1, Confidential Cultural Resources Technical Report.)

Response: The Confidential Class III Technical Report has been revised and is compliant with the ARMR format, and includes revisions for V1.A3 which describe the environment during the period of prehistoric and historical use and occupation and XI.A.2 which address the completeness of the study and if there is likelihood for additional findings. The revised Confidential Class III Technical Report is provided in a separate confidential filing to this document.

A discussion of the archaeological survey coverage is provided below and in the revised Section 5.7, Cultural Resources on pages 5.7-60.

The Project APE for archaeological resources consists is 100 percent of the Project site, linear facility routes, ancillary project areas, and 200 foot archaeological buffer, which total 9,527 acres (8,767 acre APE plus 760 acre 200 foot buffer) (Figure 5.7-1 in attachment CUL-1). The approximate collective percentage of the above areas surveyed for cultural resources is 98 percent of the Project APE. See page 5.7-7 – 5.7-8 for detailed description of the APE survey coverage area.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 18. Absent the data above on the extent of the built-environment survey coverage, staff cannot assess whether the technical report is substantially adequate for the purpose of complying with the Data Adequacy regulations. (Technical report of results of a built-environment survey. Vol. 1, Confidential Cultural Resources Technical Report.)

Response: A discussion of the built environment survey coverage is provided below and provided in the revised Section 5.7, Cultural Resources on pages 5.7-134. The Revised Confidential Class III Technical Report is provided in a separate confidential filing to this document.

The Project APE for built environment includes 100 percent of the Project site, linear facility routes, ancillary project areas, and ½ mile architectural/built environment buffers, which totals 20,289 acres (8,767 acre APE plus 11,522 ½ mile built environment buffer) (Figure 5.7-1 in attachment CUL-1). Kirsten Erickson, URS Architectural Historian, conducted fieldwork on August 19, 2008 and October 27 and 28, 2008. The approximate collective percentage of the above areas surveyed for built resources is considered 98 percent of the APE; the remaining 2 percent was not surveyed due to steep terrain and/or no Right of Entry (ROE) access. See page 5.7-7 – 5.7-9 for detailed description of the APE survey coverage area.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 19. Absent the data above on the extents of the archaeological and built-environment survey coverages, staff cannot assess whether the *Cultural Resources* section of the AFC is substantially adequate for the purpose of complying with the Data Adequacy regulations.

Response: Please see below and refer to Page 5.7-5 – 5.7-6 of the revised Section 5.7, Cultural Resources provided as Attachment CUL-1. The Revised Confidential Class III Technical Report is provided in a separate confidential filing to this document.

The Project APE referenced in this section and the technical report refers to 100 percent of the Project site, linear facility routes, and ancillary project areas, which are contained within the APE, as well as the appropriate regulatory buffers (Figure 5.7-1 in attachment CUL-1).

The Project APE totals approximately 8,767 acres without regulatory buffers. The 200 foot archaeological buffer alone totals approximately 760 additional acres and the ½ mile built environment buffer alone totals approximately 11,522 additional acres. Private parcels that are Not a Part (NAP) of the Project were surveyed in areas with ROE permission from property owners. The approximate collective percentage of the above Project APE and regulatory buffers that were surveyed for archaeological and built resources is 98 percent of the APE, the remaining 2 percent not surveyed was due to areas of steep terrain and/or areas in without ROE access (Figure 5.7-1 in attachment CUL-1). See initial response for further detail and Pages 5.7-5 – 5.7-6 for detailed descriptions of the APE and survey coverage area.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 20. Absent the data above on the extent of the archaeological survey coverage, staff cannot assess whether the *Class III Intensive Field Survey Results/Evaluations* section of the Confidential Cultural Resources Technical Report is substantially adequate for the purpose of complying with the Data Adequacy regulations. (Discussion of archaeological resources. Pp. 6-25–6-152, vol. 1, Confidential Cultural Resources Technical Report.)

Response: Please see summary and refer to Page 5.7-60 the revised Section 5.7, Please see summary and refer to Page 5.7-65 the revised Section 5.7, Cultural Resources provided as Attachment CUL-1. The Revised Confidential Class III Technical Report is provided in a separate confidential filing to this document.

The Project APE for archaeological resources consists 100 percent of the Project site, linear facility routes, ancillary project areas, and 200 foot archaeological buffer, which total 9,527 acres (8,767 acre APE plus 760 acre 200 foot buffer) (Figure 5.7-1 in attachment CUL-1). The approximate collective percentage of the above areas surveyed for archaeological resources is 98 percent of the Project APE. See page 5.7-7 – 5.7-9 and 5.7-65 for detailed description of the APE survey coverage area for archaeological resources.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 21. Absent the data above on the extent of the built-environment survey coverage, staff cannot assess whether the *Historic Built Environment Field Investigation Results* section of the Confidential Cultural Resources Technical Report is substantially adequate for the purpose of complying with the Data Adequacy regulations. (Discussion of built-environment resources. Pp. 6-162–6-168, vol. 1, Confidential Cultural Resources Technical Report.)

Response: Please see summary and refer to Page 5.7-136 the revised Section 5.7, Cultural Resources provided as Attachment CUL-1. The Revised Confidential Class III Technical Report is provided in a separate confidential filing to this document.

The Project APE for archaeological resources consists of 100 percent of the Project site, linear facility routes, ancillary project areas, and 200 foot archaeological buffer, which total 20,289 acres (8,767 acre APE plus 11,522 acre 1/2 mile built environment buffer) (Figure 5.7-1 in attachment CUL-1). The approximate collective percentage of the above areas surveyed for built environment resources is 98 percent of the Project APE. See page 5.7-7 – 5.7-9 and 5.7-136 for detailed description of the APE survey coverage area.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 22. Absent the data above on the extent of the archaeological survey coverage, staff cannot assess whether Confidential App. B includes the full complement of archaeological sites on the surface of the project area and is, therefore, substantially adequate for the purpose of complying with the Data Adequacy regulations. (Archaeology forms. Confidential app. B, vol. 4, Confidential Cultural Resources Technical Report.)

Response: Please see summary below and refer to Pages 5.7-7 – 5.7-9 and 5.7-65, of the revised Section 5.7, Cultural Resources provided as Attachment CUL-1. The Revised Confidential Class III Technical Report is provided in a separate confidential filing to this document. Archaeological sites (both updates and newly recorded sites and isolates) within the Project APE and 200 foot archaeological buffer are provided in the Confidential Appendices B and C

The Project APE for archaeological resources consists of 100 percent the Project site, linear facility routes, ancillary project areas and 200 foot archaeological buffer, which total 9,527 acres (8,767 acre APE plus 760 acre 200 foot buffer) (Figure 5.7-1 in attachment CUL-1). The approximate collective percentage of the above areas surveyed for cultural resources is 98 percent of the Project APE. See page 5.7-7 – 5.7-9 and 5.7-65 for detailed description of the archaeological survey coverage area.

TECHNICAL AREA: CULTURAL RESOURCES

Data Adequacy Request 23. Absent the data above on the extent of the built environment survey coverage, staff cannot assess whether Confidential app. D includes the full complement of built-environment resources in the project area and is, therefore, substantially adequate for the purpose of complying with the Data Adequacy regulations. (Built-environment forms. Confidential app. D, vol. 5, Confidential Cultural Resources Technical Report.)

Response: Please see summary below and refer to Page 5.7-7 - 5.7-9 and 5.7-136 of the revised Section 5.7, Cultural Resources provided as Attachment CUL-1. The Revised Confidential Class III Technical Report is provided in a separate confidential filing to this document. Built Environment sites (both updates and newly recorded) within the Project APE and ½ mile built environment buffer are provided in Confidential Appendix D.

The Project APE for built environment includes 100 percent of the project site, linear facility routes, ancillary project areas, and ½ mile architectural/built environment buffers, which totals 20,289 acres (8,767 acre APE plus 11,522 ½ mile built environment buffer) (Figure 5.7-1 in attachment CUL-1). Kirsten Erickson, URS Architectural Historian, conducted fieldwork on August 19, 2008 and October 27 and 28, 2008. The approximate collective percentage of the above areas surveyed for built resources is 98 percent of the APE; the remaining 2 percent was not surveyed due to steep terrain and/or no Right of Entry (ROE) access. See page 5.7-7 – 5.7-9 and 5.7-136 for detailed description of the APE survey coverage area.

TECHNICAL AREA: LAND USE

Data Adequacy Request 24. Please list recent or proposed zone changes and/or general plan amendments; noticed by an elected or appointed board, commission, or similar entity at the local level.

Response: According to consultation with Nadia Lopez at the County of San Bernardino on November 5th, 2008, there are no recent or proposed zone changes and/or general plan amendments noticed by an elected or appointed board, commission, or similar entity at the local level that could potentially affect the Project site or vicinity.

TECHNICAL AREA: LAND USE

Data Adequacy Request 25. Please identify all discretionary reviews by public agencies initiated or completed within 18 months prior to filing the application for those changes or developments identified in Subsection (g)(3)(A)(ii).

Response: In Section 5.18, Cumulative Impacts, a list of proposed projects in the vicinity is presented in Table 5.18-3. San Bernardino County Staff (Nadia Lopez, November 5, 2008) has not identified any discretionary permit applications filed within the last 18 months within the Project vicinity that would affect the project.

TECHNICAL AREA: LAND USE

Data Adequacy Request 26. Please provide indirect effects on agricultural land uses.

Response: There are no expected indirect effects on agricultural land uses. There are no known agricultural uses on the site or surrounding areas within 5 miles of the Project boundary. The closest agricultural land is located east of Dagget. The project site is not currently used for agriculture or grazing, and the project is not likely to impact such uses in other locales. Because there is currently no grazing on-site, the Project is not anticipated to impact grazing in the California Desert Conservation Area (CDCA).

TECHNICAL AREA: NOISE

Data Adequacy Request 27. Please identify agencies, such as the appropriate office(s) of the San Bernardino County Government that would have permit authority, were it not for the Energy Commission's exclusive jurisdiction.

Response: The Land Use Services Department at the County of San Bernardino would have permit authority. There is currently a noise ordinance, but no permits are issued. Please see the contact information below.

Jim Squire
County of San Bernardino
Land Use Services Department
Advanced Planning
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415
909.387.0236

The County of San Bernardino does not identify any permits related to noise.

TECHNICAL AREA: NOISE

Data Adequacy Request 28. Please identify officials of the San Bernardino County Government who were contacted, and who will serve as a contact person for Energy Commission staff.

Response: Jim Squire was contacted on behalf of the Applicant and will serve as the contact person. His information is listed below.

Jim Squire
County of San Bernardino
Land Use Services Department
Advanced Planning
385 N. Arrowhead Avenue, 1st Floor
San Bernardino, CA 92415
909.387.0236

TECHNICAL AREA: PROJECT OVERVIEW

Data Adequacy Request 29. Please update Table 3-14 to provide proposed dates of initiation and completion of construction, initial start-up and full-scale operation.

Response: Table 3-14 identified in the original submittal of the AFC identified the Project Schedule Major Milestones. The duration of the Construction Schedule has not changed from that submitted within the AFC, although the start date has moved up to accelerate Construction Schedule due to the Stimulus package. A Microsoft Project Construction Schedule is available if required to show specific dates.

The following is a discussion of anticipated project milestones as seen currently:

- SES currently anticipates Decision made by CEC/BLM by May/June 2010, allowing an additional 30 days for any additional public/county/local concerns.
- The Project will be developed in two phases.
- Initial Construction anticipated to begin fourth quarter 2010. Construction starts with transmission and support facilities to support SunCatcher construction – this activity starts immediately.
- Initial startup would occur with 9MW online by 2nd Quarter of 2011. Every two weeks following, an additional 9MW will be added.
- Completion of all construction and operation of the entire project would be approximately four years (41 months) from the start of construction.

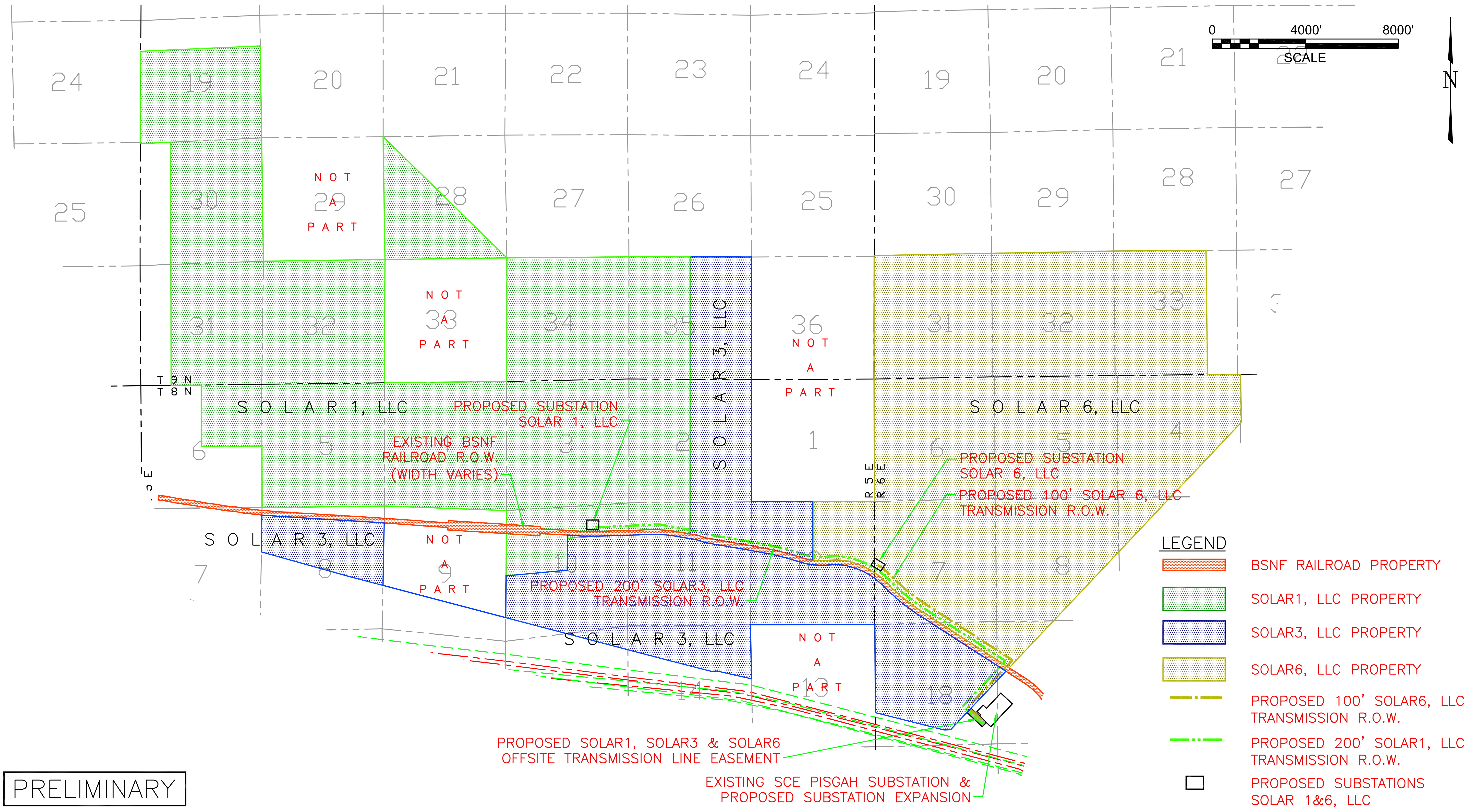
TECHNICAL AREA: PROJECT OVERVIEW

Data Adequacy Request 30. Please clarify the ownership of the site and any facilities that will not be owned by SES Solar Three, LLC and SES Solar Six, LLC.

Response: The SES Solar One Project site includes SunCatchers, Substation, road, transmission, ROW and other facilities required for the operation of the project and will be owned and operated by SES Solar Three, LLC and SES Solar Six LLC.

Within the SES Solar One Project area; the Burlington Northern Santa Fe (BNSF Railroad property will be owned and operated by BNSF; the SES Solar Three Project site to include SunCatchers, Substation, road, transmission, ROW and other facilities required for the operation of the project and will be owned and operated by Solar One, LLC.

Please reference the attached Transmission Infrastructure Ownership map.



PRELIMINARY

NO.	DATE		BY	APP.
1	2.25.09		GL	

STANTEC CONSULTING INC.
9400 S.W. BARNES ROAD
STE. 200
PORTLAND, OREGON, 97225
503.297.1631
STANTEC.COM

DRN. STC/GSP	DES. STC/SD	CHK. STC/	DATE 02/11/09
SCALE 1"=4000'		APP.	DATE

SES Stirling Energy Systems

PROJECT: 2000024301

TITLE: TRANSMISSION INFRASTRUCTURE OWNERSHIP

S1-X-0501

SHT. 1

REV. A

TECHNICAL AREA: PROJECT OVERVIEW

Data Adequacy Request 31. Please clarify the ownership and operation of the proposed transmission facilities.

Response: SES Solar Three, LLC and SES Solar Six, LLC will own and operate a single circuit 230kV transmission line which will be located on the project site. A portion of the 230kv transmission line owned and operated by SES Solar Three, LLC and SES Solar Six, LLC will be located within the SCE Lugo-Pisgah transmission line ROW.

The 230kV transmission line will interconnect to the electrical grid at the Pisgah Substation, owned and operated by Southern California Edison (SCE).

TECHNICAL AREA: PROJECT OVERVIEW

Data Adequacy Request 32. Please provide a description of the legal relationship between the applicant and the owners listed in the response to Appendix B (a) (3) (C).

Response: The Power Purchase Agreement (PPA) provides the material terms and conditions of the Renewable Power Purchase and Sale Agreement dated August 9, 2005 (the "Agreement") between Stirling Energy Systems ("SES") and Southern California Edison Company ("SCE").

Based on the PPA, SES will construct, own, and operate a 500 MW solar thermal power generation facility (subject to increase by SCE to 850 MW) (the "Generating Facility"). The Agreement is nominally for a 20 year term.

TECHNICAL AREA: PROJECT OVERVIEW

Data Adequacy Request 33. Please provide a full-page color photographic reproduction depicting a representative above ground section of the transmission line route **prior** to construction.

Response: Please see the attached photo labeled PO-1 for a full-page color photographic reproduction of a section of the transmission line route prior to construction.

PO-1

TECHNICAL AREA: SOCIOECONOMICS

Data Adequacy Request 34. Please provide the existing and expected use levels for fire protection, law enforcement, emergency response, for medical facilities and any assessment districts.

Response: The following paragraphs present the requested information. Existing public services and facilities are discussed in Section 5.10.1.6 of the AFC. Potential construction- and operation-related impacts to these resources are addressed on pages 5.10-25 to 5.10-26 and pages 5.10-31 to 5.10-32 of the AFC, respectively.

<u>Fire Protection</u>: Response to fires at the Project Site would originate from the San Bernardino County Fire Department station, located north of the Project Site in the town of Harvard. This station is staffed daily, with a full time Captain and two firefighters. The station has a type 1 and a type 3 engine, and a brush patrol. Response times to the Project Site would take, on average, 40 minutes (Horton 2008). As noted on pages 5.10-25 and 5.10-26 of the AFC, the resources may be required to enable the Fire Department to provide adequate fire protection and emergency response services during construction and operation of the Proposed Project (Horton 2008). As discussed in Section 5.10.5 of the AFC, the Applicant would work with local fire protection and emergency response service providers to address the need for any additional resources during the construction and operation phases of the Proposed Project.

<u>Law Enforcement</u>: The Proposed Project would fall under the jurisdiction of the San Bernardino County Sheriff's Department's Barstow office, which currently has 60 employees: 35 deputies, 2 detectives, 1 active detective (detective in training), 1 school resource officer, 5 sergeants, a captain, a lieutenant, and various administrative staff. The San Bernardino County Sheriff's Department indicated that based on this staffing level and existing and expected uses, the Proposed Project would not have an impact on the Sheriff Department's resources or their ability to police the general area (Lotspeich 2008).

<u>Emergency Response</u>: Both the City of Barstow and the County of San Bernardino hazardous materials units would respond to any hazardous material calls emanating from the Project Site as part of the county-wide San Bernardino County Intra-agency Hazardous Materials Response Team. Due to restrictions from the Department of Homeland Security, this team is not able to divulge their exact resources to the public; however, the team, which consists of approximately 150 members, is a Level A

response team, which is capable of handling all types of chemical, biological, radiological, and nuclear responses (Horton 2008).

Medical Facilities: The Barstow Community Hospital is the closest hospital to the Project Site. This hospital has 52 beds, 4 of which are intensive care beds. The hospital has approximately 260 employees and 98 physicians with staffing privileges. Services provided at Barstow Community Hospital include surgery, labor and delivery, radiology, and CT scans. There is an emergency room on-site; however, it is not a trauma level emergency room. An ambulance would take approximately 20 to 30-minutes to drive from the Project Site to this facility. Barstow Community Hospital would treat any minor injuries that might occur at the Project Site. The Barstow Community Hospital Administrator indicated that the hospital would be capable of handling any additional demand that may result from the Proposed Project without affecting its existing service levels (Spurlin 2008).

The helicopter would be provided by Mercy Air, which is the air ambulance service that Barstow Community Hospital uses to transfer patients to other hospitals. A patient would typically be transported to the Barstow Community Hospital via regular ambulance, and then onto Loma Linda via helicopter, if needed. If a serious accident occurred, a helicopter might be dispatched directly to the project site, and the patient would be taken directly to Loma Linda University Medical Center, approximately 20 to 30 minutes away by air.

Loma Linda University Medical Center is licensed for 822 beds and has approximately 7,300 employees. Between 600 and 1,000 physicians have staffing privileges at Loma Linda University Medical Center. This medical center is a full service hospital with a level 1 trauma center, and separate medical, children's, and psychiatric hospitals. A representative of the Loma Linda University Medical Center Administrator indicated that the medical center is more than capable of handling the existing and expected levels of injuries that may occur within its service area, and further stated that any additional demand that may result from the Proposed Project would not affect its existing service levels (Kabyzn 2008).

Assessment Districts: The San Bernardino County Tax Assessor's office indicated that the Proposed Project would not fall under the jurisdiction of any Assessment Districts (McKiernan 2009).

References:

Horton, M. 2008. San Bernardino County Fire Department, Deputy Fire Marshal. Personal Communication with John Crookston Tetra Tech EC, October 30, 2008.

Kabyzn, J. 2008. Loma Linda University Medical Center, Human Resources Specialist. Personal Communication with John Crookston Tetra Tech EC, October 23, 2008.

Lotspeich, T. 2008. San Bernardino County Sheriff, Sergeant. Personal Communication with John Crookston Tetra Tech EC, October 22, 2008.

McKiernan, L. 2009. San Bernardino Assessor's Office. Personal Communication with John Crookston Tetra Tech EC, January 22, 2008.

Spurlin, L. 2008. Barstow Community Hospital, Administrative Assistant. Personal Communication with John Crookston Tetra Tech EC, October 23, 2008.

TECHNICAL AREA: SOCIOECONOMICS

Data Adequacy Request 35. Please provide the percentage of non-local workers who will relocate to the project area to work on the project.

Response: Every effort would be made to employ qualified subcontractors and other construction personnel from the local area (within a two hour commute of the Project Site). However, some of the higher skill level positions required for essential trades, such as high voltage line electricians, controls and Information Technology (IT) specialists, and electrical engineers, may need to be hired from outside the local area, most likely from the Los Angeles or Las Vegas areas. These workers would likely commute weekly to the Project area for the duration of their work on the Proposed Project, returning home at weekends. Workers temporarily relocating or commuting weekly to the Project Site are expected to comprise 15 percent of the projected construction labor force. The projected construction labor force is discussed in detail in Section 5.10.2.2 of the AFC.

The majority of the projected operations employees are expected be drawn from areas within a one hour commute of the Project Site, including the cities of Barstow and Victorville, as well as smaller communities located in the Project vicinity. Some of the positions, primarily engineering occupations, would require individuals with specialized skills who may need to be recruited from larger statewide or national labor markets. Specialized personnel recruited from outside the region would likely relocate with their families to the area (within one hour commuting distance of the Project Site). Based on the projected labor requirements for the Project at full build out (850 MW), up to 20 jobs could require specialized personnel that might need to be recruited from outside the immediate Project area. These 20 jobs comprise approximately 11 percent of average Operations and Maintenance employment at full build out. The projected operation and maintenance labor force is discussed in detail in Section 5.10.2.2 of the AFC as well as detailed in Table 5.10-10 on the following page.

Table 5.10-10
Construction Trade Projection (850 MW)

Discipline	Hrs	Month After Construction Start																																										Average Monthly Employment
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	
Carpenters	110,664	10	25	25	25	25	19	41	40	40	28	28	38	29	29	29	29	38	32	32	32	28	34	30	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Concrete Crews	108,656	7	26	26	26	26	23	49	42	42	24	24	40	33	33	33	33	40	30	30	30	24	25	19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16
Electricians	208,826	17	35	41	31	30	57	67	60	54	54	54	54	106	96	102	101	94	104	104	104	98	98	98	88	88	88	88	88	4														73
Ironworkers	120,104	16	34	34	34	34	23	37	36	36	24	24	34	33	33	33	33	38	32	32	32	28	31	27	7	4	4	4	4	4	4	4	4											24
Laborers	217,860	20	50	67	60	54	64	136	83	39	35	30	35	72	69	89	81	79	88	66	63	39	39	49	38	28	28	28	28	8	8	8	8	4	4	4	4							45
Miscellaneous Crews	20,000							10	10	10	10	10	10					10	10	10	10	10	10	10																				10
Operators	257,754	35	94	85	67	55	62	89	77	77	65	51	92	104	112	98	83	81	60	63	54	50	49	45	14	14	14	14	14	13	12	12	12	12	12	12	12	1	1	1	0	0	0	43
Plumbers	39,840		5	9	4	4	4	26	26	26	14	14	14	5		4	4	14	18	18	18	14	14	10																				13
SES Technicians	136,320						16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	22
SunCatcher Assemblers	394,240						64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
SunCatcher Electricians	98,560						16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
SunCatcher Ironworkers	197,120						32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
SunCatcher.Laborers	60,800						16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16															16
SunCatcher Material Handlers	98,560						16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
SunCatcher Operators	30,400						8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8															8
SunCatcher Teamsters	45,600						12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12															12
SunCatcher Technicians	197,120						32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Teamsters	114,402	26	58	47	36	24	29	31	22	22	22	5	9	33	53	40	28	28	28	28	17	17	16	16	12	12	12	12	12	12	12	12	12	12	12	12	12	1	1	1	0	0	0	19
Technicians	4,094						5	5	5	5	5	5	5	6	6	6	5	5		1	1	1	1	1																				4
Total	**2,460,921**	**131**	**327**	**334**	**283**	**252**	**498**	**703**	**613**	**563**	**493**	**457**	**543**	**633**	**643**	**646**	**609**	**639**	**614**	**596**	**573**	**521**	**529**	**517**	**378**	**358**	**358**	**358**	**374**	**233**	**228**	**228**	**228**	**220**	**220**	**220**	**220**	**194**	**194**	**194**	**192**	**192**	**192**	**393**

TECHNICAL AREA: SOCIOECONOMICS

Data Adequacy Request 36. Please provide an estimate of capital costs.

Response: The total capital cost (plant and equipment) of the Proposed Project is estimated to be in excess of $1 billion. Please see Section 5.20.2.3 – Operational Impacts of the Application For Certification (AFC) for the operational impacts on resources.

TECHNICAL AREA: SOILS

Data Adequacy Request 37. Please discuss the location of any proposed fill disposal or fill procurement (borrow) sites.

Response: It is planned to balance the site with respect to cut and fill. All cut and fill is planned to be minimal. No off-site fill disposal or borrow will be required.

Solar One earthwork is confined to the construction of the necessary roadways for plant operation, maintenance and site security, the substation areas, storm water management and sediment control and the maintenance and administration/operations buildings. SES will require the site earthwork to be balance and will not require fill disposal or fill procurement (borrow) sites either onsite or off site.

TECHNICAL AREA: SOILS

Data Adequacy Request 38. Please provide a schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.

Response: Table 5.4-6 lists a required permit/approval from the Regional Water Quality Control Board (RWQCB) Colorado River Basin Region 7, which is outside the authority of the CEC. With respect to soils, the applicant will be required to file a Notice of Intent and obtain a National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit. The NPDES is administered by the State Water Resources Control Board (SWRCB). The construction Storm Water Pollution Prevention Plan (SWPPP), required under the NPDES, is jointly administered by the SWRCB and the Lahontan RWQCB. (Note that surface runoff from the project is within the Lahontan RWQCB basin but groundwater is within the Colorado River Basin RWQCB limits. Both the Lahontan and Colorado RWQCBs will be contacted regarding the project's general construction permit compliance).

The schedule for filing a Notice of Intent and obtaining the construction SWPPP is as follows:

- The applicant will coordinate with the RWQCB during the permitting process and initiate obtaining coverage under the General Construction Permit during final engineering design.
- Complete initial Construction SWPPP and file Notice of Intent with SWRCB prior to construction.
- A copy of SWPPP and Notice of Intent will be submitted to the CEC prior to construction, scheduled to begin fourth quarter 2010.

TECHNICAL AREA: TRAFFIC & TRANSPORTATION

Data Adequacy Request 39. Please provide weight and load limitations for each road identified.

Response: According to consultation with Ed Petre, (909) 387- 8104, at the County of San Bernardino on January 8, 2009, there is no current listed or posted weight limitations for Hector Road at this time (please see attachment TRAF-1 for the San Bernardino County Code and Regulations for Roadway Weight Limitations). In this regard the Applicant will be responsible for the roadway upgrades to support planned project loadings during both construction and operation of the proposed Solar One Project.

For Interstate 40 (I-40), weight limitations are governed by both Federal and State route weight limitations (see attachment TRAF-2 Weight Limitations by Truck Classification). I-40 is currently classified as a National Network (STAA Highway) as described in the California Department of Transportation District 8 Truck Map (please see attachment TRAF-3). All overweight and oversized vehicles are required to secure the necessary permit to operate along the interstate and state highways.

TRAF-1

ROAD NAME	NUMBER	REC	AREA NAME	DATE PASSED	COUNTY CODE	PAR	ST	LOC
ALMOND AVENUE	114100	020	FONTANA	10/26/1987	52.0125B	001	0	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 10,000 POUNDS ON ALMOND AVENUE BETWEEN WHITTRAM AVENUE AND FOOTHILL BOULEVARD, IN THE WEST FONTANA AREA								
BAYBERRY DRIVE	158225	020	CHINO HILLS	07/10/1989	52.0125B	001	2	CNH
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURERS GROSS VEHICLE WEIGHT RATING OF 12,000 POUNDS ON BAYBERRY DRIVE IN THE CHINO AREA FROM PEYTON DRIVE TO PIPELINE								
BLUE WATER ROAD	171800	020	SILVER LAKES	07/01/1997	52.0125C1	005	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF BLUE WATER ROAD AND HELENDALE ROAD.								
BON VIEW AVENUE	175350	020	CHINO	08/01/1988	52.0125B	001	2	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 12,000 POUNDS ON BON VIEW AVENUE BETWEEN EDISON AVENUE AND RIVERSIDE DRIVE IN THE CHINO ARE								
BROOKSIDE LANE	182175	020	SILVER LAKES	07/01/1997	52.0125C1	011	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF BROOKSIDE LANE AND SMITHSON ROAD.								
CALABASH AVENUE	200250	050	FONTANA	03/11/2003	52.0125B	001	0	FTA
PROHIBIT COMMERCIAL VEHICLES OVER FIVE TONS ON CALABASH AVENUE FROM WHITTRAM AVENUE TO FOOTHILL BOULEVARD, IN THE FONTANA AREA.								
CHAPARRAL LANE	225005	020	SILVER LAKES	07/01/1997	52.0125C1	006	0	
PROHIBIT COMMERCIAL VEHECLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF CHAPARRAL LANE AND HELENDALE ROAD.								
CHINO AVENUE	232050	010	CHINO	09/10/1996	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON CHINO AVENUE BETWEEN PIPE LINE AVENUE AND STATE ROUTE 71, EXCEPT PORTIONS THAT LIE WITHIN THE CITY LIMITS OF CHINO.								
COTTONWOOD AVENUE	257850	020	FONTANA	10/26/1987	52.0125B	001	0	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 10,000 POUNDS ON COTTONWOOD AVENUE BETWEEN WHITTRAM AVENUE AND FOOTHILL BOULEVARD, IN THE WEST FONTANA AREA.								
CRICKET DRIVE	263971	020	BLOOMINGTON	09/29/1998	52.0125C1	002	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON CRICKET DRIVE BETWEEN CACTUS AVENUE AND KATYDID AVENUE, IN THE BLOOMINGTON AREA.								

ROAD NAME	NUMBER	REC	AREA NAME	DATE PASSED	COUNTY CODE	PAR	ST	LOC
DEVORE ROAD	297750	020	DEVORE	08/15/1995	52.0125A	001	0	
ESTABLISH A "NO TRUCKS OVER 10,000 POUNDS EXCEPT LOCAL DELIVERIES" ON DEVORE ORAD, FROM CAJON BOULEVARD NORTH TO KENWOOD AVENUE, IN THE VICINITY OF DEVORE.								
EAST END AVENUE	312250	010	CHINO	09/10/1996	52.0125C1	003	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS TRAVELING ON EAST END AVENUE BETWEEN CHINO AVENUE AND RIVERSIDE, IN THE VICINITY OF CHINO.								
GREGORY STREET	394150	010	BLOOMINGTON	02/08/2000	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS TRAVELING ON GREGORY STREET (394150) FROM LARCH AVENUE EAST TO SPRUCE AVENUE, IN THE BLOOMINGTON AREA.								
GROVE AVENUE	394900	020	CHINO	08/01/1988	52.0125B	001	2	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 12,000 POUNDS ON GROVE AVENUE BETWEEN EDISON AVENUE AND RIVERSIDE DRIVE IN THE CHINO AREA								
HAVEN AVENUE	405750	020	CHINO	08/01/1988	52.0125B	001	2	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 12,000 POUNDS ON HAVEN AVENUE BETWEEN EDISON AVENUE AND RIVERSIDE DRIVE IN THE CHINO AREA.								
HEMLOCK AVENUE	409350	030	FONTANA	06/09/1998	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON HEMLOCK AVENUE BETWEEN SAN BERNARDINO AVENUE AND MERRILL AVENUE, IN THE FONTANA AREA.								
ILEX STREET	434950	020	FONTANA	10/26/1987	52.0125B	001	0	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 10,000 POUNDS ON ILEX STREET BETWEEN WHITTRAM AVENUE AND FOOTHILL BLVD, IN THE VICINITY OF WEST FONTANA								
IRIS DRIVE	439450	020	FONTANA	08/17/1992	52.0125B1	001	0	
ESTABLISH A SEVEN THOUSAND POUND (7,000) WEIGHT LIMIT ON IRIS DRIVE BETWEEN REDWOOD AVENUE AND LIVE OAK AVENUE, IN THE VICINITY OF FONTANA.								
JADE LANE	445350	020	SILVER LAKES	07/01/1997	52.0125C1	002	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF JADE LANE AND SHADOW MOUNTAIN ROAD.								
JURUPA AVENUE	455900	040	FONTANA	04/04/2000	52.0125C1	002	0	
PROHIBIT COMMERCIAL VEHICLES OVER 10,000 POUNDS FROM TRAVELING ON JURUPA AVENUE BETWEEN ALDER AVENUE AND TAMARIND AVENUE, EXCEPT THOSE PORTIONS IN THE CITY OF FONTANA, IN THE FONTANA AREA.								
KATYDID AVENUE	459100	020	BLOOMINGTON	09/29/1998	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON KATYDID AVENUE BETWEEN CACTUS AVENUE AND HALL AVENUE, IN THE BLOOMINGTON AREA.								

ROAD NAME	NUMBER	REC	AREA NAME	DATE PASSED	COUNTY CODE	PAR	ST	LOC
L STREET	470900	030	BARSTOW HEIGH	08/19/1997	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON "L" STREET BETWEEN RIMROCK ROAD AND THE I-15 FREEWAY, IN THE VICINITY OF BARSTOW HEIGHTS.								
MOUNTAIN SPRINGS RO	569900	020	SILVER LAKES	07/01/1997	52.0125C1	013	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF MOUNTAIN SPRINGS ROAD AND SILVER LAKES PARKWAY.								
MULBERRY AVENUE	572250	020	FONTANA	10/26/1987	52.0125B	001	0	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 10,000 POUNDS ON MULBERRY AVENUE BETWEEN WHITTRAM AVENUE AND FOOTHILL BOULEVARD, IN THE WEST FONTANA AREA								
NEWPORT WAY	591600	020	SILVER LAKES	07/01/1997	52.0125C1	004	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF NEWPORT WAY AND SHADOW MOUNTIAN ROAD.								
OLD MILL ROAD	609550	040	CRESTLINE	01/22/1990	52.0125B	001	0	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 12,000 POUNDS ON OLD MILL ROAD BETWEEN STATE ROUTE 138 AND LAKE DRIVE, IN THE CRESTLINE AREA.								
PIPE LINE AVENUE	660850	010	CHINO	09/10/1996	52.0125C1	002	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON PIPE LINE AVENUE BETWEEN RIVERSIDE DRIVE AND CHINO AVENUE, EXCEPT THOSE PORTIONS THAT LIE WITHIN THE CITY LIMITS OF CHINO.								
RIVERS EDGE ROAD	700125	020	SILVER LAKES	07/01/1997	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF RIVERS EDGE ROAD AND SHADOW MOUNTAIN ROAD.								
ROBIN LANE	703275	020	SILVER LAKES	07/01/1997	52.0125C1	012	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF ROBIN LANE AND MOUNTAIN SPRINGS ROAD.								
ROSEMARY DRIVE	709900	020	FONTANA	08/17/1992	52.0125B1	002	0	
ESTABLISH A SEVEN THOUSAND POUND (7,000) WEIGHT LIMIT ON ROSEMARY DRIVE BETWEEN REDWOOD AVENUE AND LIVE OAK AVENUE, IN THE VICINITY OF FONTANA.								
SANDAL WOOD LANE	730625	020	SILVER LAKES	07/01/1997	52.0125C1	010	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF SANDAL WOOD LAND AND HELENDALE ROAD.								
SILVER LAKES PKWY	755900	020	SILVER LAKES	07/01/1997	52.0125C1	003	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF SILVER LAKES PARKWAY AND SHADOW MOUNTAIN ROAD.								

ROAD NAME	NUMBER	REC	AREA NAME	DATE PASSED	COUNTY CODE	PAR	ST	LOC
SULTANA AVENUE	776100	020	BLOOMINGTON	12/21/1987	52.0125C1	015	0	
TO RESTRICT VEHICLES EXCEEDING A MANUFACTURER'S GROSS WEIGHT RATING OF 14,000 POUNDS FROM ENTERING SULTANA AVENUE AT FOOTHILL BOULEVARD (SOUTHBOUND TRAFFIC ONLY), VICINITY OF BLOOMINGTON								
SUNSHINE LANE	785275	020	SILVER LAKES	07/01/1997	52.0125C1	008	0	
PROHIBIT COMMERCIAL VEHECLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF SUNSHINE LANE AND HELENDALE ROAD.								
TAMARIND AVENUE	803250	010	FONTANA	04/04/2000	52.0125C1	001	0	
PROHIBIT COMMERCIAL VEHICLES OVER 10,000 POUNDS FROM TRAVELING ON TAMARIND AVENUE BETWEEN JURUPA AVENUE AND SLOVER AVENUE, EXCEPT THOSE PORTIONS IN THE CITY OF FONTANA, IN THE FONTANA AREA.								
VISTA ROAD	852550	020	SILVER LAKES	07/01/1997	52.0125C1	007	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF VISTA ROAD AND HELENDALE ROAD.								
WALKER AVENUE	864500	020	CHINO	08/01/1988	52.0125B	001	2	
TO PROHIBIT COMMERCIAL VEHICLES EXCEEDING A MANUFACTURER'S GROSS VEHICLE WEIGHT RATING OF 12,000 POUNDS ON WALKER AVENUE BETWEEN EDISON AVENUE AND RIVERSIDE DRIVE IN THE CHINO AREA								
WILDFLOWER LANE	877500	020	SILVER LAKES	07/01/1997	52.0125C1	009	0	
PROHIBIT COMMERCIAL VEHICLES OVER 14,000 POUNDS FROM TRAVELING ON ROADS INTO THE SILVER LAKES COMMUNITY BY POSTING SUCH SIGNS AT THE INTERSECTION OF WILDFLOWER LANE AND HELENDALE ROAD.								

CALIFORNIA DEPARTMENT OF TRANSPORTATION

Weight Limitations

Summarized here are the California Vehicle Code (CVC) sections related to vehicle weight. The CVC sections on this web page are paraphrased for brevity. For the full legal wording, please go to the on-line CVC Weight Sections 35550 - 35558 .

GROSS WEIGHT	
UNIT	**MAXIMUM**
Vehicle Combination	80,000 pounds
AXLE WEIGHTS	
UNIT	**MAXIMUM**
Single Axle	20,000 pounds
Axle Group: less than 8'-6" between outer axles	34,000 pounds
Axle Group: 8'-6" or more between outer axles	See the CVC weight chart below.

GENERAL RULE

35550. (a) The **gross weight** on any one axle shall not exceed **20,000 pounds**, and the gross weight upon any one **wheel, or wheels**, supporting one end of an axle, shall not exceed **10,500 pounds**.

(b) The **gross weight** limit for any one **wheel, or wheels**, shall not apply to vehicles the loads of **livestock**.

(c) The **maximum wheel load** is the **lesser** of the following:
(1) The load limit established by the **tire manufacturer** , on the tire sidewall.
(2) A load of **620 pounds per lateral inch of tire width**, as determined by the manufacturer's rated tire width on the tire sidewall. The **steering axle**, however, must go by the load limit by the **tire manufacturer** .

AXLE GROUP WEIGHT CHART

35551. (a) The **total gross weight in pounds** imposed on the highway by any **group of two or more consecutive axles** shall not exceed that given for the respective distance in the following table:

Distance in feet between the extremes of any group of 2 or more consecutive axles	2 axles	3 axles	4 axles	5 axles	6 axles
4	34,000	34,000	34,000	34,000	34,000
5	34,000	34,000	34,000	34,000	34,000
6	34,000	34,000	34,000	34,000	34,000
7	34,000	34,000	34,000	34,000	34,000
8	34,000	34,000	34,000	34,000	34,000
9	39,000	42,500	42,500	42,500	42,500
10	40,000	43,500	43,500	43,500	43,500
11	40,000	44,000	44,000	44,000	44,000
12	40,000	45,000	50,000	50,000	50,000
13	40,000	45,500	50,500	50,500	50,500
14	40,000	46,500	51,500	51,500	51,500
15	40,000	47,000	52,000	52,000	52,000
16	40,000	48,000	52,500	52,500	52,500
17	40,000	48,500	53,500	53,500	53,500
18	40,000	49,500	54,000	54,000	54,000
19	40,000	50,000	54,500	54,500	54,500

Distance in feet between the extremes of any group of 2 or more consecutive axles	2 axles	3 axles	4 axles	5 axles	6 axles
20	40,000	51,000	55,500	55,500	55,500
21	40,000	51,500	56,000	56,000	56,000
22	40,000	52,500	56,500	56,500	56,500
23	40,000	53,000	57,500	57,500	57,500
24	40,000	54,000	58,000	58,000	58,000
25	40,000	54,500	58,500	58,500	58,500
26	40,000	55,500	59,500	59,500	59,500
27	40,000	56,000	60,000	60,000	60,000
28	40,000	57,000	60,500	60,500	60,500
29	40,000	57,500	61,500	61,500	61,500
30	40,000	58,500	62,000	62,000	62,000
31	40,000	59,000	62,500	62,500	62,500
32	40,000	60,000	63,500	63,500	63,500
33	40,000	60,000	64,000	64,000	64,000
34	40,000	60,000	64,500	64,500	64,500
35	40,000	60,000	65,500	65,500	65,500
36	40,000	60,000	66,000*	66,000	66,000
37	40,000	60,000	66,500*	66,500	66,500
38	40,000	60,000	67,500*	67,500	67,500
39	40,000	60,000	68,000	68,000	68,000
Distance in feet between the extremes of any group of 2 or more consecutive axles	2 axles	3 axles	4 axles	5 axles	6 axles
40	40,000	60,000	68,500	70,000	70,000
41	40,000	60,000	69,500	72,000	72,000
42	40,000	60,000	70,000	73,280	73,280
43	40,000	60,000	70,500	73,280	73,280
44	40,000	60,000	71,500	73,280	73,280
45	40,000	60,000	72,000	76,000	80,000
46	40,000	60,000	72,500	76,500	80,000
47	40,000	60,000	73,500	77,500	80,000
48	40,000	60,000	74,000	78,000	80,000
49	40,000	60,000	74,500	78,500	80,000
50	40,000	60,000	75,500	79,000	80,000
51	40,000	60,000	76,000	80,000	80,000
52	40,000	60,000	76,500	80,000	80,000
53	40,000	60,000	77,500	80,000	80,000
54	40,000	60,000	78,000	80,000	80,000
55	40,000	60,000	78,500	80,000	80,000
56	40,000	60,000	79,500	80,000	80,000
57	40,000	60,000	80,000	80,000	80,000
58	40,000	60,000	80,000	80,000	80,000
59	40,000	60,000	80,000	80,000	80,000
60	40,000	60,000	80,000	80,000	80,000

*For allowable weights on two consecutive sets of tandems 36 feet or more apart, see 35551 (b) under EXCEPTIONS - TWO TANDEM AXLES.

MEASUREMENTS

35551. (c) The distance between axles shall be measured to the **nearest whole foot**. When a fraction is exactly **six inches**, the **next larger whole foot** shall be used.

35551. (e) These gross weight limits shall include all **enforcement tolerances**.

EXCEPTIONS - TWO TANDEM AXLES

35551. (b) Two consecutive sets of tandem axles may carry **34,000 pounds** each if the distance between the first and last axles of the consecutive sets of tandem axles is **36 feet** or more. The gross weight of each set of tandem axles shall not exceed 34,000 pounds and the gross weight of the two consecutive sets of tandem axles shall not exceed 68,000 pounds.

ALTERNATE AXLE GROUP WEIGHT CHART

35551.5. (a) This section shall apply only to combinations of vehicles which contain a **trailer** or **semitrailer**. Vehicles shall comply with either Section 35551 or with subdivisions (b), (c), and (d) of this section.

35551.5. (b) The gross weight imposed upon the highway by the wheels on any **one axle** of a vehicle shall not exceed **18,000 pounds** and the gross weight upon any **one wheel, or wheels, on one end of an axle** and resting upon the roadway, shall not exceed **9,500 pounds**, except that the gross weight imposed upon the highway by the wheels on any front **steering axle** of a motor vehicle shall not exceed **12,500 pounds**.

The gross weight limit on any one **wheel, or wheels,** supporting one end of an axle shall not apply to vehicles with **livestock** loads.

The following vehicles are **exempt from the front axle weight limits** specified in this subdivision:

(1) **Trucks transporting vehicles**.
(2) Trucks transporting **livestock**.
(3) **Dump trucks**.
(4) **Cranes**.
(5) **Buses**.
(6) Transit mix **concrete or cement trucks**, and trucks that mix concrete or cement at, or adjacent to, a jobsite.
(7) Motor vehicles that are **not commercial vehicles**.
(8) Vehicles operated by any **public utility** furnishing electricity, gas, water, or telephone service.
(9) Trucks or truck tractors with a **front axle** at least **four feet to the rear** of the foremost part of the truck or truck tractor, not including the front bumper.
(10) Trucks transporting **garbage**, rubbish, or refuse.
(11) Trucks equipped with a **fifth wheel** when towing a semitrailer.
(12) **Tank trucks** which have a cargo capacity of at least 1,500 gallons.
(13) Trucks transporting **bulk grains** or bulk livestock feed.

35551.5. (c) The **total gross weight** by any group of **two or more consecutive axles** where the distance between the first and last axles is **18 feet or less** shall not exceed:

Distance in feet between first and last axles of group	Allowed load in pounds on group of axles
4	32,000
5	32,000
6	32,200
7	32,900
8	33,600
9	34,300
10	35,000
11	35,700
12	36,400
13	37,100
14	43,200
15	44,000
16	44,800
17	45,600
18	46,400

35551.5. (d) The **total gross weight** where the distance between the first and last axles is **more than 18 feet** shall not exceed:

Distance in feet	Allowed load in pounds
19	47,200
20	48,000
21	48,800
22	49,600
23	50,400
24	51,200

25	55,250
26	56,100
27	56,950
28	57,800
29	58,650
30	59,500
31	60,350
32	61,200
33	62,050
34	62,900
35	63,750
36	64,600
37	65,450
38	66,300
39	68,000
40	70,000
41	72,000
42	73,280
43	73,280
44	73,280
45	73,280
46	73,280
47	73,280
48	73,280
49	73,280
50	73,280
51	73,280
52	73,600
53	74,400
54	75,200
55	76,000
56 or over	76,800

MEASUREMENTS

35551.5. (e) The distance between axles shall be measured to the **nearest whole foot**. When a fraction is exactly **six inches**, the **next larger whole foot** shall be used.

35551.5. (f) The gross weight limits shall include all **enforcement tolerances**.

EXCEPTION - FIRE TRUCKS

The California Code of Regulations, Title 21, allows increased axle weights on fire trucks. For more details, see this website: Fire Truck Exemptions .

EXCEPTION - LOG HAULERS

35552. (a) Vehicles transporting **logs** may exceed tandem weight by 1,500 pounds, and may carry a gross weight of 69,000 pounds on two consecutive sets of tandem axles, under certain conditions. For more information, see the web page: Log Haulers Weight Exemptions.

(b) One set of **tandem axles** of log trucks shall be in compliance with Section 35551 if the total gross weight of 34,000 pounds is not **exceeded by more than 1,500 pounds** . Two consecutive sets of tandem axles shall be in compliance with Section 35551 if the consecutive sets of tandem axles do not carry a combined total gross weight of more than **69,000 pounds**, if:

- the total gross weight on any **one set** does not exceed **35,500 pounds**, and
- the **distance between the first and last axle** of the consecutive sets of tandem axles is **34 feet** or more.

All such truck and vehicle combinations shall be subject to **all other provisions** .

(c) The gross weight limits expressed in this section shall include all **enforcement tolerances**.

(d) If any total gross weight is exceeded, the allowed weight in pounds set forth in Section 35551 shall be the maximum permitted weight for determining the **fine for the violation** as specified in the table in Section 42030; except that, whenever the violation is for exceeding the total gross weight for **two consecutive sets of tandem axles**, and if the overall distance between the first and last axle of such sets is 34 feet or more, the allowed weight on the two consecutive sets shall be **68,000 pounds**.

(e) This section shall have **no application** to highways which are a part of the **National Network** (NN). (To determine which routes are NN, click here for the Truck Route List in Excel and look for NN in the column "Type.")

EXCEPTION - LOADING & UNLOADING

35553. Weight limits shall not apply to any vehicle in the immediate vicinity of an unloading or loading area while preparing for or in the process of unloading or loading, provided any overload is incidental to and necessitated by such action; and provided that the action does not occur on a bridge or highway structure.

This section shall have **no application** to highways which are a part of the **National Network** (NN). (To determine which routes are NN, click here for the Truck Route List in Excel and look for NN in the column "Type.")

EXCEPTION - BUSES

35554. The gross weight on any **one axle** of a **bus** shall not exceed **20,500 pounds**.

EXCEPTION - COTTON MODULE MOVERS

35555. (a) Cotton module movers have a weight exemption under certain circumstances. For details, see the web page: "Cotton Module Movers."

LEGAL USE OF WEIGHT CERTIFICATES

35557. (a) Vehicle weight certificates issued on or after January 1, 1984, and other associated weight records, if approved by the Director of Food and Agriculture, are subject to legal process in a criminal or civil proceeding if due to a violation of the Business and Professions Code, Division 5, Chapter 7 , Chapter 7.3, and Chapter 7.7.

SCALES AT FACILITY

35558. If an axle **weigh scale** is at the loading facility, the **load shall be weighed** before the vehicle leaves the facility. In a **port** facility, this requirement only applies **if the scale is located in outbound lanes**.

EXCEPTIONS - LOCAL OVERWEIGHT PERMITS

35700. (a) Any **county or city** may permit loads on highways under their jurisdictions of a **maximum gross weight in excess** of that specified in this code. (b) This section d**oes not apply to state highways**.

EXCEPTIONS - INTERNATIONAL CONTAINERS

Per CVC Section 35700.5(a), trucks hauling international containers may be issued permits for up to 95,000 pounds GVW on segments of Routes 1, 47, and 103 under certain conditions. See web site: "International Container Weight Exemption in California."

WEIGHT RESTRICTIONS

35701. (a) Any city, or county for a residence district, may **prohibit** the use of a street by any **commercial vehicle** or by any vehicle **exceeding a maximum gross weight** limit, except:

- vehicles subject to the Public Utilities Code Sections 1031 through 1036 (**passenger stage corporations**), and
- vehicles used for the collection and transportation of **garbage** using traditionally used routes in San Diego County.

(b) The ordinance shall not be effective until appropriate **signs** are erected.

(c) No ordinance adopted after November 10, 1969 shall apply to any state highway on the **National Network** (NN). (To determine which routes are NN, click here for the Truck Route List in Excel and look for NN in the column "Type."), unless approved by a **two-thirds vote of the California Transportation Commission**.

(d) The solid waste management plan prepared under Section 66780.1 of the Government Code by San Diego County may designate the **traditionally used routes**.

(e) **"Traditionally used route"** means any street used for one year or more as access to or from a solid waste disposal site.

35702. Local weight limits are only effective on **local roads**. **State highway** weight limits must be approved by the Department of Transportation. An **alternate route** must be provided.

PICK UPS & DELIVERIES EXEMPTED

35703. No ordinance adopted pursuant to Section 35701 shall prohibit any **commercial vehicles** coming from an unrestricted street having ingress and egress **by direct route** to and from a restricted street when necessary for:

- **picking up or delivering goods** from or to any building or structure on the restricted street, or
- **delivering materials** used in the repair, alteration, remodeling, or **construction** of any building or structure on the restricted street for which

a building permit has previously been obtained.

PUBLIC UTILITIES EXEMPTED

35704. No ordinance adopted pursuant to Section 35701 to decrease weight limits shall apply to any vehicle owned by a **public utility** or a **licensed contractor** while necessary for the construction, installation, or repair of any public utility.

FUNDING

35705. Section 35701 shall not be applicable to any city street on which money from the **State Highway Account** in the **State Transportation Fund** has been used for construction or maintenance except when the legislative body of the city, after notice and hearing, determines to reduce weight limits on such streets. For more information, see the CVC Section 35705.

COUNTIES

35706. Counties may reduce the permissible weight of vehicles and loads on unimproved **county highways** or on **county bridges**.

For more information on Weights and Local Authority, and Weights and Bridges, see the CVC Division 15, Chapter 5 ("Weight"), Article 4 ("Local Authorities") Sections 35706 to 35722. and Article 5 ("Bridges and Other Structures") Sections 35750 to 35755.

CONTACTS

Caltrans Legal Truck Size & Weight Work Group
Casey Robb
Manuel Fonseca
General number (916) 654-5741
E-mail: Truck Size & Weight Unit.

Return to the Caltrans "Office of Truck Services" page.

Revised 4/2/08.

TRUCK NETWORKS on California State Highways

DISTRICT 8

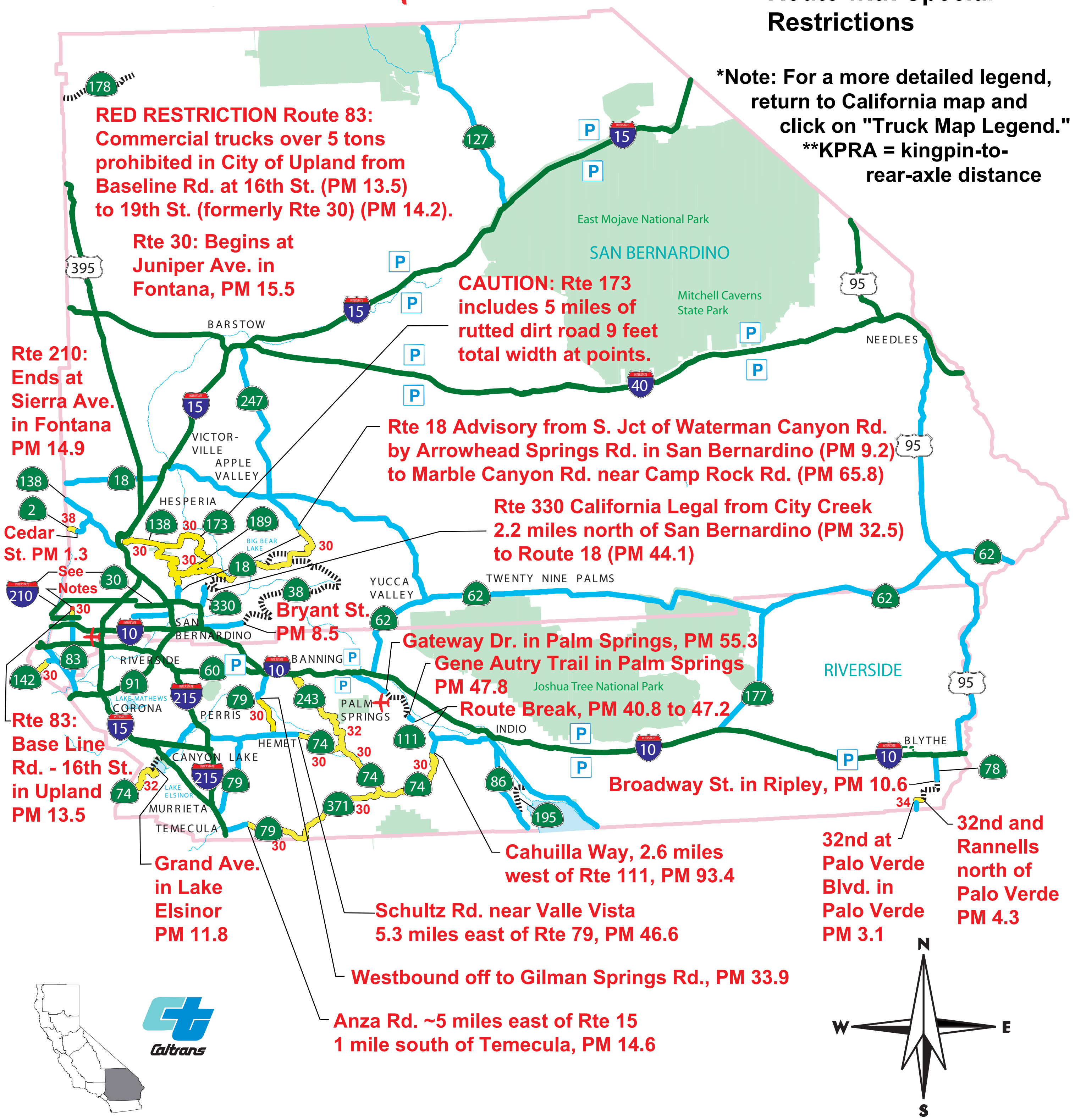
Map 8 of 12

Not to scale

Last revised July 6, 2007

LEGEND*

- National Network (STAA)
- Terminal Access (STAA)
- California Legal Network
- Ca Legal Advisory Route
- 30 KPRA** Advisory
- Route with Special Restrictions
- P Rest Area
- Airport



TECHNICAL AREA: TRANS LINE SAFETY & NUISANCE

Data Adequacy Request 40. Please provide the name, title, phone number, address, and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.

Response:

California Public Utilities Commission:
Chloe Lukins
Supervisor, Transmission Permitting
CPUC
505 Van Ness Avenue
San Francisco, CA 94102
415-703-1637
clu@cpuc.ca.gov

California Independent System Operator:
David Le
Senior Engineer
California ISO
151 Blue Ravine Rd
Folsom, CA
916-608-7062
dle@caiso.com

TECHNICAL AREA: TRANS LINE SAFETY & NUISANCE

Data Adequacy Request 41. Please provide a schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.

Response: Permit required: It is expected that Southern California Edison will require a Certificate of Public Convenience and Necessity (CPCN) for the network transmission upgrades associated with the Solar 1 project as described in Appendix EE to the AFC, at pages 5-6:

"SCE proposes to construct the Lugo-Pisgah No. 2 500kV (single circuit) within the existing Right-of-Way (ROW) of the existing Lugo-Pisgah 220kV Transmission Line (see Figure 1 and Plat Maps 1 through 58 at the end of this document) for 57 of the approximately 67 miles of the ROW. The last 10 miles south of Victorville would be constructed within a new ROW area. There would also be two new T/L loops constructed in the vicinity of the existing Pisgah Substation. The existing Pisgah Substation (approximately 5 acres) will be expanded to approximately 40 acres to accommodate new electrical and communication facilities. The Proposed Project would serve current and projected demand for electricity and maintain electric system reliability in this portion of the Mojave Desert where numerous renewable (solar and wind) projects are being proposed, including SES Solar One.

The Proposed Project is expected to be operational on or before 2015 (see CAISO October 2008 Interconnection Facility Study Report) to ensure that safe and reliable electric service is available to meet existing and projected customer electrical demands."

Schedule: Uncertain. SCE has not yet applied for the CPCN. The draft Large Generator Interconnection Agreement provided to the applicant in early February 2009 posits an online date for the transmission project of December 2016. SES is working diligently with SCE and the ISO to advance this date. However, it is expected that 400MW could be available for SES to transmit to the grid without any upgrade for the initial phase of the project.

Steps the Applicant Has Taken or Plans to Take: Among the steps that the applicant has taken to facilitate the development of the transmission upgrades in a timely fashion are the following:

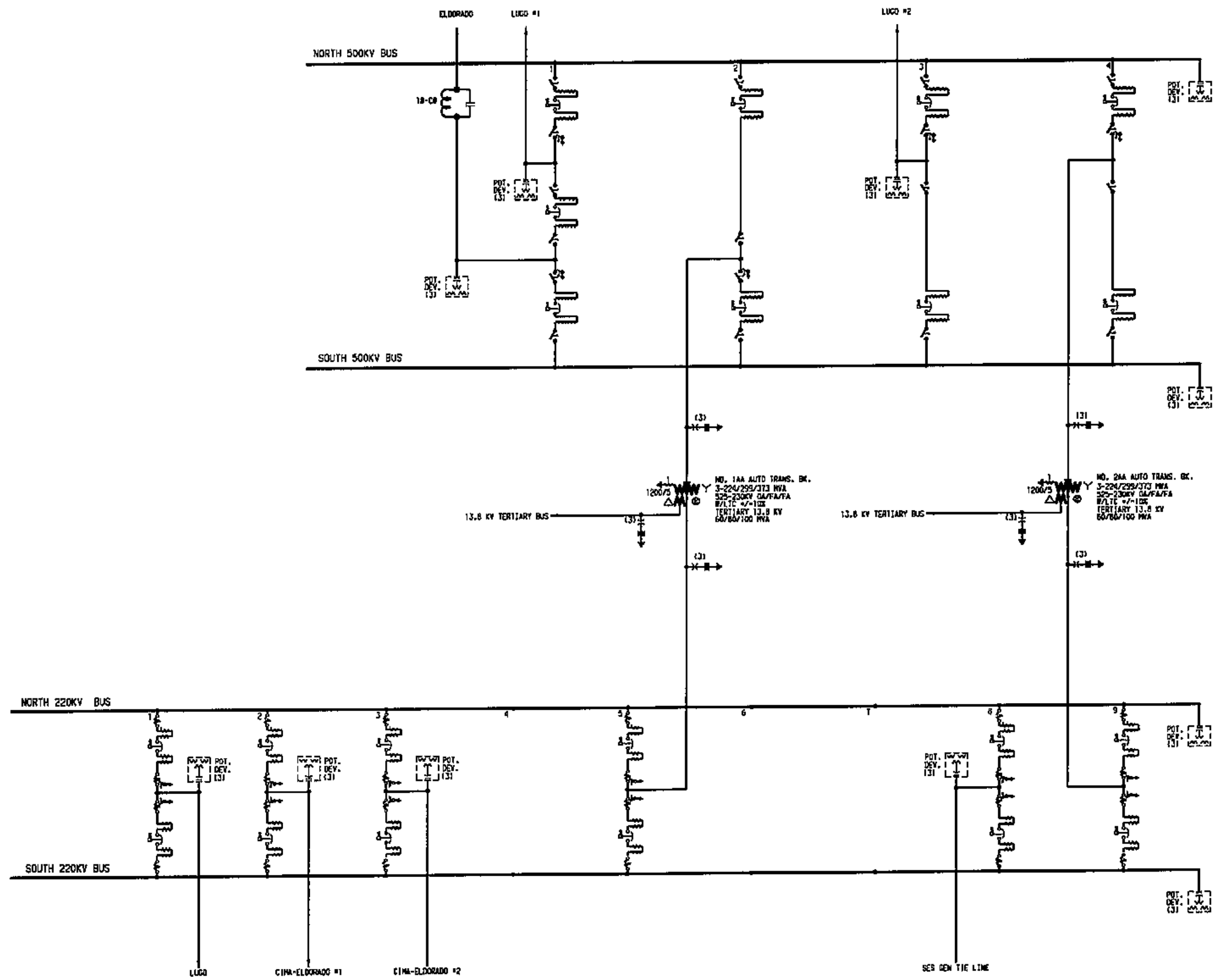
- Submitted Interconnection Application to the California ISO and follow-up documentation, culminating in ISO issuance of a final facilities study in November 2008.
- Entered into Letter Agreements with SCE in 2006 intended to facilitate development of both the applicant's AFC and SCE's CPCN filings, pursuant to which the following work has been conducted:
    - Right of way studies and analysis regarding SCE's existing land ownership rights to accommodate the conceptual transmission upgrades
    - Biological assessment of transmission right of way, conducted for the purpose of both satisfying the CEC's requirements and to be used by SCE in a subsequent CPCN filing.-
- Requested and received an "Optional Study" from the ISO in January 2008 which discusses the potential for and conditions under which up to 275 MW could be interconnected in advance of the full network upgrades
- Pursued the development of additional letter agreements with SCE under which SCE would undertake additional work intended to both accelerate the planning and permitting of the network transmission upgrades, and further examine the potential for an earlier interconnection of less than the full 850 MW
- Retained a transmission consultant to review SCE's transmission study data to contribute to the assessment of potential early interconnection
- Contacted CEC and CPUC staff to begin discussing potential mechanisms for coordinated review of the applicant's Solar 1 project and SCE's expected transmission CPCN filing
- Contacted ISO to determine mechanisms to ensure SCE cost recovery should SCE agree to finance the network upgrades in advance

TECHNICAL AREA: TRANSMISSION SYSTEM DESIGN

Data Adequacy Request 42. Provide detailed pre and post project one line diagrams of the existing SCE Pisgah 230/500kV substation showing all the equipment that would be required to interconnect the project including 230kV and 500kV breakers, disconnect switches (with their respective ratings) and conductor termination points of the substation.

Response: Detailed One Line and Plot Plan of the Pisgah Substation are provided as an attachment (Attachment TS-1 and TS-2).

TS-1



ORSA Consulting Engineers, Inc. Fullerton, California

REFERENCE DRAWINGS	REFERENCE DRAWINGS	NO.	REVISIONS	DATE	P.E.	OAE	SUPV	APPROVED	ENGR	CK'D	MADE	I.O.
			FOR STUDY								ORSA	

LOCATION: PISGAH SUBSTATION

ONE LINE
FOR FACILITY STUDY

SOUTHERN CALIFORNIA EDISON An EDISON INTERNATIONAL Company

SHEET NO.

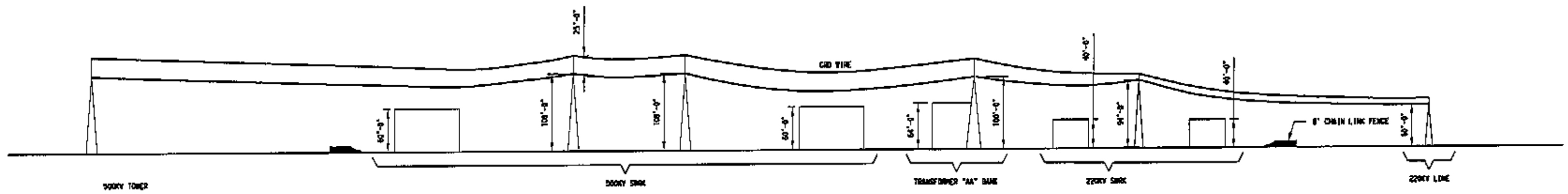
SCALE: NONE

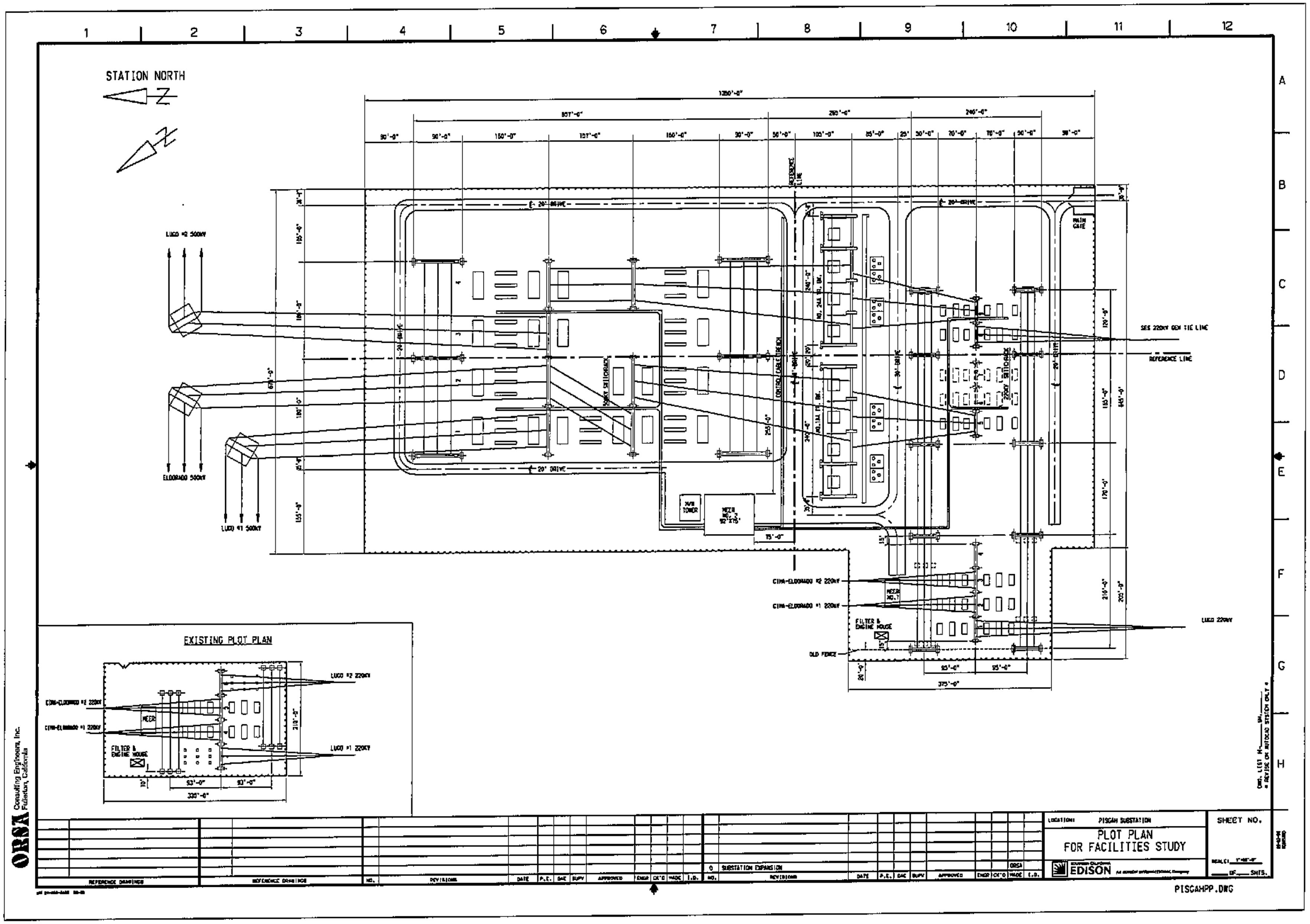
____ OF ____ SHTS.

DWG. LIST M-____ EM.____
* REVISE ON AUTOCAD SYSTEM ONLY *

PISGAH1L.DWG

TS-2


GND WIRE
8' CHAIN LINK FENCE
500KV TOWER
500KV SWYD
TRANSFORMER "AA" BANK
220KV SWYD
220KV LINE


STATION NORTH
LUGO #2 500KV
ELDORADO 500KV
LUGO #1 500KV
20' DRIVE
MAIN GATE
REFERENCE LINE
SCE 220KV GEN TIE LINE
CONTROL CABLE TRENCH
500KV SWITCHRACK
220KV SWITCHRACK
CIMA-ELDORADO #2 220KV
CIMA-ELDORADO #1 220KV
LUGO 220KV
FILTER & ENGINE HOUSE
OLD FENCE
EXISTING PLOT PLAN
LUGO #2 220KV
LUGO #1 220KV
REFERENCE DRAWINGS
REVISIONS
0 SUBSTATION EXPANSION
LOCATION: PISGAH SUBSTATION
PLOT PLAN
FOR FACILITIES STUDY
EDISON
SHEET NO.
PISGAHPP.DWG
ORSA Consulting Engineers, Inc. Fullerton, California

TECHNICAL AREA: TRANSMISSION SYSTEM DESIGN

Data Adequacy Request 43. Please provide table(s) which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.

Response:

Agency	Name/Title	Contact Info	Agency Role
California Independent System Operator (CAISO)	David Le Senior Engineer	151 Blue Ravine Rd Folsom, CA 916-608-7062 dle@caiso.com	Operate the electrical grid, provide open transmission access, and facilitate and promote infrastructure development
California Public Utilities Commission (CPUC)	Chloe Lukins Supervisor, Transmission Permitting	505 Van Ness Avenue San Francisco, CA 94102 415-703-1637 clu@cpuc.ca.gov	Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transporation companies, in addition to authorizing video franchises.

The utility responsible for the transmission line is Southern California Edison, Their contact on this project is Jorge Chacon, Transmission Planning Project Manager, 2131 Walnut Grove Ave., Rosemead, CA 91770, phone number: 626-302-0364, e-mail address: Jorge.Chacon@sce.com

TECHNICAL AREA: TRANSMISSION SYSTEM DESIGN

Data Adequacy Request 44. Please provide the name, title, phone number, address, and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.

Response: California Public Utilities Commission:
Chloe Lukins
Supervisor, Transmission Permitting
CPUC
505 Van Ness Avenue
San Francisco, CA 94102
415-703-1637
clu@cpuc.ca.gov

California Independent System Operator:
David Le
Senior Engineer
California ISO
151 Blue Ravine Rd
Folsom, CA
916-608-7062
dle@caiso.com

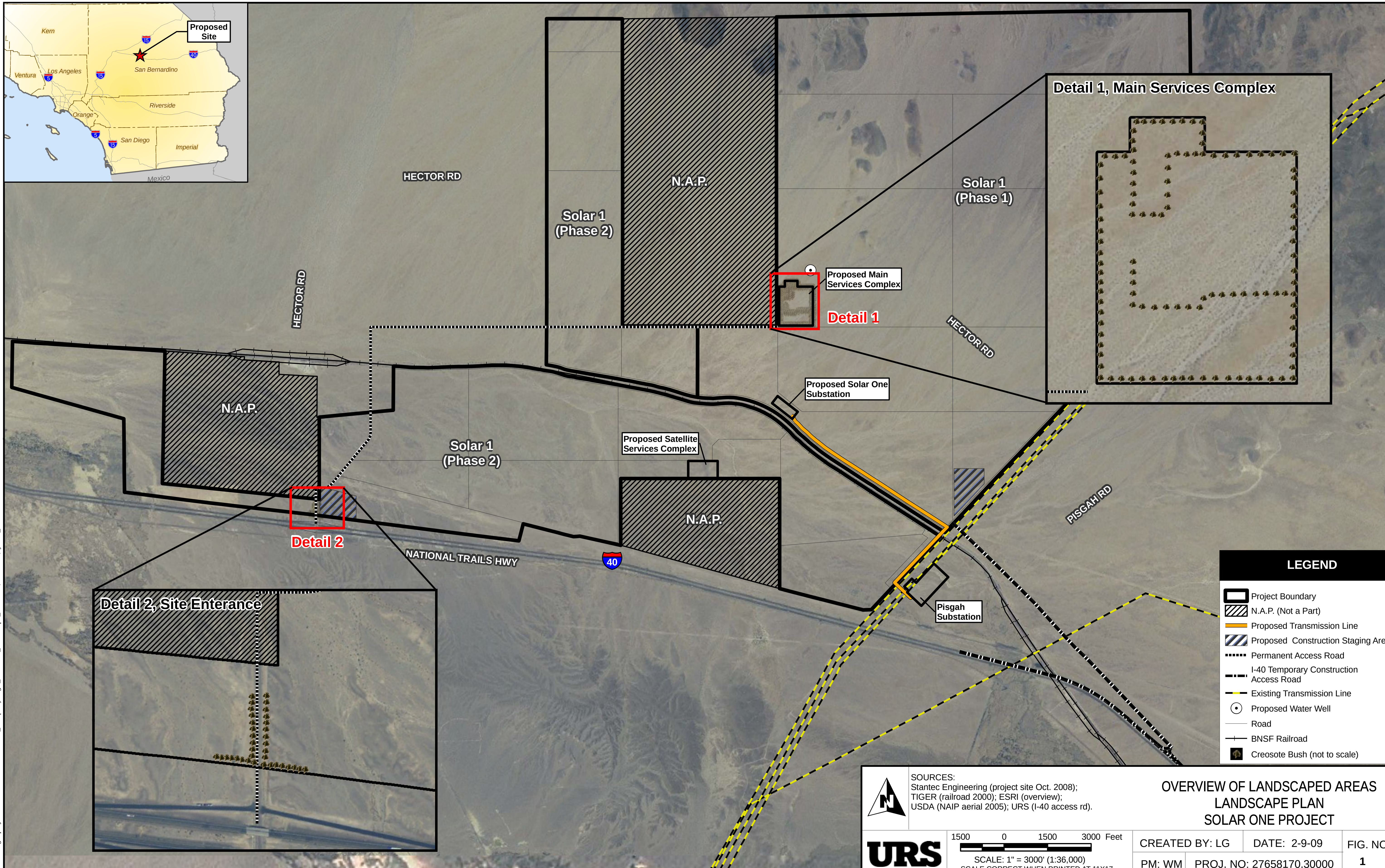
TECHNICAL AREA: VISUAL RESOURCES

Data Adequacy Request 45. The applicant is proposing a conceptual landscaping plan to mitigate visual impacts. Please include the landscaping in simulation(s) representing sensitive area views, depicting the landscaping five years after installation; and estimate the expected time until maturity is reached.

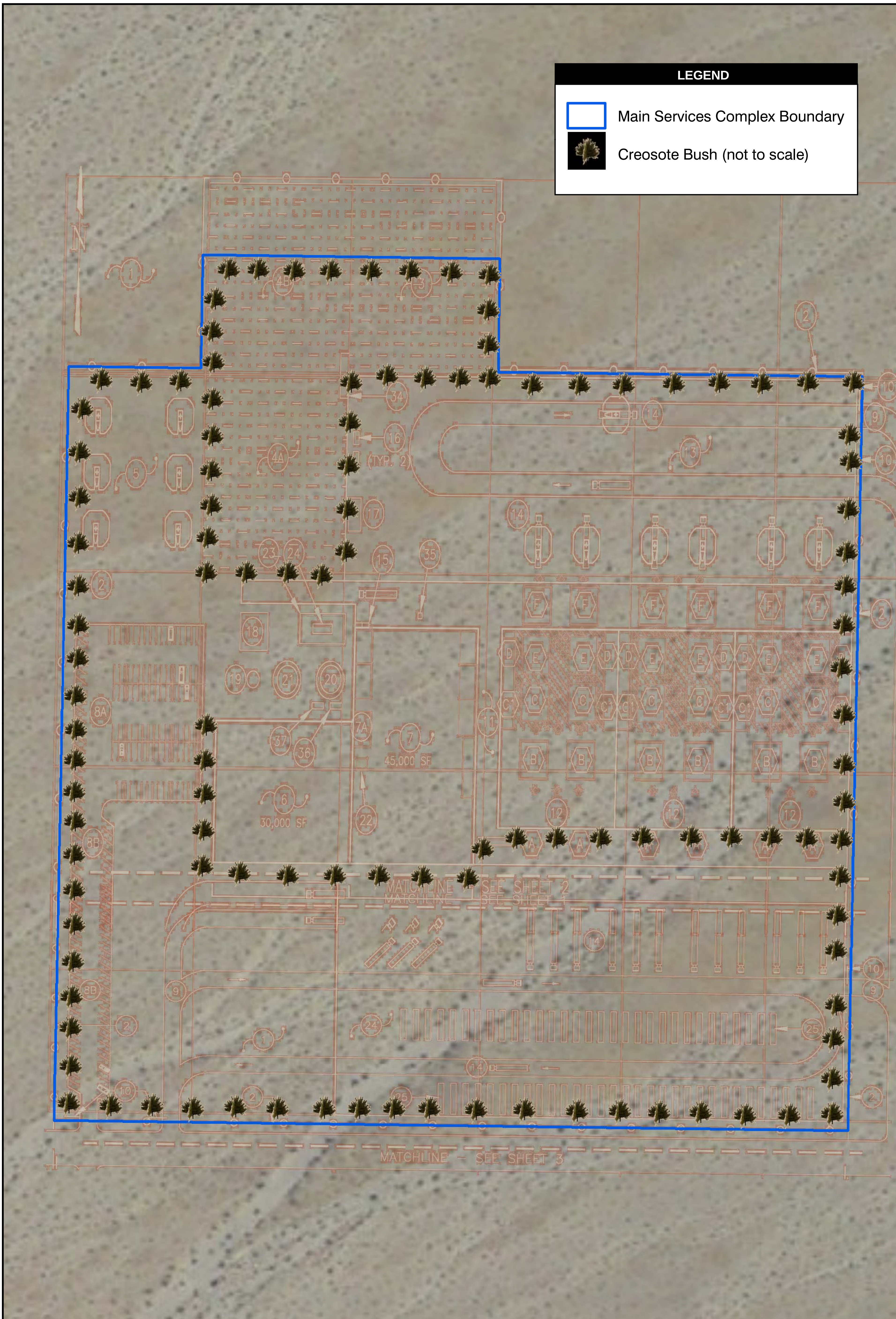
Response: The landscaping plan, provided as attachment VIS-1 will include native creosote bushes that will be planted around the main services complex and entrance only. The landscaping will not be visible from the road or any of the KOP locations. However, the proposed landscaping plan will allow the Main Services Complex and access roads a degree of visual harmony with the surroundings. A simulation of the landscaping plan would not alter any of the photos taken for the project. Therefore, none of the simulations have been revised.

Attachment VIS-1

VIS-1



Path: G:\gis\projects\1577\27658100\mxd\Data_Adequacy\Fig1_Overview_Landscape_Plan.mxd, 02/12/09, jason_sokol



SOURCES:
Stantec Consulting Inc. 2008.
Imagery from ESRI online services, 2007.

MAIN SERVICES COMPLEX
LANDSCAPE PLAN
SOLAR ONE PROJECT

URS

80 0 80 160 Feet

SCALE: 1" = 160' (1:1920)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: JS | DATE: 2-11-09 | FIG. NO: 2

PM: CL | PROJ. NO: 27658170.30000

Path: G:\gis\projects\1577\27658100\mxd\Data_Adequacy\MainServiceComplex_LandscapePlan.mxd, 02/12/09, jason_sokol

CNDDB and USFWS data points shown here are derived from a polygonal dataset, and are intended only as a guide to depict general presence of the identified species within the specified area. Contact CNDDB and USFWS for further information.

SOURCES:
Aerial photograph from ESRI online services, 2005.

PROJECT ENTERANCE OFF I-40
LANDSCAPE PLAN
SOLAR ONE PROJECT

URS

75 0 75 150 Feet

SCALE: 1" = 150' (1:1800)
SCALE CORRECT WHEN PRINTED AT 8.5X11

CREATED BY: JS	DATE: 2-11-09	FIG. NO: 3
PM: CL	PROJ. NO: 27658170.30000	

Path: G:\gis\projects\1577\27658100\mxd\Data_Adequacy\Entrance_LandscapePlan.mxd, 02/12/09, jason_sokol

CNDDB and USFWS data points shown here are derived from a polygonal dataset, and are intended only as a guide to depict general presence of the identified species within the specified area. Contact CNDDB and USFWS for further information.

TECHNICAL AREA: VISUAL RESOURCES

Data Adequacy Request 46. The applicant is proposing a conceptual landscaping plan to mitigate visual impacts.

Please provide a conceptual landscaping plan at a 1:40 scale (1"=40'). Include information on the type of plant species proposed, their size, quantity, and spacing at planting, expected heights at 5 years and maturity, and expected growth rates.

Response: The Solar One Landscaping Plan is referenced as attachment VIS-1. The plan shows locations of plantings and quantity of plants to be used, although number of plants may change in final design. The objective is planting to match existing spacing of native vegetation on the project site. *Larrea tridentata*, creosote bush, will be widely spaced around the main services complex and entrance. These shrubs are native and do not require watering once established. They typically reach a height of 3 to 5 feet on the project site and will grow at a rate of 1-2 feet per year.

TECHNICAL AREA: WASTE MANAGEMENT

Data Adequacy Request 47. The AFC provides no discussion of temporary or permanent closure. AFC, Section 5.14.2.3, refers to a facility closure plan that is not included in the document.

Response: FACILITY CLOSURE PLANNING

At some point in the future, the Solar one Project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Facility closure will be consistent with LORS in effect at the time of closure. There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure and unplanned permanent closure**.** The purpose and objective of facility closure planning includes:

1. Strategies to secure the site against illegal entry;
2. methods and processes to remove any toxic and/or hazardous materials;
3. methods and processes to remove equipment and structures; and
4. measures to ensure reclamation of the site after project abandonment.

The following sections define types of facility closures as well as describe general mitigation measures to address biological and waste considerations. A more detailed closure plan will be finalized prior to construction related activities associated with the Solar One Project.

<u>Closure Definitions</u>

Planned Closure - A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure - An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure - An unplanned permanent closure occurs if SES closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where SES fails to implement the contingency plan, and the project is essentially abandoned.

Mitigation Planning

Planned Closure

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure, will be undertaken. To ensure adequate review of a planned project closure, SES would submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by CEC's compliance program manager CPM) prior to commencement of closure activities. SES would file the number of copies requested by the CEC of a proposed facility closure plan with the Energy Commission. The plan would:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;
2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and
4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting would be held between SES and the Energy Commission CPM for the purpose of discussing the specific contents of the plan. In the event that there are significant issues associated with the proposed facility closure plan's approval, or the desires of local officials or interested parties are inconsistent with the plan, the CPM would hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, SES would take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but would not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

SES would submit an on-site contingency plan for CPM review and approval. The plan would be submitted no less than 60 days (or other time agreed to by the CPM and BLM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and would be kept at the site at all times.

SES, in consultation with the CPM and BLM, will update the on-site contingency plan as necessary. The CPM and BLM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, SES will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM and BLM.

The on-site contingency plan would provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan would provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment.

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, SES would notify the CPM and BLM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and would take all necessary steps to implement the on-site contingency plan. SES would keep the CPM and BLM informed of the circumstances and expected duration of the closure. If the CPM and

BLM determine that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure would be developed and submitted to the CPM and BLM within 90 days of the CPM's and BLM's determination (or other period of time agreed to by the CPM and BLM).

Unplanned Permanent Closure

The on-site contingency plan required for unplanned temporary closure would also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure would also apply to unplanned permanent closure. In addition, the on-site contingency plan would address how SES will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, SES would notify the CPM and BLM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and would take all necessary steps to implement the on-site contingency plan. SES would keep the CPM and BLM informed of the status of all closure activities. A closure plan, consistent with the requirements for a planned closure, would be developed and submitted to the CPM and BLM within 90 days of the permanent closure or another period of time agreed to by the CPM and BLM.

Mitigation Measures

SES would implement and incorporate into the facility closure plan measures to address the local biological resources related to facility closure. A funding mechanism would be developed in consultation with the BLM and Energy Commission staff to ensure sufficient funds are available for revegetation, reclamation, and decommissioning. The facility closure plan would address biological resources-related mitigation measures. In addition to these measures, the plan must include the following:

1. Removal of transmission conductors when they are no longer used and useful;
2. Removal of all above ground and subsurface power plant site facilities and related facilities;
3. Methods for restoring wildlife habitat and promoting the re-establishment of native plant and wildlife species;
4. Re-vegetation of the project site and other disturbed areas utilizing appropriate seed mixture;
5. Criteria that would trigger implementation of the plan (e.g., nonoperational for one year or greater); and
6. A cost estimate to complete closure-related activities.

7. In addition, SES would secure funding to ensure implementation of the plan and provide to the CPM and BLM written evidence of the dedicated funding mechanism(s).

SES would prepare an Operation Waste Management Plan for all wastes generated during operation of the facility and would submit the plan to the CPM and BLM for review and approval. The plan would contain, at a minimum, the following:

1. a detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
2. management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
3. information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations would be included in the plan and updated as necessary;
4. a detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
5. a detailed description of how facility wastes will be managed and disposed upon closure of the facility.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 48. Please provide a discussion of indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.

Response: Potential, direct, indirect, and cumulative impacts due to construction, operation, and maintenance of the project were evaluated. Specifically, potential impacts to surface and groundwater supply, use, and quality were evaluated and described in the AFC section 5.5.2, Environmental Consequences. The following discussion provides additional information related to water resources related impacts.

Direct Impacts

From a surface water perspective, the Project will create new impervious surfaces that will have the potential to create additional runoff and subsequent erosion and sedimentation. To minimize potential surface water impacts, site grades will be established to minimize the amount of earthwork required to construct the facilities and to maintain control of stormwater runoff. Selected areas will be covered with appropriate material, as conditions require (*e.g.,* soil binders or asphalt concrete for road base and gravel for other facility area surfaces). Finish grading will be performed to conform to the finished design elevations for surface drainage and to prepare the areas for the specified surface finishes. Rainfall from vehicle parking and paved areas in the site facilities area will be collected and directed to appropriately designed water quality devices for pollutant removal.

With regard to nearby communities or wells, no significant impact would be expected based on the results of the preliminary groundwater investigation, which indicates there are no known active wells within the Lavic Valley basin in the vicinity of the site. Further, groundwater within the basin appears to be structurally separated from the basins to the east and west, decreasing the potential for impact to those basins.

Indirect Impacts

As described in Section 5.18 of the AFC document, indirect impacts are caused by an action (Project related activities) and are later in time or farther removed in distance but are still reasonably likely. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effect on air and water and other natural systems.

Potential indirect impacts related to project water resources include potential increase in standing water onsite due to potential construction of swales, detention or infiltration areas that may promote vector issues (mosquito breeding). However, proper design and maintenance of these facilities will ensure full drainage within 72-hours. Additional indirect impacts include potential wildlife attraction to standing water within project wastewater evaporation ponds. However, the ponds will be designed to discourage wildlife use of the ponds to minimize indirect impacts to wildlife.

Cumulative Impacts

As described in Section 5.18 of the AFC document, cumulative impacts are additive or interactive effects resulting from the incremental effect of the Project when added to other past, present, or reasonably foreseeable future actions. Interactive effects may be either countervailing or synergistic. The existing baseline considered for the impacts analysis includes existing development in the watershed. The future baseline includes proposed projects likely to occur at the same time or before the Project (transmission line upgrades and Pisgah substation upgrades). Future projects within the surface watershed likely to occur after the Proposed Project include Solar Three. Other renewable projects in the area, because of their more uncertain nature, were analyzed on a more general level, including the possibility of a SES Solar Six Project located approximately 8 miles to the east of the Solar One Site, and other potential future projects in the basin. Figure 5.18-2 in the AFC shows the pending BLM applications for wind and solar projects near the Solar One site. Seven potential future solar and wind projects near the project area (in addition to SES Solar Three and Solar Six) lie within the surface watershed up to the Solar One Project boundary or downstream. These include projects listed in AFC Table 5.18-3 with Serial numbers CACA 048472, 048629, 049179, 049362, 049585, 049882, and 050105. Total acreage of all these potential future projects (including SES Solar One, Three, and Six) is approximately 77,089 acres (120 square miles). Therefore, there exists the potential for significant surface water hydrologic changes in the basin if some or all of these projects are constructed without regard to flooding, erosion, and sedimentation due to potential changes in drainage patterns, flow rates and volumes.

When evaluated from an overall basin perspective, the total watershed area at the downstream end of the Solar One Phases I and II is approximately 90 square miles, which lies within the 200,000 square mile Great Basin (0.01 percent of the total basin). The 90 square mile watershed up to the downstream (west) end of the Solar One project boundary includes the SES

Solar One, Three, and Six projects along with five other potential future projects in the area.

From a project level perspective, however, the project proposes relatively minor changes in overall surface topography, but will include access roads, swales, channels, and basins to control flooding onsite. To minimize or eliminate cumulative impacts from the Solar One Project, the Applicant will implement a construction and operation phase SWPPP (and associated monitoring program) that will identify proper location, implementation, and maintenance of BMPs for erosion and sediment control (for both wind and water) and the associated effectiveness of the BMP program. These measures will avoid and/or reduce project-specific impacts to levels that will not add to cumulative effects from other projects to the region, such that no cumulative effects are expected to occur or be associated with this Project.

Currently there is limited to no groundwater use in the Lavic Groundwater Basin. The principal recharge is derived from percolation of runoff. Subsurface flow from adjoining basins may also contribute to recharge. Groundwater will likely be the main source of water for future projects in the basin. If some or all potential future projects within the Lavic Groundwater Basin are constructed without regard to groundwater withdrawal rates in relation to the total basin storage and recharge, there is a potential for impact to the groundwater resource.

DWR reports that the total storage capacity of the Lavic groundwater basin is approximately 270,000 af and that there is approximately 300 afy of natural recharge to the basin. Although projected annual water use is approximately 11% of the annual average recharge to the lavic basin (currently with minimal to no use), the projected operational phase water use over twenty to thirty years is approximately 724 to 1086 af, respectively, which constitutes approximately 0.3 to 0.4%, respectively, of the total basin capacity. Additionally, as shown in Figure 5.5-3 of the AFC, the Project uses much less water than other solar technologies on a per MegaWatt (MW) basis. Therefore, it is anticipated that the Project will not be a significant contributing source of cumulative groundwater resource impacts within the Lavic Valley groundwater basin.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 49. Please provide a discussion of groundwater wells within ½ mile of the project.

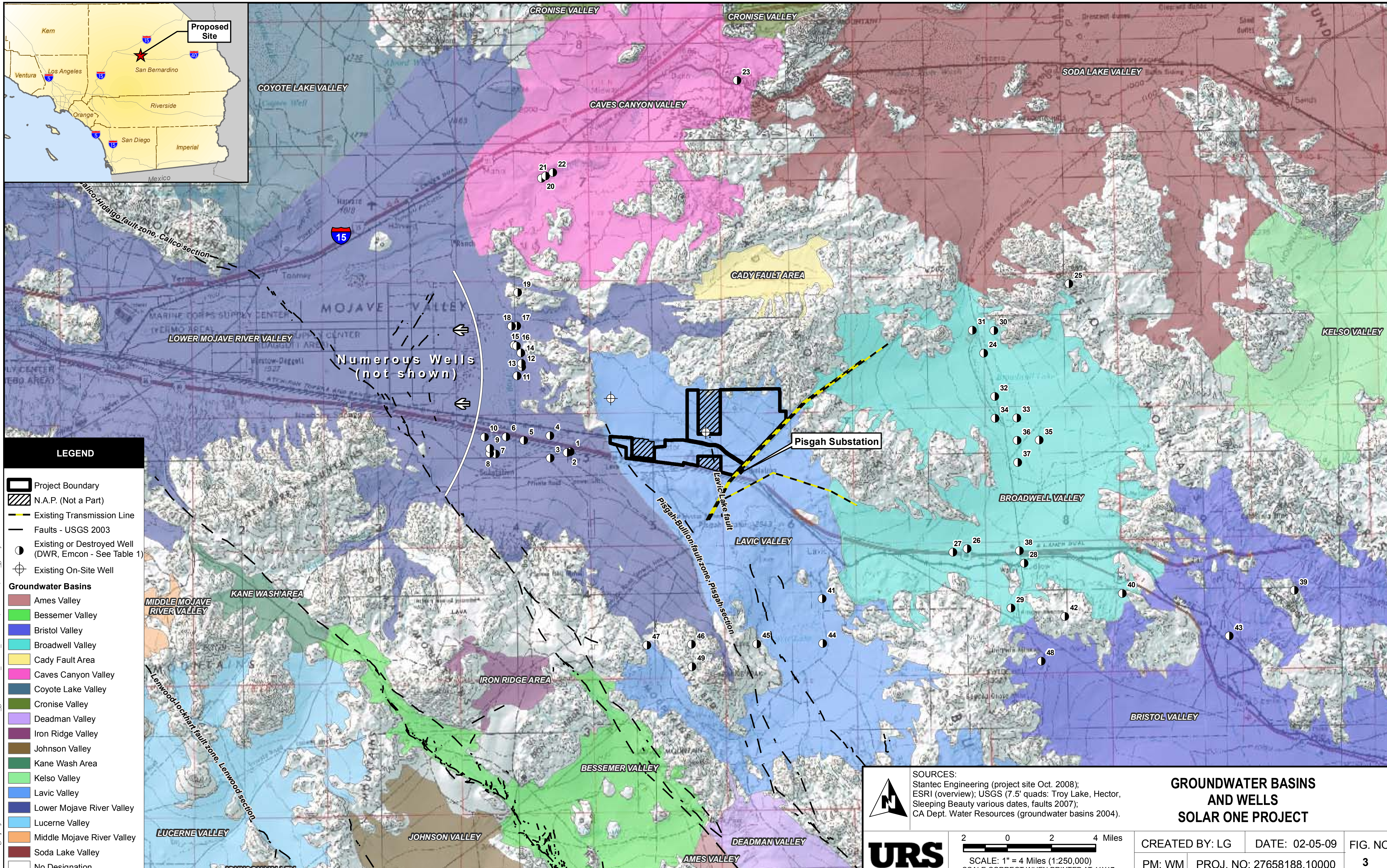
Response: Two groundwater wells are present within the immediate site vicinity that are not being used presently. The wells are generally in poor condition and not suitable for water us production for the project. The locations of other nearby wells and groundwater depths were researched using the DWR website and other sources available: http://wdl.water.ca.gov/gw/map/scal.cfm. No other wells were found within approximately one mile of the site boundaries; however, numerous wells were found in the general area. An additional search of the U.S. Geological Survey (USGS) National Water Information System (NWIS) Web Interface resulted in no groundwater well information for an approximately 400-square mile area generally centered on the site.

The existing and destroyed wells identified during the data search are shown on Figure 3, provided as attachment WR-1. Additional details, including well location, ground surface elevation, and well and groundwater depth (where available) are presented in Table 1, provided as attachment WR-2 to this response.

The two groundwater wells present within the immediate site vicinity include: one in the central portion of the site in an area of private land; and another (the “Crow Nest Well”) about 1.5 miles north of the westernmost point of the project. Both wells are shown in attachment WR-1. According to the BLM, the Crow Nest Well was approximately 170 feet deep and historically used to support the grazing of livestock. It was associated with two 4,500-gallon above ground water tanks (Personal communication with Rich Rotte, 2008). URS measured depth to water in this well to be about 130 feet and the total well depth to be approximately 138 feet. Both wells are in relatively poor condition and are not considered useable for the project. Well completion reports are not available from DWR or San Bernardino County.

Within the Lavic Valley groundwater basin, records for several wells constructed in the late 1800s and early 1900s were located in the central/southern part of the basin (close to Lavic Lake, see wells 41, 44 and 45 on Figure 3) approximately 7 to 9 miles from the site. The data indicates that groundwater depths measured in the 1960s and earlier ranged from 53 to 64 feet below the ground surface. A pumping rate of 140 gallons per minute (gpm) was recorded in well no. 44 in 1917 (DWR, 1967). More recent data for these wells has not been reported. Based on the review of existing data,no wells were identified in the basin that were closer in closer proximity to the site.

WR-1



Proposed Site
Kern
San Bernardino
Ventura
Los Angeles
Orange
Riverside
San Diego
Imperial
Mexico
CRONISE VALLEY
COYOTE LAKE VALLEY
CAVES CANYON VALLEY
SODA LAKE VALLEY
CADY FAULT AREA
KELSO VALLEY
LOWER MOJAVE RIVER VALLEY
Numerous Wells (not shown)
Calico-Hidalgo fault zone, Calico section
Pisgah Substation
Lavic Lake fault
Pisgah-Bullion fault zone, Pisgah section
BROADWELL VALLEY
LAVIC VALLEY
MIDDLE MOJAVE RIVER VALLEY
KANE WASH AREA
IRON RIDGE AREA
BRISTOL VALLEY
BESSEMER VALLEY
Lenwood-Lockhart fault zone, Lenwood section
LUCERNE VALLEY
JOHNSON VALLEY
DEADMAN VALLEY
AMES VALLEY
LEGEND
Project Boundary
N.A.P. (Not a Part)
Existing Transmission Line
Faults - USGS 2003
Existing or Destroyed Well (DWR, Emcon - See Table 1)
Existing On-Site Well
Groundwater Basins
Ames Valley
Bessemer Valley
Bristol Valley
Broadwell Valley
Cady Fault Area
Caves Canyon Valley
Coyote Lake Valley
Cronise Valley
Deadman Valley
Iron Ridge Valley
Johnson Valley
Kane Wash Area
Kelso Valley
Lavic Valley
Lower Mojave River Valley
Lucerne Valley
Middle Mojave River Valley
Soda Lake Valley
No Designation
SOURCES:
Stantec Engineering (project site Oct. 2008);
ESRI (overview); USGS (7.5' quads: Troy Lake, Hector, Sleeping Beauty various dates, faults 2007);
CA Dept. Water Resources (groundwater basins 2004).
GROUNDWATER BASINS AND WELLS
SOLAR ONE PROJECT
URS
2 0 2 4 Miles
SCALE: 1" = 4 Miles (1:250,000)
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: LG
DATE: 02-05-09
FIG. NO: 3
PM: WM
PROJ. NO: 27658188.10000

WR-2

Table 1
Nearby Well Information

Reference No. (see Fig 1)	Groundwater Basin	Township, Range, Section	UTM Data					Ground Surface Elevation (feet, datum?)	Measured Depth to Groundwater (feet, bgs)	Date Groundwater Measured	Source	Total Dissolved Solids (TDS, ppm)	Notes
			Datum	Easting	Northing	Units	Zone						
1	Lower Mojave River Valley	NA	NAD27	544074	3850401	metres	11	1807	48.2	4/6/2006	DWR-1		
2	Lower Mojave River Valley	NA	NAD27	543829	3850350	metres	11	1810.1	31.2	12/3/1958	DWR-1		
3	Lower Mojave River Valley	NA	NAD27	542611	3849944	metres	11	1850	72.5	11/19/1962	DWR-1		
4	Lower Mojave River Valley	NA	NAD27	542604	3851577	metres	11	1780	42.4	10/17/1962	DWR-1		
5	Lower Mojave River Valley	NA	NAD27	540699	3851260	metres	11	1782	47.5	4/30/2008	DWR-1		
6	Lower Mojave River Valley	NA	NAD27	539402	3851531	metres	11	1783.2		5/20/1953	DWR-1		Dry well
7	Lower Mojave River Valley	NA	NAD27	538620	3850296	metres	11	1780	8.4	6/18/1959	DWR-1		
8	Lower Mojave River Valley	NA	NAD27	538213	3850325	metres	11	1785	12.0	6/17/1959	DWR-1		
9	Lower Mojave River Valley	NA	NAD27	538211	3850695	metres	11	1780	8.7	6/17/1959	DWR-1		
10	Lower Mojave River Valley	NA	NAD27	537827	3851525	metres	11	1780	6.4	6/17/1959	DWR-1		
11	Lower Mojave River Valley	NA	NAD27	540247	3855940	metres	11	1780	5.9	6/16/1959	DWR-1		nearby pump operating
12	Lower Mojave River Valley	NA	NAD27	540604	3856602	metres	11	1782	52.6	5/1/2008	DWR-1		
13	Lower Mojave River Valley	NA	NAD27	540581	3856857	metres	11	1778	51.8	5/1/2008	DWR-1		
14	Lower Mojave River Valley	NA	NAD27	540552	3857606	metres	11	1807	66.2	4/5/2008	DWR-1		
15	Lower Mojave River Valley	NA	NAD27	540059	3858188	metres	11	1783	NA	6/3/1992	DWR-1	1100	Pumping
16	Lower Mojave River Valley	NA	NAD27	540219	3858128	metres	11	1791	40.4	5/1/2008	DWR-1		
17	Lower Mojave River Valley	NA	NAD27	540256	3859575	metres	11	1790	7.0	6/16/1959	DWR-1		nearby pump operating
18	Lower Mojave River Valley	NA	NAD27	539875	3859573	metres	11	1780	2.8	6/16/1959	DWR-1		nearby pump operating
19	Mojave Watershed	NA	NAD27	540347	3862009	metres	11	1820	41.2	10/29/1959	DWR-1		nearby pump operating
20	Caves Canyon Valley	NA	NAD27	542161	3870297	metres	11	1612.1	17.7	5/2/2008	DWR-1		
21	Caves Canyon Valley	NA	NAD27	542465	3870459	metres	11	1607.7	NA	4/27/2006	DWR-1		Dry well
22	Caves Canyon Valley	NA	NAD27	542996	3870707	metres	11	1603.4	23.8	5/2/2008	DWR-1		
23	Caves Canyon Valley	NA	NAD27	556471	3877281	metres	11	1410	NA	3/22/1993	DWR-1	1400	Well destroyed

Table 1
Nearby Well Information
(Continued)

Reference No. (see Fig 1)	Groundwater Basin	Township, Range, Section	UTM Data: Datum	UTM Data: Easting	UTM Data: Northing	UTM Data: Units	UTM Data: Zone	Ground Surface Elevation (feet, datum?)	Measured Depth to Groundwater (feet, bgs)	Date Groundwater Measured	Source	Total Dissolved Solids (TDS, ppm)	Notes
24	Broadwell Valley	NA	NAD27	574245	3857261	metres	11	1299	101.6	6/28/1979	DWR-1		
25	Broadwell Valley	NA	NAD27	580500	3862243	metres	11	2180	49.0	2/1/1972	DWR-1		
26	Broadwell Valley	T7N, R7E, S1E1	NA	NA	NA	NA	NA	1795	425	2/26/1963	DWR-2		well depth 500 ft
27	Broadwell Valley	T7N, R7E, S2Z1	NA	NA	NA	NA	NA	1830	NA	2/26/1963	DWR-2		140 gpm
28	Broadwell Valley	T7N, R8E, S8B1	NA	NA	NA	NA	NA	1788	785	1883	DWR-2	470 to 551	Well depth 1600 ft
29	Broadwell Valley	T8N, R8E, S20D	NA	NA	NA	NA	NA		261	1990	Emcon		drilled early 1990
30	Broadwell Valley	T9N, R8E, S18	NA	NA	NA	NA	NA	1298	dry	2/27/1964	DWR-2		Well depth 43 feet
31	Broadwell Valley	T9N, R7E, S13	NA	NA	NA	NA	NA	1300	dry | 103	7/27/64 | 11/27/17	DWR-2		Well depth 89 feet (7/27/64)
32	Broadwell Valley	T9N, R8E, S31	NA	NA	NA	NA	NA	1300	NA	NA	DWR-2		Well depth 28 feet (6/22/65
33	Broadwell Valley	T8N, R8E, S5	NA	NA	NA	NA	NA	1300	dry	7/27/1964	DWR-2		Well depth 600 ft (1915), 51 ft (7/27/64)
34	Broadwell Valley	T8N, R8E, S6	NA	NA	NA	NA	NA	1300	destroyed	6/22/1965	DWR-2		Well depth 303 ft originally
35	Broadwell Valley	T8N, R8E, S9	NA	NA	NA	NA	NA	1415	destroyed	6/22/1965	DWR-2		Well depth 332 ft originally
36	Broadwell Valley	T8N, R8E, S8	NA	NA	NA	NA	NA	1330	dry	10/5/1964	DWR-2		Well depth 68 ft (10/5/64), 400 ft (1917)
37	Broadwell Valley	T8N, R8E, S17	NA	NA	NA	NA	NA	1355	destroyed	6/22/1965	DWR-2		Well depth 425 ft originally
38	Broadwell Valley	T7N, R8E, S5	NA	NA	NA	NA	NA	1740	dry	7/30/1964	DWR-2		Well depth 445 ft (7/30/64)
39	Bristol Valley	T7N, R10E, S16	NA	NA	NA	NA	NA	1080	destroyed	12/1/1965	DWR-2		Well depth 867 ft originally
40	Broadwell Valley	T7N, R9E, S18	NA	NA	NA	NA	NA	2020	destroyed	8/4/1964	DWR-2		Well depth 89 ft (8/4/64)
41	Lavic Valley	T7N, R6E, S14	NA	NA	NA	NA	NA	1890	55	9/23/1963	DWR-2		
42	NA	T7N, R8E, S22	NA	NA	NA	NA	NA	2400	dry	8/4/1964	DWR-2		Well depth 117 ft
43	Bristol Valley	T7N, R9E, S25	NA	NA	NA	NA	NA	1650	destroyed	7/30/1964	DWR-2	1260 (4/15/1902)	
44	Lavic Valley	T7N, R6E, S26	NA	NA	NA	NA	NA	1900	64	1917	DWR-2		140 gpm, well depth 72 ft (1917)

Table 1
Nearby Well Information
(Continued)

Reference No. (see Fig 1)	Groundwater Basin	Township, Range, Section	UTM Data					Ground Surface Elevation (feet, datum?)	Measured Depth to Groundwater (feet, bgs)	Date Groundwater Measured	Source	Total Dissolved Solids (TDS, ppm)	Notes
			Datum	Easting	Northing	Units	Zone						
45	Lavic Valley	T7N, R6E, S29	NA	NA	NA	NA	NA	1888	53	2/9/1918	DWR-2		Well depth 59 ft (2/9/18)
46	NA	T7N, R5E, S26	NA	NA	NA	NA	NA	3280	80	8/5/1964	DWR-2		Well depth 90 ft
47	Lavic Valley	T7N, R5E, S28	NA	NA	NA	NA	NA	3320	dry	8/5/1964	DWR-2		Well depth 60 ft
48	Bristol Valley	T7N, R8E, S33	NA	NA	NA	NA	NA	2111	dry	7/30/1964	DWR-2		Well depth 192 ft
49	NA	T7N, R5E, S35	NA	NA	NA	NA	NA	3760	dry	8/5/1964	DWR-2		Well depth 60 ft

Notes:

DWR-1 = California Department of Water Resources (http://wdl.water.ca.gov/gw/map/scal.cfm)

DWR-2 = California Department of Water Resources Bulletin No. 91-14, "Water Wells and Springs in Bristol, Broadwell, Cadiz, Danby, and Lavic Valleys and Vicinity," August 1967.

Emcon = Emcon Associates, 1993, Hydrogeologic Characterization, Broadwell Basin Residuals Repository, San Bernardino County, California, Prepared for Broadwell Corporation, Project D46-11.04, December 1990 and updated 1993.

Approximate well locations are shown on Figure 1.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 50. Please provide a discussion of back-up water supplies and the rationale for their selection.

Response: Three water supply alternatives have been considered: 1) Drilling on-site water wells, 2) Purchasing water from local water purveyors, and 3) Trucking water from neighboring communities / agencies.

SES has researched information pertaining to existing water wells in the vicinity of the Solar One project site. These studies conclude that most of the existing water wells (outside the Lavic Groundwater Basin) provide adequate water at various depths. BLM is now reviewing SES' application and associated environmental studies for the installation of the proposed on-site water wells.

SES has been meeting and coordinating with the Mojave Water Agency (Agency; Kirby Brill) to discuss alternatives for a water source for the Solar One project. The Agency described its process for reviewing water supply requests and options that SES may have for obtaining water. SES has also met with San Bernardino County, City of Victorville, and Golden State Water Authority to identify other water and reclaimed water options to serve as back up plans for the Solar One project.

It is currently anticipated that water supply will be provided via on-site groundwater wells with on-site back up above ground water storage tanks. Additional water supply; e.g., emergency water supply may be augmented by offsite water trucking. SES has also considered trucking and railing water to the Solar One site. This is only a backup plan in case water wells would be temporarily out of service. In this case, water will be trucked or railed to the site and stored in the existing storage tanks. This would be economically feasible in case of emergencies, as the project's water demand would not be interrupted by temporary water outages.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 51. Please provide a discussion of the expected physical and chemical characteristics of the source and discharge water(s) including identification of both organic and inorganic constituents before and after any project-related treatment and provide copies of background material used to create this description (e.g., laboratory analysis).

Response: The results of SES and its consultant URS' study suggest that groundwater is likely to be available at the site for use. The data available at the site and in nearby basins suggests that the depth to groundwater is likely to range from approximately 100 to 400 feet below the ground surface at the site, generally at greater depths to the north (near the mountains) and east. Well yields are likely to provide the water requirements for the project. Regarding the water quality information, data from neighboring basins suggests TDS concentrations could range from as low as about 300 mg/L in sandy alluvial areas (most of the Solar One site) to around 1,700 mg/L in the vicinity of lake deposits (possibly the southwest corner of the site).

Limited water quality data is available within the Lavic Lake Groundwater Basin. Water from a well in the southern part of the basin near Lavic Lake sampled in 1917 was sodium sulfate in character with a TDS content of 1,680 mg/L (ppm). Water from a well sampled in the 1950s in the northeastern part of the basin, possibly near the site, was sodium sulfate in character with a TDS content of 1,721 mg/L. Water from a well in the northwestern part of the basin near Hector Siding (not found during recent field studies) sampled in the 1950s was calcium-sodium bicarbonate in character with a TDS content of 278 mg/L (DWR 2004).

Water quality characteristics of the discharge water will be provided to CEC when more detailed design information is available for the onsite water quality treatment system.

With regard to nearby communities or wells, no significant impact would be expected based on the results of this preliminary study, which indicate there are no known active wells within the Lavic Valley basin in the vicinity of the site. Further, groundwater within the basin appears to be structurally separated from the basins to the east and west, decreasing the potential for impact to those basins.

References:

California Department of Water Resources (DWR), 2004a, California's Groundwater Bulletin 118, Colorado River Hydrologic Region, Lavic Lake Groundwater Basin, updated February 27, 2004.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 52. Please provide an impacts analysis of the proposed project on water resources and a discussion of the effects of project demand on the water supply and other users of this source, including, but not limited to, water availability for other uses during construction or after the power plant begins operation, consistency of the water use with applicable RWQCB basin plans or other applicable resource management plans.

Response: The project overlies the Lavic Valley Groundwater Basin which is a closed basin. It is not anticipated that groundwater use for the project would affect basin uses, as there are limited existing uses in the basin. There are no known active groundwater wells within 0.5-mile of the site (see attachment WR-1), and no known active wells within the Lavic Basin. Other existing wells outside the Lavic Valley Groundwater Basin are separated from the project by the existing fault lines, and therefore, it is not anticipated that the project water demand should not affect other potential users of this basin.

The basin is in the jurisdiction of the Lahontan Basin RWQCB. According to the Water Quality Control Plan for the Lahontan Region, the basin has the beneficial uses of municipal and domestic supply, agricultural supply, industrial service supply and freshwater replenishment. The project would be classified as an industrial project according to the Control Plan, and therefore, is consistent with the applicable water use under the Lahontan RWQCB's authority.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 53. Please provide an estimation of aquifer drawdown based on a computer modeling study conducted by a professional geologist and include the estimated drawdown on neighboring wells within 0.5 mile of the proposed well(s), any effects on the migration of groundwater contaminants, and the likelihood of any changes in existing physical or chemical conditions of groundwater resources.

Response: Except for the Building Sites, the majority of the site will remain pervious, as only a negligible portion of the site will be impacted by pavement and SunCatcher foundations. Potential water quality impacts will be minimized during construction, operation and maintenance by implementation of appropriate Best Management Practices (BMPs) identified in a construction and operation SWPPP including: soil stabilization, sediment control, tracking control, wind erosion control, non-stormwater management, and waste management BMPs. The SWPPP will be in compliance with applicable State and Federal requirements and regulations.

Soil Stabilization BMPs include scheduling construction sequences and employing BMPs appropriate for the season; preservation of existing vegetation by marking areas of preservation with temporary orange propylene fencing; use of geotextiles, mats, plastic covers or erosion control blankets to stabilize disturbed areas and protect soils from erosion by wind or water.

Sediment Control BMPs will include use of one or more of the following BMPs: silt fences, straw bales, fiber rolls, gravel bags, sediment basins/traps, use of earthen dikes, drainage swales and lined ditches to intercept, divert and convey surface runoff to prevent erosion; use of outlet protection devices and velocity dissipation devices at pipe outlets to prevent scour and erosion from stormwater flows.

Wind Erosion Control BMPs will be applied using water or dust palliatives as required to prevent or alleviate windblown dust.

Tracking Control BMPs will be used to limit track-out include stabilized points of entering and exiting the site and stabilized construction roadways on the site.

Non-Stormwater BMPs will include the following BMPs as applicable: illicit discharge prevention; vehicle equipment fueling, cleaning, and maintenance; and concrete curing and finishing;

Waste Management BMPs will include the following BMPs as applicable: material delivery and storage, material use, stockpile management, spill prevention and control, solid waste management, hazardous waste management, concrete waste management, sanitary waste management, and liquid waste management.

Other BMPs considered include a variety of permanent water quality features such as stabilized dikes, swales/channels, sediment basins, detention/infiltration basins to control runoff volumes and rates, erosion/sedimentation, and prevent adverse impacts to water quality. Stormwater runoff from paved areas within the site facilities areas will be directed to oil/water separators or similar devices to remove anticipated pollutants prior to reuse disposal, evaporation, or infiltration.

Use of the above BMPs will minimize potential sediment, erosion, and water quality impacts for the project. The construction and operation phase project SWPPP will include these BMPs along with associated maintenance and monitoring requirements to satisfy State Water Resources Control Board requirements in conformance with NPDES regulations.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 54. Please discuss the effects of construction activities and plant operation on water quality and to what extent these effects could be mitigated by best management practices.

Response: Except for the Building Sites, the majority of the site will remain pervious, as only a negligible portion of the site will be impacted by pavement and SunCatcher foundations. Potential water quality impacts will be minimized during construction, operation and maintenance by implementation of appropriate Best Management Practices (BMPs) identified in a construction and operation SWPPP including: soil stabilization, sediment control, tracking control, wind erosion control, non-stormwater management, and waste management BMPs. The SWPPP will be in compliance with applicable State and Federal requirements and regulations.

Soil Stabilization BMPs include scheduling construction sequences and employing BMPs appropriate for the season; preservation of existing vegetation by marking areas of preservation with temporary orange propylene fencing; use of geotextiles, mats, plastic covers or erosion control blankets to stabilize disturbed areas and protect soils from erosion by wind or water.

Sediment Control BMPs will include use of one or more of the following BMPs: silt fences, straw bales, fiber rolls, gravel bags, sediment basins/traps, use of earthen dikes, drainage swales and lined ditches to intercept, divert and convey surface runoff to prevent erosion; use of outlet protection devices and velocity dissipation devices at pipe outlets to prevent scour and erosion from stormwater flows.

Wind Erosion Control BMPs will be applied using water or dust palliatives as required to prevent or alleviate windblown dust.

Tracking Control BMPs will be used to limit track-out include stabilized points of entering and exiting the site and stabilized construction roadways on the site.

Non-Stormwater BMPs will include the following BMPs as applicable: Illicit discharge prevention; vehicle equipment fueling, cleaning, and maintenance; and concrete curing and finishing;

Waste Management BMPs will include the following BMPs as applicable: material delivery and storage, material use, stockpile management, spill prevention and control, solid waste management, hazardous waste management, concrete waste management, sanitary waste management, and liquid waste management.

Other BMPs considered include a variety of permanent water quality features such as stabilized dikes, swales/channels, sediment basins, detention/infiltration basins to control runoff volumes and rates, erosion/sedimentation, and prevent adverse impacts to water quality. Stormwater runoff from paved areas within the site facilities areas will be directed to oil/water separators or similar devices to remove anticipated pollutants prior to reuse, disposal, evaporation or infiltration.

Use of the above BMPs will minimize potential sediment, erosion, and water quality impacts for the project. The construction and operation phase project SWPPP will include these BMPs along with associated maintenance and monitoring requirements to satisfy State Water Resources Control Board requirements in conformance with NPDES regulations.

TECHNICAL AREA: WATER RESOURCES

Data Adequacy Request 55. Please explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed.

Response: Please see the table below for reference pages in the AFC wherein conformance with each law or standard during both construction and operation of the facility is discussed.

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
Federal Jurisdiction				
CWA §402; 33 USC §1342; 40 CFR Parts 110, 112, 116	Requires NPDES Permits for construction and industrial storm water discharges. Requires preparation of a SWPPP and Monitoring Program.	Coverage under NPDES industrial storm water permit maybe required. NOI for coverage under NPDES construction storm water permit will be filed before construction.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.1 Page 5.5-15

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
CWA §311; 33 USC §1342; 40 CFR Parts 122-136	Requires reporting of any prohibited discharge of oil or hazardous substance.	Project will conform by proper management of oils and hazardous substances both during construction and operation. If an accidental release or unintended spill occurs it will promptly be reported.	RWQCB and DTSC M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.1 Page 5.5-15
CFR, Title 40, Parts 124, 144 to 147	Requires protection of underground water resources	Underground water resources will be protected due to the lined evaporation pond.	Environmental Protection Agency	Section 5.5.5.1 Page 5.5-15
State Jurisdiction				
CWC §13552.6	Use of potable domestic water for cooling towers and air conditioning is unreasonable use if suitable recycled water is available.	Recycled water is not available in the vicinity of the Project Site. Additionally, no cooling towers are proposed.	SWRCB and RWQCB	Section 5.5.5.2 Pages 5.5-16 to 5.5-18

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
California Constitution Article 10 §2	Avoid the waste or unreasonable uses of water. Regulates methods of use and diversion of water.	Project includes appropriate water conservation measures, both during construction and operation.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
State Water Resources Control Board, Resolution No. 75-58	Addresses sources and use of cooling water supplies for power plants that depend on inland waters for cooling and in areas subject to general water shortages.	Recycled water is not available at the Project Site. Moreover, no cooling towers are proposed.	SWRCB and RWQCB	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
Porter-Cologne Water Quality Act of 1972; CWC § 13000-14957, Division 7, Water Quality	Requires State and Regional Water Quality Control Boards to adopt water quality initiatives to protect state waters. Those criteria include identification of beneficial uses, narrative and numerical water quality standards.	Project will conform to applicable state water standards, both qualitative and quantitative, before and during operation. Applicable permits will be obtained from Regional Water Quality Control Board.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
Title 22, CCR	Addresses the use of recycled water for cooling equipment	Project has investigated the technical and economic feasibility of using reclaimed water and determined that this resource is not available.	California Department of Health Services J. Stone Jeffrey.Stone@cdph.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
The Safe Drinking Water and Toxic Enforcement Act of 1986 (proposition 65), Health and Safety Code 25241.5 *et seq.*	Prohibits the discharge or release of chemicals known to cause cancer or reproductive toxicity into drinking water sources.	Project will conform to all state water quality standards, both qualitative and quantitative. Project will not discharge into any drinking water source. If an unintended spill occurs, reporting of spill will be prompt.	California Department of Health Services J. Stone Jeffrey.Stone@cdph.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
CWC Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	Project has investigated the technical and economic feasibility of using reclaimed water and determined that it is not available.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
CWC Section 5002	Requires a "Notice of Extraction and Diversion of Water" to be filed with the State Water Resources Control Board on or before 1 March of the succeeding year.	Notice will be filed as required by state law.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
CWC Section 13751	Requires a "Report of Completion" to be filed with the State Water Resources Control Board within 60 days of well construction.	A report of well completion will be filed with the SWRCB if a permanent onsite production well is constructed.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
California Public Resources Code §25523(a); 20 CCR §§1752, 1752.5, 2300 – 2309, and Chapter 2 Subchapter 5, Article 1, Appendix B, Part 1	The code provides for the inclusion of requirements in the CEC's decision on an AFC to assure protection of environmental quality and requires submission of information to the CEC concerning proposed water resources and water quality protection.	Project will comply with the requirements of the CEC to assure protection of water resources.	CEC and RWQCB	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
CWC §§ 13271 – 13272; 23 CCR §§2250 – 2260	Reporting of releases of reportable quantities of hazardous substances or sewage and releases of specified quantities of oil or petroleum products.	No releases of hazardous substances are anticipated; however, Project will conform to all State water quality standards, both qualitative and quantitative. If an unintended spill occurs, reporting of spill will be prompt.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
CWC §13260 – 13269; 23 CCR Chapter 9	Requires the filing of a Report of Waste Discharge and provides for the issuance of WDRs with respect to the discharge of any waste that can affect the quality of the waters of the state.	An ROWD will be filed for the RO Unit discharge waste. The RO Unit will be constructed and monitored in accordance with RWQCB requirements.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
CEQA, Public Resources Code §21000 *et seq*.; CEQA Guidelines, 14 CCR §15000 *et seq*.; Appendix G	The CEQA Guidelines (Appendix G) contain definitions of projects that can be considered to cause significant effects to water resources.	Project will comply with the requirements of the CEC to assure protection of water resources.	CEC	Section 5.5.5.2 Pages 5.5-16 to 5.5-18
Title 27, CCR Division 2, §20375, SWRCB – Special Requirements for Surface Impoundments (C15: §2548)	This regulation governs the design requirements for surface impoundments.	The evaporation pond for wastewater disposal will be designed and operated in accordance with the requirements of this section.	SWRCB and RWQCB M. Plaziak (760) 241-6583 mplaziak@waterboards.ca.gov	Section 5.5.5.2 Pages 5.5-16 to 5.5-18

AFC Table 5.5-5 (Revised)
Summary of LORS – Water Resources

LORS	Requirements	Conformance Section	Administering Agency & Contact	AFC Section and Page Number
Local Jurisdiction				
San Bernardino County Code, Title 8	The ordinance classify the Project as industrial development and regulates its uses	The Project will conform to all code standards	San Bernardino County G. Kim 909-287-7906	Section 5.5.5.3 Pages 5.5-16 to 5.5-19
San Bernardino County Code, Title 8	Ensures compliance of Water Quality Management Plan features.	The Project may develop, if necessary, a Water Quality Management Plan	San Bernardino County G. Kim 909-287-7906	Section 5.5.5.3 Pages 5.5-16 to 5.5-19

Source: URS Corporation, 2008.
Notes:
APCD = Air Pollution Control District
CEQA = California Environmental Quality Act
CFR = Code of Federal Regulations
CWA = Clean Water Act
CWC = California Water Code
LORS = laws, ordinances, regulations, and standards
NOI - Notice of Intent
NPDES = National Pollutant Discharge Elimination System
RWQCB = Regional Water Quality Control Board
SWRCB = State Water Resources Control Board
SWPPP = Storm Water Pollution Prevention Plan
USC = United States Code