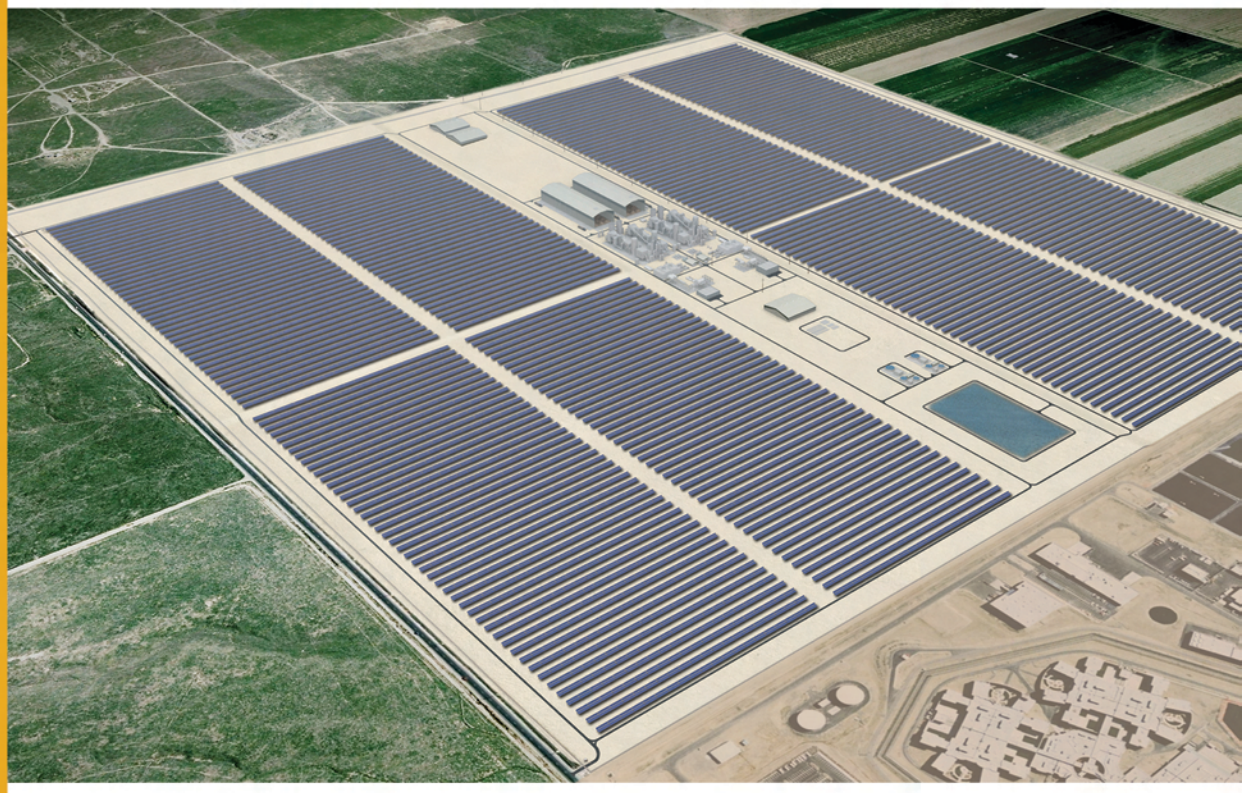
JULY 14, 2009

San Joaquin Solar 1 & 2 Hybrid Project

Complete Response to CEC Data Request

Set #1, 08-AFC-12

Submitted to:
California Energy Commission



Submitted by:

MARTIFER
RENEWABLES SOLAR THERMAL

With Support from:

URS
BETHELENERGY

San Joaquin Solar 1 & 2 Hybrid Project
Supplemental Information
In Response to CEC Data Request Set #1
08-AFC-12

TECHNICAL AREA: AIR QUALITY

General Comment:

After reviewing the air quality data requests received from CEC staff, the Applicant reviewed the air quality section of the AFC for the project and has made the following changes that effect the estimation of emissions from construction and operation activities:

- Reassessed combustor operations and stack parameters to provide more detailed combustor emission scenarios dependent upon various ambient conditions, combustor cold startups and combustor commissioning.
- Reassessed operations equipment and facility design, this included adding one front-end loader and one dust suppression water truck, adding an additional 50 MMBtu/hr natural gas heater to each combustor for cold startup purposes, replacing two 2-cell WSACs with four 2-cell WSACs and revising the locations of buildings on the plot plan.
- Modified biomass handling activities by removing the biomass storage building and adding a baghouse to the biomass handling system for each plant.
- Updated travel distances for construction and operation vehicles.
- Modified fugitive dust emission calculations per CEC staff suggestion.
- Clarified construction delivery vehicle schedule.
- Added an analysis of air quality impacts from construction of the recycled water line from the Coalinga Waste Water Treatment Plant.

In the following pages, a revised air quality analysis is presented based on these re-evaluated revisions. It describes the assumptions and general approaches used to estimate emissions from the project operational and construction phases. It also presents revised emission estimates and provides a summary comparison of the new results with those in the AFC. The revised analyses are presented using the same section and table numbering as the AFC. Figure 5.2-2 Revised is also provided with this analysis showing the new site plan and building configurations.

In reference to the original air quality analysis in the AFC, the sections that were re-evaluated and revised in this analysis are as follows: Section 5.2.2.1 Construction Emissions, Section 5.2.2.2 Operation Emissions, Section 5.2.2.3 Greenhouse Gas Emissions (GHG), and the entire Section 5.2.2.5 Modeling Results. Section 5.2.2.5.1 Construction Impact Modeling includes a brief discussion of the impacts from the construction of the new recycle water line from the Coalinga Waste Water Treatment Plant. Since the revised construction emissions are similar to those in the AFC and the construction model results presented in the AFC were below the AAQS, no new construction modeling analysis was conducted.

The basis for any changes from the air quality modeling analyses presented in the AFC is described in the following discussion. Appendices AQ-1 and AQ-2 present the detailed and revised emission calculations for construction and operations, respectively, and the basis for the assumptions used to estimate these emissions. Appendix AQ-3 presents the details of combustor commissioning data. All modeling files associated with the new data for the project operation are provided on a CD/DVD with these data requests. The responses to each data request are provided in the following new analyses discussions.

Environmental Consequences

5.2.2.1 Construction Emissions

The primary emission sources during construction of the Project include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, erection of Project solar pylons, and construction of biomass combustion units and associated structures. The projected construction schedule remains at 15 months for full build-out of both Plants. In response to the data requests from the CEC, the following changes were made in estimating the construction emissions:

- Modified fugitive dust emission calculations per CEC staff suggestion.
- Clarified construction delivery vehicle schedule.
- Updated travel distances for construction and worker vehicles.

The general approach outlined in the AFC for estimation of construction emissions along with other data assumptions remains the same and is discussed below. Detailed construction emission calculations are presented in Appendix AQ-1, Construction Emission Calculations.

Fugitive dust emissions from the construction of SJS 1&2 will result from:

- Site grading/excavation activities at the construction site;
- Installation of new transmission lines and waterline;
- Installation of solar pylon foundations;
- Construction of solar pylon facilities, roads, and substation;
- On-site travel of worker vehicles and delivery trucks on paved roads;
- On-site travel of mobile construction equipment on unpaved surfaces; and,
- Off-site travel of worker vehicles and delivery trucks on paved roads.

Fuel combustion exhaust emissions of gases and particulates during construction will result from:

- Exhaust from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of on-site structures, and water trucks used to control construction dust emissions;
- Exhaust from on-road construction vehicles, including pickup trucks and diesel trucks used to transport workers and materials within the construction site, and from diesel trucks used to deliver concrete, equipment, and construction supplies to the construction site; and,
- Exhaust from vehicles used by workers to commute to the construction site.

Construction equipment and vehicle exhaust emissions were estimated using the equipment list and construction scheduling information provided by the Project design-engineering firm as shown in Table 5.2-9, Estimated Construction Equipment Usage Schedule. The values in this table have not changed.

Table 5.2-9
Estimated Construction Equipment Usage Schedule

SJS 1&2	Horsepower	Utilization Load Factor	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Month 13	Month 14	Month 15
Scraper	250	0.72	4	4	3	2	2	2	1	1							
Grader	120	0.61	3	3	2	2	2	2	2	1							
Dozer	175	0.65	3	3	3	3	3	3	2	1							
Loaders	120	0.54	3	3	1	1	1	1	1	1	1	1	1	1			
Augers	120	0.75			6	6	6	6	6	6	6	6	6	6	3	3	3
Cement Trucks	250	0.5			6	6	6	7	7	7	7	6	6	6	5	4	4
Excavator	175	0.57	3	2	1	1	1	1	1	1	1	1	1				
Backhoe	120	0.55	2	2	2	1	1	1	1	1	1	1	1				
Water Truck	250	0.57	4	4	3	3	3	3	2	2	2	2	2	2	2	2	2
Dump Truck	250	0.57	4	4	2	2	2	1	1	1	1				1	1	
Crane (20 Ton)	120	0.43				1	1	1	2	4	4	6	4	3	3	3	2
Crane (90 Ton)	250	0.43						1	1	1	1	1	1				
Boom Truck	250	0.57	1	1	1	2	2	2	3	3	4	6	4	3	3	2	2
ATVs	50	0.5	5	5	5	5	5	5	5	5	5	5	5	1	1	1	5
Pick Up trucks	120	0.5	2	2	2	2	2	2	2	2	2	2	4	4	4	3	2
Pavers	175	0.62													2	2	1
Rollers	175	0.56													2	2	1
Plate Compactors	15	0.25						1	1	1	1						
Forklift	50	0.6			1	2	2	2	2	2	2	2	2	2	2	2	
Welder	50	0.45						1	1	1	1	1	1	1	1	1	1
Generator	50	0.75				1	1	1	1	1	2	2	3	3	3	3	2
Aerial Lift	50	0.46						1	1	1	1	1	1	1	1	1	1
Total			**34**	**33**	**38**	**40**	**40**	**44**	**43**	**43**	**42**	**43**	**42**	**33**	**33**	**30**	**26**

This paragraph lists construction emissions that remained the same after incorporating the modifications presented above. Mass emissions of all criteria pollutants from fueled construction equipment and vehicles were estimated using equipment-specific emissions factors obtained by means of the OFFROAD model for Fresno County (unchanged from those used in the AFC). Diesel equipment emissions were calculated by means of an Excel Workbook (presented in the Appendix AQ-1, Construction Emission Calculations) and were represented for modeling purposes as point sources. Generic stack parameters (exhaust temperatures and flow rates) for diesel internal combustion engines were obtained from the *Risk Management Guidance for the Permitting of New Stationary Source Diesel-Fueled Engine* (CARB 2000).

This paragraph lists construction emissions that changed after incorporating the modifications presented above. Emissions from on-road delivery trucks and worker commute trips were estimated using emission factors for on-road vehicles from the EMFAC2007 model for Fresno County, although the average distance of each round trip was increased to 140 miles per CEC request, the distance to Fresno and back. Fugitive dust emissions resulting from on-site soil disturbances were estimated using the *EPA Compilation of Emission Factors AP-42* (EPA 1995) emission factors for bulldozing and grading (Section 11.9), travel on sealed or paved roads (Section 13.2.1), travel on unpaved roads (Section 13.2.2) and material handling (Section 13.2.4). Fugitive dust from the erosion of aggregate storage piles was estimated using the emission factor in SCAQMD CEQA Handbook Table A9-9-E (SCAQMD 1993). As the EPA AP-42 emission factors are created to be applicable for many different activities, the most appropriate or similar dust-generating activities presented in the AP-42 document were selected for use in this emission estimation. Mitigation control efficiencies for fugitive dust emissions were obtained from the SCAQMD CEQA Handbook - Mitigation Measures and Control Efficiencies (SCAQMD 2007). A dust control efficiency of 61 percent for the unpaved road and construction area activities was assumed to be achieved for these activities by watering every three hours. By limiting the maximum vehicle speed to 15 miles per hour on unpaved roads, an additional 57 percent dust control efficiency was applied. For the paved roads, dust will be mitigated by periodic road cleaning, amounting to a 16 percent dust control efficiency. Emissions of fugitive dust (PM_{10} and $PM_{2.5}$) were represented as area sources for purposes of the construction impacts modeling.

Assumptions used in calculating the Project construction emissions included a 15-month construction period; 5 construction days per week; and a 10-hour workday (22 construction days per month). The list of fueled equipment needed during each month of the construction effort served as the basis for estimating pollutant emissions throughout the term of construction, and helped to identify the periods of probable maximum short-term emissions. An ultra-low fuel sulfur content of 0.0015 percent by weight (15 ppm) was assumed for all diesel construction equipment operations. Detailed spreadsheets are provided in Appendix AQ-1, Construction Emission Calculations, which show the calculation of emissions from all Project construction equipment and activities, along with the data and assumptions used in these calculations.

The short-term maximum combustion and fugitive dust emissions were calculated using the equipment listed in the Table 5.2-9 for Month 6 of the construction schedule, which was calculated to have the highest on-site emissions from the equipment usage and earthmoving activities of any month. Based on the equipment usage and earthmoving schedules, the on-site emissions during Months 1 through 12 were calculated to have the highest on-site emissions of any consecutive 12-month period during the overall 15-month construction effort.

Tables 5.2-10 Revised and 5.2-11 Revised present the estimated maximum daily and annual emissions of air pollutants due to Project construction, respectively, including information on the contributions from specific activities. Detailed construction emission estimations are presented in Appendix AQ-1.

The onsite daily construction emissions presented in Table 5.2-10 Revised for all pollutants are similar to those presented in the AFC, and the offsite emissions are significantly lower. The annual construction emissions presented in Table 5.2-11 Revised both onsite and offsite are similar to those presented in the AFC for all pollutants except particulate matter which decreased substantially for offsite vehicle travel. Since the revised construction emissions are similar to those in the AFC and the construction model results presented in the AFC were well below the AAQS, no new construction modeling analysis was conducted in response to Data Request Set 1.

Table 5.2-10 Revised
Estimated Daily Maximum Construction Emissions (lb/day)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Onsite						
Onsite Combustion Emissions						
Diesel Construction Equipment	14.55	13.38	118.74	36.98	281.14	0.30
Worker Passenger Vehicles	0.04	0.03	2.60	0.22	0.22	0.00
Delivery Trucks	0.11	0.09	0.77	0.39	1.75	0.00
Subtotal of Onsite Combustion Emission	***14.69***	***13.50***	***122.11***	***37.59***	***283.11***	***0.31***
Onsite Fugitive Dust Emissions						
Vehicle Travel on Onsite Roads	30.28	4.80				
Earth clearing/Bulldozing	8.73	3.47				
Earth Loading/Storage	4.22	0.73				
Subtotal of Onsite Fugitive Emissions	***43.23***	***8.99***				
Subtotal of Onsite Emissions	**57.92**	**22.50**	**122.11**	**37.59**	**283.11**	**0.31**
Offsite						
Offsite Combustion Emissions						
Worker Passenger Vehicles	3.51	2.59	260.39	22.21	22.47	0.39
Delivery Trucks	7.91	6.76	61.75	23.11	130.26	0.12
Subtotal of Offsite Combustion Emissions	***11.42***	***9.35***	***322.14***	***45.32***	***152.73***	***0.50***
Offsite Fugitive Dust Emissions						
Worker Passenger Vehicle travel Offsite Paved Roads	2.99	0.51				
Delivery Truck travel Offsite Paved Roads	32.71	4.24				
Subtotal of Offsite Fugitive Emissions	***35.70***	***4.74***				
Subtotal of Offsite Emissions	**47.12**	**14.09**	**322.14**	**45.32**	**152.73**	**0.50**
Total Maximum Daily Emissions	**105.04**	**36.59**	**444.25**	**82.91**	**435.84**	**0.81**

Notes:
Maximum daily onsite emissions occur in month 6.
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
ROC = reactive organic compounds
CO = carbon monoxide
NO_x = nitrogen oxide(s)
SO_x = sulfur oxide(s)

Table 5.2-11 Revised
Estimated Maximum Annual Construction Emissions (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	ROC	NO_x	SO_x
Onsite						
Onsite Combustion Emissions						
Diesel Construction Equipment	1.71	1.57	13.85	4.33	32.79	0.04
Worker Passenger Vehicles	0.01	0.01	0.52	0.04	0.05	0.00
Delivery Trucks	0.02	0.02	0.14	0.07	0.32	0.00
Subtotal of Onsite Combustion Emission	***1.73***	***1.59***	***14.52***	***4.45***	***33.16***	***0.04***
Onsite Fugitive Dust Emissions						
Vehicle Travel on Onsite Roads	4.88	0.54				
Earth clearing/Bulldozing	0.71	0.27				
Earth Loading/Storage	0.63	0.11				
Subtotal of Onsite Fugitive Emissions	***6.22***	***0.92***				
Subtotal of Onsite Emissions	**7.95**	**2.51**	**14.52**	**4.45**	**33.16**	**0.04**
Offsite						
Offsite Combustion Emissions						
Worker Passenger Vehicles	0.70	0.52	52.26	4.46	4.51	0.08
Delivery Trucks	1.68	1.44	12.80	5.25	27.55	0.02
Subtotal of Offsite Combustion Emissions	***2.39***	***1.96***	***65.06***	***9.71***	***32.06***	***0.10***
Offsite Fugitive Dust Emissions						
Worker Passenger Vehicle travel Offsite Paved Roads	0.60	0.10				
Delivery Truck travel Offsite Paved Roads	6.91	0.90				
Subtotal of Offsite Fugitive Emissions	***7.51***	***1.01***				
Subtotal of Offsite Emissions	**9.89**	**2.96**	**65.06**	**9.71**	**32.06**	**0.10**
Total Maximum Annual Emissions	**17.84**	**5.47**	**79.58**	**14.16**	**65.22**	**0.14**

Notes:
Maximum annual onsite emissions occur during months 1-12.
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
ROC = reactive organic compounds
CO = carbon monoxide
NO_x = nitrogen oxide(s)
SO_x = sulfur oxide(s)

5.2.2.2 Operation Emissions

As with the construction phase, activities associated with the operation and maintenance of the SJS1&2 Project were re-evaluated to ensure all emission sources were accounted for accurately. The changes that affected the operational emission estimates and air quality modeling included:

- Reassessed combustor operations and stack parameters to provided more detailed combustor emission scenarios dependent upon various ambient conditions, combustor cold startups and combustor commissioning.

- Reassessed operations equipment and facility design, which included adding 1 front-end loader and 1 dust suppression water truck, adding an additional 50 MMBtu/hr natural gas heater to each

combustor for cold startup purposes, replacing the two 2-cell WSACs with four 2-cell WSACs and revising the locations of buildings on the plot plan.

- Modified biomass handling activities by removing the biomass storage building and adding a baghouse to the biomass handling system for each plant.
- Updated travel distances for operations vehicles.
- Modified fugitive dust emission calculations per CEC staff suggestion.

Below is a brief description of the planned operations and maintenance activities for SJS1&2, followed by how the emissions from these activities were estimated and characterized in the AERMOD modeling. Detailed emission calculations are presented in Appendix AQ-2, Operation Emission Calculations.

The proposed Project consists of two solar power plants, each augmented with a biomass combustion facility. Each plant is sized for a nominal 53.4 MW net of solar generation, each complemented by up to 40 MW net of biomass generated production to supplement solar production when not fully charged by solar input, or during non-solar hours. The biomass facility at each plant consists of two 20 MW combustor trains, which can be operated independently. The primary fuel source for the biomass combustors is anticipated to be 50% agricultural wood waste, comprised primarily of wastes collected during clearing or pruning of local orchards, and 50% municipal green waste, comprised primarily of clippings and collected wood materials from local municipalities. The combustion of waste wood is expected to emit more air contaminants than the agricultural wood waste; thus only the emissions and impacts from the waste wood combustion were examined in this analysis. The biomass combustion equipment will consist of a fluidized bed system that is ideal for combusting a fuel such as waste wood.

The primary sources of criteria air pollutants emissions from SJS 1&2 would be the four biomass combustors, although additional emissions would occur due to ancillary sources, including the following stationary sources:

- Sixteen natural gas burners (four burners located in each of the biomass combustors for use during unit cold start-ups only),
- Four 2-cell evaporative wet surface air cooler condensers (WSACs),
- Two diesel emergency generators,
- Two diesel firewater pumps,
- Two baghouses associated with the two biomass handling systems (one per plant) that receive, process and transport the biomass to the combustors, and
- Fugitive particulate emissions from the conveyor drop points and wind erosion of the biomass storage piles and unloading and handling of the lime, limestone and fly ash.

Emissions are also expected from the operation of mobile sources associated with the routine operations of the Project. Those include emissions from:

- The biomass loaders (two front-end loaders),
- Heavy-duty trucks delivering biomass, limestone, lime and ammonia and removing fly ash,

- Water trucks used for cleaning the solar reflector mirrors and dust control (2 trucks for mirror cleaning and 1 truck for dust control watering for the entire project), and
- Worker vehicles transporting workers to and from the Project.

Emissions from each biomass combustor will be reduced by adding limestone to the fluidized bed to control acid gas emissions. The following pollution control equipment will also be installed with each biomass combustor:

- An SNCR system in the combustor to reduce NO_x emissions;
- A multi-clone and baghouse for particulate reduction;
- A dry scrubber for chloride reduction;
- An SCR system to further reduce NO_x emissions; and,
- A wet scrubber for chloride and SO_x reduction.

Criteria pollutant emissions from the biomass combustors with these control technologies were provided by the equipment vendor, Energy Products of Idaho (EPI). As requested by CEC, EPI developed emissions for numerous ambient operating conditions and combustor loads. Table 5.2-11.1 New summarizes these operating scenarios for three different loads (100%, 75%, and 50%), at ambient temperatures of 30, 60, 70, and 90 degrees Fahrenheit and relative humidity of 90%, 60%, 20%, and 9%.

The worst-case hourly biomass combustor emissions were estimated using the highest hourly emissions from all the combustor emission scenarios provided in Table 5.2-11.1 New. For the annual maximum emission calculations, it was assumed that each biomass combustor would operate at the maximum hourly emission rate for 75 percent of the annual hours, or 6,570 hours per year, plus two cold start-up events. Maximum daily operational emissions are based on the highest emissions from either 24 hours of normal operation, or one cold start-up event and the remaining 24 hours at normal operations.

Four natural gas burners are associated with each combustor train, one 15 MMBtu/hr and three 50 MMBtu/hr burners. The burners will be used only during combustor cold startup, thus it is anticipated that each burner will be operated up to 14 hours per year (two cold startup events). Emissions from the natural gas burners within the biomass combustors were estimated by the vendor (EPI) for NO_x, CO and VOC, and by using *AP-42 Table 1.4-2 for Natural Gas Combustion* (EPA 1995) for the remaining pollutants. The burner exhaust emissions will be vented out of the combustor stacks. The annual emissions presented include the natural gas heater emissions generated during two assumed cold startup events.

Emission factors, detailed combustor scenario data and estimated maximum hourly, daily, and annual emissions per combustor train are summarized in the Appendix AQ-2, Operation Emission Calculations. Appendix AQ-2 also shows the combustor emissions that are used in the air quality modeling analysis presented in Section 5.2.2.5.2.1.

Table 5.2-11.1 New
Combustor Scenarios in Different Loads, Ambient Temperatures, and Relative Humidity

Case / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%
Ambient Temperature (degree F)	30	60	70	90	30	60	70	90	30	60	70	90
Ambient Relative Humidity	90%	60%	9%	20%	90%	60%	9%	20%	90%	60%	9%	20%
Total Energy Input, MBtu/hr (HHV)	315.7	313.8	310.6	310.2	234.9	234.3	231.9	231.6	154.8	154.6	153.2	152.9
Exhaust Conditions												
Exhaust Temperature (degree F)	230	230	230	230	230	230	230	230	230	230	230	230
Gas Flow (lb/hr)	416,370	405,897	395,963	398,467	299,207	301,670	294,977	296,175	187,893	191,652	188,130	188,315
Exhaust Flow Rate (acfm)	125,361	125,771	119,784	123,041	89,868	93,263	89,118	91,244	56,291	59,090	56,735	57,863
Exhaust Flow Rate (m/s)	17.381538	17.438385	16.608276	17.059865	12.460367	12.931090	12.356378	12.651152	7.804853	8.192939	7.866414	8.022813
Exhaust Moisture Content (Wt %)	13.4	18.6	14.5	18.0	13.3	18.2	14.32	17.7	13.3	18.1	14.3	17.5
Emissions												
CO (lb/hr)	6.3	8.5	6.20	8.4	4.6	6.8	4.63	6.7	5.7	7.2	5.9	7.1
SO_2 (lb/hr)	3.8	3.8	3.74	3.7	2.4	2.4	2.35	2.4	1.5	1.5	1.46	1.5
NO_X (lb/hr)	3.7	3.7	3.63	3.6	2.7	2.7	2.71	2.7	1.8	1.8	1.77	1.8

Table 5.2-11.1
Combustor Scenarios in Different Loads, Ambient Temperatures, and Relative Humidity
(Continued)

Case / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
PM_{10} (lb/hr)	7.7	7.2	7.321	7.2	5.6	5.4	5.469	5.4	3.1	3.0	3.536	3.0
$PM_{2.5}$ (lb/hr)	7.7	7.2	7.321	7.2	5.6	5.4	5.469	5.4	3.1	3.0	3.536	3.0
VOC (lb/hr)	1.0	1.3	0.98	1.3	0.8	1.1	0.73	1.1	0.7	0.77	0.70	0.76
CO (lb/MMBtu)	0.02	0.027	0.020	0.027	0.02	0.029	0.020	0.029	0.037	0.046	0.039	0.046
SO_2 (lb/MMBtu)	0.012	0.012	0.012	0.012	0.01	0.01	0.010	0.01	0.01	0.01	0.010	0.01
NO_X (lb/MMBtu)	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
PM_{10} (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.023	0.019
$PM_{2.5}$ (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.023	0.019
VOC (lb/MMBtu)	0.003	0.004	0.003	0.004	0.003	0.005	0.003	0.005	0.005	0.005	0.005	0.005
CO (ppmdv)[3]	18.7	25.3	20.0	25.3	18.5	27.1	20.0	27.1	34.3	43.4	40.0	43.4
SO_2 (ppmdv)[3]	4.9	4.9	5.3	4.9	4.2	4.2	4.4	4.2	3.9	3.9	4.3	3.9
NO_X (ppmdv)[3]	6.7	6.7	7.1	6.7	6.7	6.7	7.1	6.7	6.6	6.6	7.3	6.6
VOC (ppmdv)[3]	2	2.5	2.0	2.5	1.9	2.7	2.0	2.7	2.7	3	3.0	3

Notes:
1. Other stack parameters
- stack height = 100 ft
- stack diameter = 6.83 ft
2. All cases are for burning 100% wood waste and 75% annual capacity (6,570 hours per year)
3. All ppm corrected to 7% O_2, dry basis
4. Updated from 2009/06/05 version from EPI except for Case 3, 7, and 11.
5. Case 3, 7 and 11 used the data from "emiss 100% 5 21 09 Rev A.pdf", "emiss 75% 5 21 09 Rev B.pdf", and "emiss 50% 5 21 09 Rev A.pdf", respectively. (all from EPI)

Four 2-cell WSACs will be used for process cooling at SJS 1&2, as opposed to two 2-cell WSACs as described in the AFC. The total water usage for the new WSACs remains the same as the water usage presented in the AFC. Particulate emissions from the wet surface air cooler condensers (WSACs) were calculated from the circulating water rate, total dissolved solids and the drift elimination rate. For the annual emission calculations, it was assumed that WSACs would operate continuously for a maximum of 8,760 hours per year.

Combustion emissions from the two diesel-fired emergency generators and two firewater pump engines were estimated using the EPA stationary diesel engine Tier 2 emission limits and the maximum power rating for each engine. The diesel-fired emergency generators were each assumed to run at full rated capacity (1,000 kilowatt [kW]) for one hour per month for testing. The diesel-fired firewater pumps were each assumed to run at full-rated capacity (250 horsepower [hp]) for one hour per week for testing. Actual emergency use of the diesel engines was not included.

Two 100 hp diesel front-end loaders will be used to augment the electric conveyor and reclaiming systems delivering biomass to the combustors. Combustion emissions from the biomass loaders were estimated using emission factors from CARB's Off-Road Model. Combustion emissions will also occur during the regular cleaning of the solar reflector mirrors due to operation of two mobile diesel water trucks, one truck per solar field. The diesel particulate combustion emissions from these trucks were estimated using the emission factor from CARBs EMFAC2007 for on-road Light-Heavy-Duty Diesel Truck. Dust emissions associated with the mirror cleaning trucks and dust control water truck were estimated using the *EPA Compilation of Emission Factors AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2* (EPA 1995) emission factor for vehicle travel on unpaved surface. The emissions from the mirror cleaning and water trucks were estimated based on 12 hours per day, 5 days per week, and 260 days per year operation schedule. The daily average total trip was assumed to be six miles for each truck.

Delivery trucks and worker vehicles are included as mobile combustion emission sources. The number of biomass delivery trucks was determined based on the hourly and annual usage of as received wet tons of 50% wood waste and 50% agricultural waste. Combustion emissions from the heavy trucks delivering biomass, limestone, lime and ammonia to the site and removing ash from the site were calculated using emission factors from CARB's EMFAC2007 for on-road Heavy-Heavy-Duty Diesel Trucks. Emissions were estimated for the travel of these trucks onsite and offsite as well as from an assumed 15 minutes of onsite idling per truck while waiting to unload. Fugitive dust emissions from the delivery trucks and worker vehicles were estimated using the *EPA Compilation of Emission Factors AP-42 Section 13.2.1 Paved Roads Equation 2* (EPA 1995) for emissions from travel on paved roads, along with the silt loading of a major street from *CARB - Emission Inventory Database - Section 7.8 SJV Entrained Paved Road Dust Paved Road Travel* (CARB 2006), although offsite travel will be primarily on freeways. The emissions from the delivery trucks were estimated based on 12 hours per day, 5 days per week, and 260 days per year operation schedule. The onsite miles traveled per round trip were assumed to be 1.4 miles on site, the distance from Jayne Road to the biomass unloading area and back. Offsite emissions from biomass delivery trucks are discussed below in the biomass delivery emission subsection. Combustion emissions from workers traveling to and from the Project were calculated using CARB's EMFAC2007 for On-Road Passenger Vehicles. Fugitive dust emissions were estimated using the *EPA AP-42 Section 13.2.1 Paved Roads Equation 2* (EPA 1995) emission factor for emissions from passenger vehicle travel on paved roads. Project engineers anticipate 80 employees daily during operations. The numbers of worker vehicles were estimated by using the carpooling ratio of 1.5 employees per vehicle. The miles

traveled per round trip were assumed to be 140 miles for each worker vehicle which is the roundtrip distance to Fresno.

Fugitive particulate matter emissions from the unloading and handling of the limestone, lime and fly ash were estimated using *EPA AP-42 Section 13.2.4 Aggregate Handling and Storage Piles Equation 1* (EPA 1995) material handling emission factor and using the 99% design control efficiency provided by the biomass facility equipment designer. The emissions from unloading and handling of the limestone, lime and fly ash were estimated based on 12 hours per day and 365 days per year operation schedule.

The fugitive dust emissions associated with unloading and handling the biomass and wind erosion of the biomass storage piles were estimated separately. There will be a wind break wall on the north and south sides of the biomass storage area for each plant. The biomass storage area will not be covered. The majority of the biomass handling will occur in an enclosed system with slight negative pressure for dust control. Biomass delivery trucks will be unloaded directly into two enclosed hoppers, which will feed a screen to separate the wood chips according to size. The oversized chips will be processed by a grinder, then combined with the rest of the biomass. The biomass will then travel on a covered a conveyor to the stacker which creates the biomass storage pile. Biomass will be picked up from the storage pile by a reclaim conveyor that will load the biomass into an interim storage silo which feeds a metering bin and ultimately the combustor. There will be seven dust capture points along the biomass handling system that will feed a baghouse. Each plant will have its own biomass handling system. The dust removal/control efficiency for the baghouses is anticipated to be at least 99%. One front end loader for each plant will be used intermittently in the biomass storage area.

The fugitive dust emissions from the erosion of the biomass storage piles were estimated using *SCAQMD CEQA Handbook Table A9-9-E* (SCAQMD 1993). Both emissions from the unloading and handling the biomass and wind erosion of the storage piles were estimated based on 24 hours per day and 365 days per year operation schedule.

Biomass Delivery Emissions

To accurately present the net emissions attributed to the biomass delivery trucks, a baseline of pre-project emissions should be established so the post project emissions can be compared. Establishing a baseline is difficult due to the lack of detailed information on this subject. Usually when comparing the net effect of project emissions to the baseline, the only factor to vary is the addition of the project. The baseline for determining emissions from the current use of biomass in the San Joaquin Valley include emissions from the trucks that deliver biomass to existing power plants and from the common practice of open burning of agricultural biomass. The post project emissions include the net effect of adding the delivery trucks to SJS 1&2 and the reduction in open burning resulting from increased demand for agricultural biomass. Under CEQA guidelines, the appropriate environmental baseline is determined from the conditions that exist when the Application is filed. However, by the time SJS 1&2 is operational, Phase IV of Rule 4103 (open burning) will be enforced, significantly reducing, if not completely eliminating, the open burning of agricultural biomass in the SJVAPCD. Therefore, for informational purposes, we have also prepared an estimate comparing baseline emissions and post project emissions assuming no open burning is allowed. The development of these emissions estimates follows and is based on conversations conducted with biomass processors in San Joaquin Valley and the limited studies available.

A Biomass Fuel Supply Study was prepared for SJS 1&2 which presented a preliminary overview of biomass fuel availability for the Project. The report (Appendix A-4 in the AFC) identified a 75- mile radius fuel study area (FSA) around the project site, and summarized biomass availability and uses in and tributary to the FSA. Relevant findings in the report include:

- Biomass material generated within and tributary to the FSA is approximately 2,251,576 BTD per year. This is comprised of approximately 1,043,043 BDT of urban wood waste and 1,208,533 BDT of agricultural waste.
- There are 5 competing biomass power plants in the FSA. The 5 plants use approximately 901,000 BDT per year of fuel (including 450,500 BDT of urban wood waste and 405,000 BDT of agricultural waste).
- Other uses/disposal options for biomass include open burning, transporting off-site (usually by truck) to landfills, tilling field and pruning waste back into the soil, mulching, composting, soil conditioning, and landscaping uses, manufacturing of fiberboard and wood paneling at Sierra Pine facilities, cattle feed, or firewood.

To minimize transportation costs, power plants give preference to biomass sources located nearest the plant site. During conversations with a local biomass processor, it was determined that the historical average one way delivery distance for agricultural biomass to the power plants in the FSA is 39 miles (see Appendix AQ-4). Delivery distance for urban wood waste is expected to be greater than that of agricultural waste since the sources of urban waste are larger municipalities. For this discussion an average one way distance of 60 miles is assumed.

As presented in the draft feasibility study for an open burning biomass incentive, prepared by SJVAPCD (SJVAPCD 2008) and presented as Appendix AQ-5, about 178,000 acres of agricultural waste were approved for open burn in 2007. About 50% of the FSA is located in the SJVAPCD. The general land use in the FSA is similar to the general land use through out the SJVAPCD, so it can be estimated that approximately 36% of the open burning occurring in SJVAPCD is located in the FSA. (This value was achieved by the ratio of the area of the San Joaquin Valley Air District to half the area of the FSA).

SJS 1&2 will be the sixth biomass power plant in the FSA. There is adequate biomass currently produced within and tributary to the FSA to supply these biomass plants but there will be some changes in biomass delivery resulting from the start up of SJS 1&2. For example, some biomass currently delivered to the five existing plants will be diverted to SJS 1&2 if the biomass source is located closer to this project. This shift will result in a decrease of delivery miles for those specific loads of biomass. However, it is anticipated that the competing biomass plants will replace those biomass deliveries with biomass from another source (i.e., the competing plants fuel usage will not decrease but the source locations will change due to SJS 1&2 entering the market.) It is expected that the long term average one way delivery distance for agricultural waste will decrease after SJS 1&2 is in operation due to an increase in power plant density. For estimation purposes a ten percent decrease is assumed, resulting in a one way delivery distance of 35 miles for agricultural biomass. Additionally, SJS 1&2 will create a local option to open burning for agricultural waste generated in the FSA. It is expected that the addition of a biomass plant will reduce the amount of open burning currently experienced in the SJVAPCD. For estimation purposes, a 10% reduction in open burning within the FSA is assumed as a result of increased demand for agricultural biomass.

The assumptions used in estimating the baseline emissions, with open burning allowed (Case A) are:

- 5 biomass power plants in FSA
- Average agricultural biomass delivery distance is 39 miles one way
- Average urban waste delivery distance is 60 miles one way
- 36% of open burn emissions in SJVAPCD are generated in FSA

The assumptions used in estimating the post project emissions, with open burning allowed (Case B) are:

- 6 biomass power plants in FSA
- Average agricultural biomass delivery distance is 35 miles one way
- Average urban waste delivery distance is 60 miles one way
- 10% reduction in open burn emissions in the FSA

When phase IV of Rule 4103 is enforced in 2010, open burning of agricultural waste will not be allowed. Once open burning is no longer a disposal option, agricultural waste will likely be tilled back into the soil or transported offsite for disposal (e.g., mulch and landscape uses, to a landfill, or compost facility). To establish a baseline for emissions in the FSA with no open burning allowed, it was assumed that 50% of the agricultural biomass is tilled back into the soil, and 50% is transported 50 miles offsite for disposal. The estimate of post project emissions with no open burning allowed assumes that all the agricultural biomass supplied to SJS 1&2 is diverted from the biomass transported for disposal.

The assumptions used in estimating the baseline emissions, without open burning (Case C) are:

- 5 biomass power plants in FSA
- Average agricultural biomass delivery distance is 39 miles one way
- Average urban waste delivery distance is 60 miles one way
- Average agricultural waste transportation to disposal sites is 50 miles one way
- 50% of previously burned agricultural biomass being transported 50 miles offsite for disposal (landfill, compost, landscape, etc.) The rest is tilled into soil.

The assumptions used in estimating the post project emissions, without open burning (Case D) are:

- 6 biomass power plants in FSA
- Average agricultural biomass delivery distance is 35 miles one way
- Average urban waste delivery distance is 60 miles one way
- Average agricultural waste transportation to disposal sites is 50 miles one way
- All of SJS 1&2 agricultural biomass is taken from the 50% of previously burned agricultural biomass being transported offsite for disposal (landfill, compost, landscape, etc.) The rest of the previously burned biomass is tilled into soil.

The summary of emissions estimates for the four cases described above is presented in Table 5.2-11.2 New, along with the net emissions of the project. Supporting calculations for the emission estimates are presented in Appendix AQ-6. As the CEQA guidelines outline, the baseline is determined from the conditions that exist when the application is filed, thus the net emissions from the time after open burning is banned are included in the total project related emission summary (the difference between Case D and Case C).

Table 5.2-11.2 New
Summary of Biomass Delivery Emissions Estimates

Pollutant	Case A Baseline Emissions- open burn allowed (TPY)	Case B Post project Emissions - open burn allowed (TPY)	Net Emissions (TPY)	Case C Baseline Emissions - no open burn (TPY)	Case D Post project - no open burn (TPY)	Net Emissions (TPY)
CO	7,052.26	6,354.58	-697.68	17.36	20.24	2.89
NO_X	619.77	592.95	-26.82	80.83	94.27	13.44
VOC	660.19	595.78	-64.41	3.71	4.32	0.62
SO_2	14.86	13.42	-1.44	0.10	0.12	0.02
PM_{10}	865.37	813.70	-51.67	80.16	93.49	13.33
$PM_{2.5}$	776.95	705.11	-71.84	13.45	15.69	2.24

Assumptions:

Case A: baseline Emissions, with open burning
5 biomass power plants in FSA
Average agricultural waste biomass delivery distance is 39 miles one way
Average urban waste delivery distance is 60 miles one way
36% of open burn emissions in SJVAPCD are generated in FSA

Case B: Post Project Emissions, with open burning
6 biomass power plants in FSA
Average agricultural waste biomass delivery distance is 35 miles one way
Average urban waste delivery distance is 60 miles one way
10% reduction in open burn emissions in the FSA

Case C: baseline Emissions, with out open burning
5 biomass power plants in FSA
Average agricultural waste biomass delivery distance is 39 miles one way
Average agricultural waste transportation to disposal sites is 50 miles one way
Average urban waste delivery distance is 60 miles one way
50% of previously burned agricultural waste biomass being transported 50 miles offsite for disposal (landfill, compost, landscape, etc.) The rest is tilled into soil.

Case D: Post Project Emissions, without open burning
6 biomass power plants in FSA
Average agricultural waste biomass delivery distance is 35 miles one way
Average agricultural waste transportation to disposal sites is 50 miles one way
Average urban waste delivery distance is 60 miles one way
All of SJS 1&2 agricultural waste biomass is taken from the 50% of previously burned agricultural waste biomass being transported offsite for disposal (landfill, compost, landscape, etc.) The rest is tilled into soil.

A summary of the estimated maximum annual emissions from all SJS 1&2 sources both onsite and offsite are presented in Table 5.2-12 Revised. Detailed operational emission calculations can be found in Appendix AQ-2. These show that the annual combustor emissions of PM_{10} and $PM_{2.5}$ decreased slightly from those presented in the AFC. The annual NO_x, CO, VOC, and SO_2 combustor emissions increased by approximately 2, 36, 35, and 2 percent, respectively. The exhaust emissions from the biomass delivery trucks decreased as a result of using the net emissions compared to the baseline whereas the AFC incorporated the gross delivery truck emissions. The dust emissions estimated from the delivery vehicles dropped substantially due to usage of a more accurate silt loading in the paved road dust emission factor

and taking into account the baseline emissions. The delivery truck emissions in Table 5.2-12 Revised include the emissions from the limestone, lime and ammonia deliveries and the fly ash removal.

Table 5.2-12 Revised
Maximum Annual SJS 1&2 Site Operations Emissions

	Maximum Annual Emission Rate (ton/yr)					
	NO_X	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$
Onsite Emission Sources						
Stationary Sources						
Combustion Emissions						
Fluidized Bed Combustors with Natural Gas Burners	49.03	111.40	17.37	50.28	100.75	100.75
Emergency Generators	0.169	0.093	0.026	0.0001	0.005	0.005
Fire Water Pumps	0.141	0.075	0.021	0.0001	0.004	0.004
WSAC					1.61	1.61
Fugitive Emissions						
Biomass, Limestone and Ash Handling Fugitive Dust					0.090	0.019
Total Onsite Stationary Source Emissions	*49.34*	*111.57*	*17.42*	*50.28*	*102.45*	*102.38*
Mobile Sources						
Combustion Emissions						
Biomass Handling Equipment	0.20	0.15	0.03	0.0003	0.02	0.02
Water Trucks (Cleaning Solar Mirrors & Dust Control)	0.01	0.01	0.001	0.00002	0.0008	0.0007
Worker Vehicles - Travel Onsite	0.03	0.10	0.009	0.00022	0.0045	0.0038
Delivery Trucks - Travel & Idling Onsite	2.30	1.00	0.475	0.002	0.096	0.091
Fugitive Emissions						
Water Trucks (Cleaning Solar Mirrors & Dust Control)					0.67	0.07
Worker Vehicles - Travel Onsite					0.08	0.01
Delivery Trucks - Travel Onsite					5.18	0.77
Total Onsite Mobile Source Emissions	*2.53*	*1.26*	*0.51*	*0.00*	*6.04*	*0.96*
Total Onsite Emissions	***51.87***	***112.82***	***17.93***	***50.28***	***108.49***	***103.34***
Offsite Emission Sources						
Mobile Sources						
Combustion Emissions						
Delivery Trucks - Offsite Travel	18.55	3.98	0.85	0.02	0.71	0.62
Worker Vehicles - Offsite Travel	1.70	3.91	0.15	0.01	0.15	0.10
Fugitive Emissions						
Delivery Trucks - Offsite Travel					17.69	2.47
Worker Vehicles - Offsite Travel					0.21	0.04
Total Offsite Mobile Source Emissions	*20.25*	*7.90*	*1.00*	*0.03*	*18.75*	*3.22*
Total Offsite Emissions	***20.25***	***7.90***	***1.00***	***0.03***	***18.75***	***3.22***
Total Project Operational Emissions (ton/yr)	**72.12**	**120.72**	**18.93**	**50.31**	**127.24**	**106.56**

5.2.2.2.1 Combustor Startup Emissions

Each combustor requires a cold startup if it has not operated for over 48 hours. Emissions after shutdowns of less than 48 hours are expected to be substantially equivalent to those for normal combustor operations and are thus not considered separately in this analysis.

It is anticipated that cold starts will occur up to two times a year for each combustor. A cold startup is an eight hour event. It consists of six hours when the natural gas burners operate prior to the introduction of biomass to warm up the fluidized bed. On the seventh hour of the startup, some biomass is introduced into the combustor along with the heat from the natural gas burners. In the eighth hour, the natural gas burners no longer are needed, the maximum quantity of biomass can be added and the pollution control systems become functional.

The maximum hourly emissions during a cold startup occur in hour seven for NO_x and hour eight for all other pollutants. These emissions are presented in Table 5.2-13 Revised for each combustor.

Table 5.2-13 Revised
Maximum Hourly Emissions during a Cold Startup For Each Combustor

Pollutants	Maximum 1-Hour Emission Rate during Cold Startup per combustor
	(lb/hr)
CO	15.50
SO_2	46.50
NO_X	37.62
PM_{10}	13.95
$PM_{2.5}$	13.95
VOC	3.72

5.2.2.2.2 Facility Commissioning

The commissioning of each fluidized bed combustor will entail several relatively short periods of operation prior to and during installation and testing of the pollution control technologies. During these test periods, emissions of all pollutants will be higher than during normal operations because the control equipment will be either partially or completely inoperative.

The fluidized bed combustor commissioning activities can be broken down into seven separate test periods as described below. The first test occurs without the baghouse. Thus, the PM emissions will be higher since no particulate capture from the baghouse will occur. In the second and successive tests, the baghouse will be operational. The SNCR will be started in the third stage, providing some reduction in NO_x emissions. The NO_x emissions will be further reduced when the SCR is started in the fourth stage.

Based on information provided by EPI, Table 5.2-14 Revised outlines the expected sequence of commissioning tests, stack parameters, and the approximate emissions for each fluidized bed combustor during each test stage.

During the commissioning test, the worst-case short-term emission rates of NO_x, SO_2 and CO will be greater than during either normal operations or combustor startup. Thus, short-term (1-hour, 3-hour, 8-hour, and 24-hour) impacts were examined in separate modeling analyses (see Section 5.2.2.5.2.4 below). As noted in the AFC, the applicant is willing to accept a permit condition limiting combustor commissioning to one combustor train at any one time.

The commissioning of each successive combustor is anticipated to take less time. Therefore, progressively lower emission quantities are expected during commissioning of the second, third and fourth combustor trains. Table 5.2-15 Revised summarizes the anticipated reduction in emissions for the commissioning of each successive combustor. This table also presents the maximum estimated emissions from the total commissioning of all four combustors and the WSACs. Actual test durations for individual combustor trains will vary, but total SJS 1&2 commissioning emissions are not expected to exceed the totals presented in Table 5.2-15 Revised. The emissions presented in Tables 5.2-14 Revised and 5.2-15 Revised are similar to the values presented in the AFC, the minor changes are due to re-running the EPI process models to provide stack parameters for each commissioning stage as requested by CEC.

At the conclusion of the commissioning period, all subsequent operational emissions rates will be at the controlled rates for normal operations that were presented previously in this section. Continuous emissions monitoring system (CEMS) for NO_x and CO (plus oxygen) are expected to be operable by the third stage of the commissioning period (*i.e.*, when the SNCR is started) to document actual emissions during this and subsequent commissioning stages.

Appendix AQ-3, Commissioning Data presents supporting technical information and calculation spreadsheets used to develop the emission data for the various stages of commissioning.

Table 5.2-14 Revised
Commissioning Phases and Emissions for the First Biomass Combustor

								Emissions										Total Emissions				
								(Lb/MM Btu)					lb/hr					tons				
Commissioning Phase	Duration of test (hours/day)	How many days for this test?	Biomass fuel loading (based on 310 MMBtu/hr HHV)[1]	Natural gas loading (3 burners @ 150 MM Btu/hr) [1]	Stack gas flow lb/hr (est.)	Stack gas temp, F	Operating load (%)	NO_x	SO_x	PM_{10}	VOC	CO	NO_x	SO_x	PM_{10}	VOC	CO	NO_x	SO_x	PM_{10}	VOC	CO
Stabilize combustor and boiler (include limestone feed)	10	3	186	30	237,141	330	60%	0.35	0.07	1.7	0.015	0.1	75.6	13.0	316.2	3.2	21.6	1.1	0.2	4.7	0.0	0.3
Start spray dryer and Baghouse	20	17	217.0	0.0	276,665	240-270	70%	0.15	0.02	0.1	0.01	0.08	33.5	4.3	21.7	2.2	17.4	5.7	0.7	3.7	0.4	3.0
commission the CEMS	included above																					
Start SNCR	18	7	248.0	0.0	316,188	240-270	80%	0.15	0.02	0.1	0.01	0.08	37.2	5.0	24.8	2.5	19.8	2.3	0.3	1.6	0.2	1.2
Start SCR	24	4	248.0	0.0	316,188	355	80%	0.03	0.02	0.1	0.01	0.08	7.4	5.0	24.8	2.5	19.8	0.4	0.2	1.2	0.1	1.0
Start Wet Scrubber	24	4	248.0	0.0	316,188	230	80%	0.04	0.012	0.05	0.01	0.08	9.9	3.0	12.4	2.5	19.8	0.5	0.1	0.6	0.1	1.0
Stabilize	24	10	248.0	0.0	316,188	230	80%	0.012	0.012	0.025	0.0031	0.02	3.0	3.0	6.2	0.8	5.0	0.4	0.4	0.7	0.1	0.6
Stabilize at full load	24	7	310.0	0.0	395,235	230	100%	0.012	0.012	0.025	0.0031	0.02	3.7	3.7	7.8	1.0	6.2	0.3	0.3	0.7	0.1	0.5
Total commissioning		52																10.64	2.28	13.21	0.98	7.50

Notes:
1. All heat rates (in MMBtu/hr) are estimated averages over the duration of the testing.
2. PM_{10} and SO_x emissions from the natural gas heaters are negligible

Table 5.2-15 Revised
Total Emissions from the Combustor Commissioning

Source	% of emissions from commissioning each combustor relative to the first combustor	Total Commissioning Emissions (tons)				
		NO_x	SO_x	PM_{10}	VOC	CO
Combustor 1	100%	10.64	2.28	13.21	0.98	7.50
Combustor 2	75%	7.98	1.71	9.91	0.74	5.62
Combustor 3	50%	5.32	1.14	6.61	0.49	3.75
Combustor 4	50%	5.32	1.14	6.61	0.49	3.75
Total SJS1&2 Combustor Commissioning Emissions		**29.25**	**6.28**	**36.33**	**2.70**	**20.61**
Total SJS1&2 WSAC Commissioning Emissions				**0.16**		
Total SJS1&2 Commissioning Emissions		**29.25**	**6.28**	**36.49**	**2.70**	**20.61**

Note:
The commissioning time decreases with each combustor

5.2.2.3 Greenhouse Gas Emissions (GHG)

The assumptions regarding equipment usage and operating schedules that are used to estimate greenhouse gas (GHG) emissions from the construction and operation of the Project are the same as those described in the previous sections for criteria pollutants.

5.2.2.3.1 Construction GHG Emissions

GHG emissions for the construction equipment were estimated using the OFFROAD model emission factors for carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). CO_2 emission factors for on-road vehicles, such as worker vehicles and delivery trucks, were obtained from EMFAC2007. CH_4 and N_2O emission factors for on-road vehicle came from Table C.4 of the California Climate Action Registry (CCAR 2009) General Reporting Protocol for the appropriate vehicle and fuel types.

Table 5.2-16 Revised, Total Construction Related Greenhouse Gas Emissions, presents the estimated greenhouse gas emissions from the total SJS 1&2 construction phases in metric tons (tonnes). Data are provided for each of the three greenhouse gases individually and for the combined emissions in CO_2 equivalents (CO_2e). GHG construction emissions are similar to those presented in the AFC. Supporting calculation details for the greenhouse gas emissions estimates in this table are provided in Appendix AQ-1, Construction Emission Calculations.

Table 5.2-16 Revised
Total Construction Related Greenhouse Gas Emissions

Activity	CO_2	CH_4	N_2O	CO_2e
Onsite				
Diesel Construction Equipment	2,714.48	0.35	0.00	2,721.88
Worker Passenger Vehicle	74.85	0.01	0.01	76.53
Delivery Truck	26.85	0.00	0.00	26.87
Subtotal of Onsite Emissions	**2,789.33**	**0.35**	**0.01**	**2,798.40**
Offsite				
Worker Passenger Vehicle	7,485.01	0.55	0.50	7,652.82
Delivery Truck	2,324.62	0.00	0.00	2,326.11
Subtotal of Offsite Emissions	**9,809.62**	**0.55**	**0.51**	**9,978.93**
Total Construction related GHG Emissions	**12,598.95**	**0.91**	**0.51**	**12,777.33**

Maximum annual onsite emissions occur during months 1-12.

5.2.2.3.2 Operational GHG Emissions

Development of GHG emissions from the biomass combustors used the assumption that 5% of the biomass would be contained in captured ash, with 95% of all carbon in the biomass fuel converted to CO_2 and released to the atmosphere.

The biomass that will be burned in the fluidized bed combustors incorporated CO_2 from the atmosphere while it was grown. The carbon taken in during plant growth will then be expelled during combustion of the biomass, resulting in a complete cycling of the CO_2 within a period of only a few years. Thus, the combustion of biomass at SJS 1&2 can be considered a carbon-neutral activity.

Small amounts of sulfur hexafluoride (SF_6) will be emitted as a result of leakage from the new circuit breakers associated with the project. Two 230kV breakers, each containing 135 pounds of SF_6, will be installed for the Project. A conservative leakage rate of 1 percent was assumed for purposes of estimating annual SF_6 emissions from the circuit breakers.

The OFFROAD2007 model was used to calculate GHG emission from the front-end loaders. GHG emissions from the diesel engines were estimated using emission factors for stationary combustion sources from Tables C.7 and C.9 of the CCAR General Reporting Protocol (CCAR 2009). Emissions of methane and nitrous oxide (N_2O) for all on-road mobile sources were estimated using the emission factors from CCAR General Protocol Table C.4 for the appropriate vehicle and fuel types. Mobile source emissions of CO_2 for on-road vehicles were obtained using EMFAC2007.

Table 5.2-17 Revised presents the estimated total annual emission GHG rate for the operational SJS 1&2 in CO_2e. The revised operational GHG emissions are similar to those presented in the AFC, except the delivery truck emissions represent the difference from the baseline to project operations biomass transportation emissions after the implementation of SJVAPCD Phase IV of Rule 4103 banning open

burning plus emissions from all other delivery trucks. Supporting calculation details for the greenhouse gas emissions estimates in this table are provided in Appendix AQ-2, Operational Emission Calculations.

Table 5.2-17 Revised presents the entire project related GHG emissions. Since the emissions associated with the burning of the biomass are considered neutral, the direct project related onsite GHG emissions are 463 tonnes per year, and the total onsite and offsite emissions are 3,602 tonnes per year.

There are currently no established significance thresholds for environmental impacts resulting from GHG emissions in California. However, CARB approved a Mandatory GHG Reporting Regulation on December 6, 2007. Based on the projected emissions in Table 5.2-17 Revised, the project would be required to report its GHG emission on an annual basis because it would be an electricity generating facility that emits greater than 2,500 tonnes of CO_2 per year.

Table 5.2-17 Revised
Total Project Operational Greenhouse Emissions

	Annual Emission Rate (tonnes/yr)				
	CO_2	**CH_4**	**N_20**	**SF_6**	**CO_2e**
Onsite Emission Sources					
Stationary Sources					
Fluidized Bed Combustors	940,168				940,168.5
Natural Gas Burners Only	167.5	3.07E-04	9.79E-04		167.8
Emergency Generators	16.9	6.68E-04	1.67E-04		17.0
Fire Water Pumps	14.8	5.82E-04	1.46E-04		14.8
Circuit breakers				1.22E-03	29.3
Total Onsite Stationary Source CO_2e Emissions					*940,397.4*
Mobile Sources					
Biomass Handling Equipment	20.2	2.31E-03	0.00E+00		20.2
Water Trucks (Cleaning Solar Mirrors & Dust Control)	1.6	5.15E-06	7.95E-06		1.6
Worker Vehicles - Travel Onsite	21.1	1.56E-03	1.99E-03		21.7
Delivery Trucks - Travel & Idle Onsite	190.6	1.94E-04	1.83E-04		190.7
Total Onsite Mobile Source CO_2e Emissions					*243.2*
Total Onsite CO_2e Emissions					*940,631.7*
Offsite Emission Sources					
Mobile Sources					
Delivery Trucks - Offsite Travel	2,221.9	6.78E-03	6.38E-03		2,224.0
Worker Vehicles - Offsite Travel	849.4	1.56E-01	1.99E-01		914.3
Total Offsite Mobile Source CO_2e Emissions					*3,138.3*
Total Offsite CO_2e Emissions					***3,138.3***
Total Project Operational CO_2e Emissions (tonne/yr)					**943,770**
Total Project Operational CO_2e Emissions minus the Biomass Combustors (tonne/yr)					**3,602**

5.2.2.4 Air Quality Impact Analysis

The air quality modeling methodology used in the revised analyses required to answer the data requests are identical to those discussed in the AFC, therefore this section will not be repeated here.

5.2.2.5 Modeling Results

5.2.2.5.1 Construction Impacts

The revised construction emissions presented above are similar to those presented in the AFC and the construction model results presented in the AFC were below the AAQS, thus no new construction modeling analysis was conducted. The project now includes the construction of a recycle water line from the Coalinga Waste Water Treatment Plant. As this water line stretches offsite, it is unlikely that impacts predicted from the construction analysis presented in the AFC would add to impacts from the construction of the water pipeline.

The new recycle water pipeline will extend south from the onsite water treatment area along the western site boundary to project site southwestern corner, then west along the Firestone Avenue alignment to South Alpine Avenue and connect to the new Coalinga Waste Water Treatment Plant (see Figure DR-56). The recycle water line will be approximately 2.5 miles long and the estimated construction time is two months. This equates to approximately 150 yards per day.

The recycle water line will be constructed from PVC pipe. This lightweight material will require fewer pieces of equipment to install. It is assumed that there will be up to five pieces of equipment needed to install the pipeline: a small excavator to dig the trench, a backhoe to lower the pipe into the trench and help with excavating or filling as needed, a loader to backfill the trench after the pipe has been laid, a truck to deliver the pipe, and a water truck to control dust. It is anticipated that the equipment schedule provided in Table 5.2-9 will encompass these equipment, thus no additional exhaust emissions are expected.

The default fugitive dust value used in the most recent URBEMIS model is 10 pounds of PM_{10} per acre per day. The pipeline construction will follow the same schedule used at the SJS1&2 site, 10 hours per day, and 22 days per month for 2 months. That equals 44 days (440 hours) to build the recycle water pipeline. The width of the disturbed area associated with this pipeline will be no more than 10 yards (30 feet) and the daily length will be 150 yards (450 feet). The daily disturbed area then equals 1,500 square yards (13,500 square feet) which is 0.31 acres. Using the URBEMIS default value for fugitive dust, the fugitive dust emissions generated from the construction activities associated with the recycle water pipeline are:

10 lb PM_{10}/acre/day x 0.31 acre = 3.1 lb PM_{10}/day;
10 hours/day construction = 0.31 lb PM_{10}/hr

There is one residence located approximately 360 feet (120 yards) from the pipeline location. This residence is located approximately 825 feet (275 yards) east of South Alpine Avenue on the Firestone Avenue alignment. Based on estimated daily movement, construction activities near this residence will last only a few days, at most one week. Thus, per the above calculations, this location would be exposed to less than 16 pounds of additional PM10 dust in a week, a very small amount.

5.2.2.5.2 Operations Impact Modeling

As described previously, the emissions used in the model simulations for the total SJS 1&2 Project operations were selected to ensure that the maximum potential impacts would be addressed for each pollutant and averaging time corresponding to an ambient air quality standard.

5.2.2.5.2.1 Combustor Screening

A screening modeling analysis was performed to determine which combustor operating scenarios described in the Section 5.2.2.2 and stack parameters shown in Table 5.2-11.1 New would produce the worst-case offsite impacts (*i.e.*, maximum ground-level concentrations for each pollutant and averaging time). Screening modeling was performed for the four biomass combustors only, as these are by far the most important emission sources of the operational project. The screening model was accomplished with AERMOD using the same receptor grid and 2004 meteorological data described in the AFC.

The AERMOD screening model simulation examined impacts due to the emissions from four biomass combustors releasing emissions from separate 6.83 foot-diameter (2.08 m), 100 foot-tall (30.48 m) stacks. The stacks were modeled as point sources at their proposed locations within the project site. Table 5.2-18.1 New summarizes the combustor screening results for different operating loads and ambient conditions. First, the model was run with unit emissions (1.0 grams per second) from each stack to obtain normalized concentrations that are not specific to any pollutant. EPI vendor data used to derive the stack parameters for the different operating conditions evaluated in this screening analysis are included in Appendix AQ-2.

The maximum ground-level concentrations predicted to occur offsite with the unit combustor emission rates for each of the 12 operating scenarios shown in Table 5.2-18.1 New and then were multiplied by the corresponding combustor mass emission rates for specific pollutants. The highest resulting concentration for each pollutant and averaging time were then identified.

The stack parameters associated with these maximum predicted impacts for each pollutant and averaging time were used in the subsequent normal operation AERMOD analyses described in the next subsection. Model input and output files for the screening modeling analysis are included with those from all other modeling tasks on the Modeling CD/DVD that is provided separately with this analysis.

Table 5.2-18.1 New
Maximum Predicted Criteria Pollutant Concentrations from Total SJS 1&2 Project Combustor Screening Operations

Cases / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%
Ambient Temperature (degree F)	30	60	70	90	30	60	70	90	30	60	70	90
Ambient Relative Humidity	90%	60%	9%	20%	90%	60%	9%	20%	90%	60%	9%	20%
Total Energy Input, Mbtu/hr (HHV)	315.7	313.8	310.6	310.2	234.9	234.3	231.9	231.6	154.8	154.6	153.2	152.9
Exhaust Conditions												
Exhausted Temperature (degree F)	230	230	230	230	230	230	230	230	230	230	230	230
Gas Flow (lb/hr)	416,370	405,897	395,963	398,467	299,207	301,670	294,417	296,175	187,893	191,652	187,501	188,315
Exhausted Flow Rate (acfm)	125,361	125,771	119,784	123,041	89,868	93,263	88,857	91,244	56,291	59,090	56,443	57,863
Exhausted Flow Rate (m/s)	17.381	17.438	16.608	17.060	12.460	12.931	12.356	12.651	7.805	8.193	7.866	8.022
Exhausted Moisture Content (Wt %)	13.4	18.6	14.5	18.0	13.3	18.2	14.2	17.7	13.3	18.1	14	17.5

Table 5.2-18.1 New
Maximum Predicted Criteria Pollutant Concentrations from Total SJS 1&2 Project Combustor Screening Operations
(Continued)

Cases / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%
Emissions												
CO (lb/hr)	6.3	8.5	6.20	8.4	4.6	6.8	4.63	6.7	5.7	7.2	5.9	7.1
SO_2 (lb/hr)	3.8	3.8	3.74	3.7	2.4	2.4	2.35	2.4	1.5	1.5	1.46	1.5
NO_X (lb/hr)	3.7	3.7	3.63	3.6	2.7	2.7	2.71	2.7	1.8	1.8	1.77	1.8
PM_{10} (lb/hr)	7.7	7.2	7.321	7.2	5.6	5.4	5.469	5.4	3.1	3.0	3.536	3.0
$PM_{2.5}$ (lb/hr)	7.7	7.2	7.321	7.2	5.6	5.4	5.469	5.4	3.1	3.0	3.536	3.0
VOC (lb/hr)	1.0	1.3	0.98	1.3	0.8	1.1	0.73	1.1	0.7	0.77	0.70	0.76
CO (g/s)	0.79	1.07	0.78	1.06	0.59	0.85	0.58	0.84	0.71	0.90	0.74	0.89
SO_2 (g/s)	0.48	0.48	0.47	0.47	0.30	0.30	0.30	0.30	0.19	0.19	0.18	0.18
NO_X (g/s)	0.47	0.47	0.46	0.46	0.35	0.34	0.34	0.34	0.23	0.23	0.22	0.22
PM_{10} (g/s)	0.97	0.91	0.92	0.91	0.70	0.68	0.69	0.67	0.39	0.38	0.45	0.37
CO (lb/MMBtu)	0.02	0.027	0.020	0.027	0.02	0.029	0.020	0.029	0.037	0.046	0.039	0.046
SO_2 (lb/MMBtu)	0.012	0.012	0.012	0.012	0.01	0.01	0.010	0.01	0.01	0.01	0.010	0.01
NO_X (lb/MMBtu)	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
PM_{10} (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.023	0.019
$PM_{2.5}$ (lb/MMBtu)	0.024	0.023	0.024	0.023	0.024	0.023	0.024	0.023	0.02	0.019	0.023	0.019
VOC (lb/MMBtu)	0.003	0.004	0.003	0.004	0.003	0.005	0.003	0.005	0.005	0.005	0.005	0.005
CO (ppmdv)[3]	18.7	25.3	20.0	25.3	18.5	27.1	20.0	27.1	34.3	43.4	40.0	43.4
SO_2 (ppmdv)[3]	4.9	4.9	5.3	4.9	4.2	4.2	4.4	4.2	3.9	3.9	4.3	3.9

Table 5.2-18.1 New
Maximum Predicted Criteria Pollutant Concentrations from Total SJS 1&2 Project Combustor Screening Operations
(Continued)

Cases / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%
NO_X (ppmdv)[3]	6.7	6.7	7.1	6.7	6.7	6.7	7.1	6.7	6.6	6.6	7.3	6.6
VOC (ppmdv)[3]	2	2.5	2.0	2.5	1.9	2.7	2.0	2.7	2.7	3	3.0	3
Model Results - Maximum X/Q concentration (ug/m^3/(g/s)) predicted from AERMOD												
1 hour	31.398	31.341	32.157	31.716	35.281	35.077	35.318	35.206	42.595	41.541	42.432	42.011
3 hour	10.550	10.538	10.725	10.623	11.767	11.699	11.779	11.742	14.205	13.854	14.151	14.011
8 hour	7.752	7.747	7.823	7.782	8.247	8.177	8.268	8.212	9.907	9.751	9.881	9.819
24 hour	5.667	5.657	5.797	5.720	6.557	6.466	6.576	6.521	7.623	7.525	7.607	7.567
annual	1.940	1.937	1.980	1.955	2.238	2.205	2.245	2.224	2.697	2.646	2.689	2.668
Maximum Concentration (ug/m^3) predicted per Pollutant Normal Operations												
NO_x 1 hour	14.611	14.624	**14.721**	14.519	12.191	12.077	12.070	12.032	9.615	9.377	9.472	9.378
NO_x annual	0.903	0.904	**0.906**	0.895	0.773	0.759	0.767	0.760	0.609	0.597	0.600	0.596
CO 1 hour	24.946	33.438	25.143	33.598	20.645	29.948	20.622	29.703	30.404	37.509	31.572	**37.563**
CO 8 hour	6.159	8.266	6.117	8.243	4.826	6.981	4.827	6.928	7.071	**8.805**	7.352	8.780
SO_2 1 hour	15.047	15.020	**15.167**	14.959	10.589	10.528	10.467	10.434	7.896	7.701	7.813	7.682
SO_2 3 hour	5.056	5.050	**5.059**	5.010	3.532	3.511	3.491	3.480	2.633	2.568	2.606	2.562
SO_2 24 hour	2.716	2.711	**2.734**	2.698	1.968	1.941	1.949	1.932	1.413	1.395	1.401	1.384
SO_2 annual	0.930	0.928	**0.934**	0.922	0.672	0.662	0.665	0.659	0.500	0.491	0.495	0.488
PM_{10} 24 hour	**5.474**	5.137	5.352	5.193	4.623	4.412	4.536	4.399	2.942	2.847	3.392	2.834
PM_{10} annual	**1.874**	1.759	1.828	1.775	1.577	1.504	1.548	1.501	1.041	1.001	1.199	0.999

Table 5.2-18.1 New
Maximum Predicted Criteria Pollutant Concentrations from Total SJS 1&2 Project Combustor Screening Operations
(Continued)

Cases / Parameters	1	2	3	4	5	6	7	8	9	10	11	12
Load	100%	100%	100%	100%	75%	75%	75%	75%	50%	50%	50%	50%

Notes:
1. Other stack parameters
   - stack height = 100 ft
   - stack diameter = 6.83 ft
2. All cases are in 100% wood and 75% capacity (6,570 hours per year).
3. All ppm corrected to 7% O_2, dry basis.
4. Updated from 2009/06/05 version from EPI except for the Case 3, 7, and 11.
5. Case 3, 7 and 11 used the data from "emiss 100% 5 21 09 Rev A.pdf", "emiss 75% 5 21 09 Rev B.pdf", and "emiss 50% 5 21 09 Rev A.pdf", respectively. (all from EPI).
6. Bold numbers are the maximum concentrations of the 12 scenarios.

5.2.2.5.2.2 Normal Operations

As described in the previous section, the stack parameters associated with these maximum predicted combustor screening model impacts for each pollutant and averaging time were used in the normal operation AERMOD analyses. Modeled criteria pollutant impacts for the normal operations of the total SJS 1&2 Project are summarized in the Table 5.2-19 Revised. As shown in this table, the maximum modeled concentrations due to the Project operational emissions would not cause a violation of any CAAQS or NAAQS and would not significantly contribute to the existing violations of the federal and state PM_{10} and $PM_{2.5}$ standards. In addition, the Project's onsite stationary source operational emissions of non-attainment pollutants and their precursors will be offset to comply with SJVAPCD Rule 2201.

The locations of the predicted maximum impacts vary by pollutant and averaging time. The highest concentrations for annual average NO_2, 24-hour PM_{10} and $PM_{2.5}$, annual average PM_{10} and $PM_{2.5}$, 3-hour SO_2, 24-hour SO_2, and annual average SO_2 are expected to occur on the southeastern boundary line of the proposed Project site. The peak 8-hour CO concentration is expected to occur on the north Project site boundary. The highest 1-hour NO_2 and 1-hour CO concentrations are predicted to be located at the western site boundary line. The highest 1-hour SO_2 concentration is predicted at a location in the elevated terrain approximately 7,250 meters southwest of the facility. The Figure 5.2-6 Revised shows the locations of the maximum predicted operational impacts for all pollutants and averaging times. The concentrations predicted from the revised normal operations analysis are similar to those presented in the AFC.

Table 5.2-19 Revised
Maximum Predicted Criteria Pollutant Concentrations from Total SJS 1&2 Project Operations

Pollutant	Averaging Period	Maximum Predicted Concentration	Background Concentration	Total Concentration	NAAQS	CAAQS	Above Most Stringent AAQS?
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	
NO_2	1-hour	191.13	137.24	328.37	NA	339	No
	Annual	0.66	22.56	23.22	100	57	No
SO_2	1-hour	15.88	23.49	39.37	NA	655	No
	3-hour	5.14	15.66	20.80	1300	NA	No
	24-hour	2.78	10.44	13.22	365	105	No
	Annual	0.72	5.22	5.94	80	NA	No
CO	1-hour	169.39	5016	5185.39	40000	23,000	No
	8-hour	11.12	3773	3784.52	10000	10,000	No
PM_{10}	24-hour	5.54	255	260.54	150	50	(Background is already above)
	Annual	1.43	46.8	48.23	NA	20	(Background is already above)

Table 5.2-19 Revised
Maximum Predicted Criteria Pollutant Concentrations from Total SJS 1&2 Project Operations (Continued)

Pollutant	Averaging Period	Maximum Predicted Concentration	Background Concentration	Total Concentration	NAAQS	CAAQS	Above Most Stringent AAQS?
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	
$PM_{2.5}$	24-hour	5.54	143.2	148.74	35	NA	(Background is already above)
	Annual	1.43	21.2	22.63	15	12	(Background is already above)

5.2.2.5.2.3 Combustor Startup Impacts

Table 5.2-20 Revised shows that during the brief combustor cold startup periods, the predicted concentrations resulting from four combustors starting up simultaneously along with concurrent operation of all other project emission sources are below the AAQS for all non-attainment pollutants. Combustor emissions of PM_{10} and $PM_{2.5}$ over a 24 hour period are expected to be lower during these startup events than during normal operations. Consequently, additional modeling for particulate matter is not reflected in Table 5.2-20 Revised. The concentrations predicted from the revised combustor startup modeling are similar to those presented in the AFC.

Table 5.2-20 Revised
Maximum Predicted Criteria Pollutant Concentrations during Startup of the Four Combustors plus Ancillary Sources

Pollutant	Averaging Period	Maximum Predicted Concentration	Background Concentration	Total Concentration	NAAQS	CAAQS	Above Most Stringent AAQS ?
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	
NO_2	1-hour	191.14	137.24	328.38	NA	339	No
SO_2	1-hour	209.96	23.49	233.45	NA	655	No
	3-hour	45.92	15.66	61.58	1300	NA	No
	24-hour	6.19	10.44	16.63	365	105	No
CO	1-hour	169.37	5016	5185.37	40000	23,000	No
	8-hour	9.92	3773	3783.32	10000	10,000	No

5.2.2.5.2.4 Combustor Commissioning Impacts

The Table 5.2-21 Revised shows the results of the model simulations for the combustor commissioning. The values represented in this table are the highest concentrations for the indicated averaging times that are predicted by AERMOD due to the worst-case commissioning emissions for each individual combustor; no other sources would be operating during combustor commissioning except the WSAC associated with the given combustor. The Table 5.2-21 Revised demonstrates that when the maximum incremental commissioning impacts are added to applicable background concentrations and compared with the most stringent state or national ambient standards, no violations of the applicable standards for these pollutants are predicted to occur. Maximum PM_{10} and $PM_{2.5}$ impacts for commissioning will add to existing violations of the applicable ambient standards, but project emissions of these pollutants will need to be offset with approved emission reduction credits. The concentrations predicted from the revised combustor commissioning modeling are similar to those presented in the AFC.

Table 5.2-21 Revised
Maximum Predicted Criteria Pollutant Concentrations during per Combustors during Commissioning

Pollutant	Averaging Period	Maximum Predicted Impact[1]	Background Concentration	Total Concentration	NAAQS	CAAQS	Above Most Stringent AAQS?
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m3)	(µg/m3)	
NO_2	1-hour	80.63	137.24	217.87	NA	339	No
SO_2	1-hour	13.89	23.49	37.38	NA	655	No
	3-hour	4.83	15.66	20.49	1300	NA	No
	24-hour	1.13	10.44	11.57	365	105	No
CO	1-hour	23.04	5016	5039.04	40,000	23,000	No
	8-hour	5.90	3773	3779.30	10,000	10,000	No
PM_{10}	24-hour	27.55	255	282.55	150	50	(Background is already above)
$PM_{2.5}$	24-hour	27.55	143.2	170.75	35	NA	(Background is already above)

Note:
1. Maximum from any one of the combustor commissioning

5.2.2.5.3 Fumigation Impacts

Potential worst-case fumigation impacts were modeled according to the method described in the AFC Section 5.2.2.4.8. The SCREEN3 modeling results obtained with a unit emission rate were multiplied by the actual Project emission rates to obtain the 1-hour NO_2, CO and SO_2 concentration values presented in Table 5.2-22 Revised. The 1-hour values are multiplied by the EPA conversion factor of 0.9 to estimate the maximum 3-hour concentration for SO_2. As shown in Table 5.2-22

Revised, the resulting incremental concentration predictions for fumigation conditions are well below the state and federal AAQS. The concentrations predicted from the revised combustor fumigation modeling are similar to those presented in the AFC.

Table 5.2-22 Revised
Project Operations Fumigation Impact Summary

Pollutant	Source	Inversion Impact (µg/m^3)	Distance to Maximum Impact (meters)
NO_2 1 hour	Combustors	7.6	6728
CO 1 hour	Combustors	17.5	6728
SO_2 1 hour	Combustors	7.8	6728
SO_2 3 hour[1]	Combustors	7.1	6728

Notes:
[1] SO_2 1-hour results multiplied by 0.9 to convert to 3-hour average.
% = percent

µg/m^3 = micrograms per cubic meter
CO = carbon monoxide
NO_2 = nitrogen dioxide
SO_2 = sulfur dioxide

References

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

CARB, Emission Inventory Database, Area-Wide Source Methodologies, Section 7.8 SJV Entrained Paved Road Dust Paved Road Travel, June 2006.

CARB, Greenhouse Gases Mandatory Reporting Regulation 2008 (http://www.arb.ca.gov/regact/2007/ghg2007/froghg.pdf); Webpage (http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm)

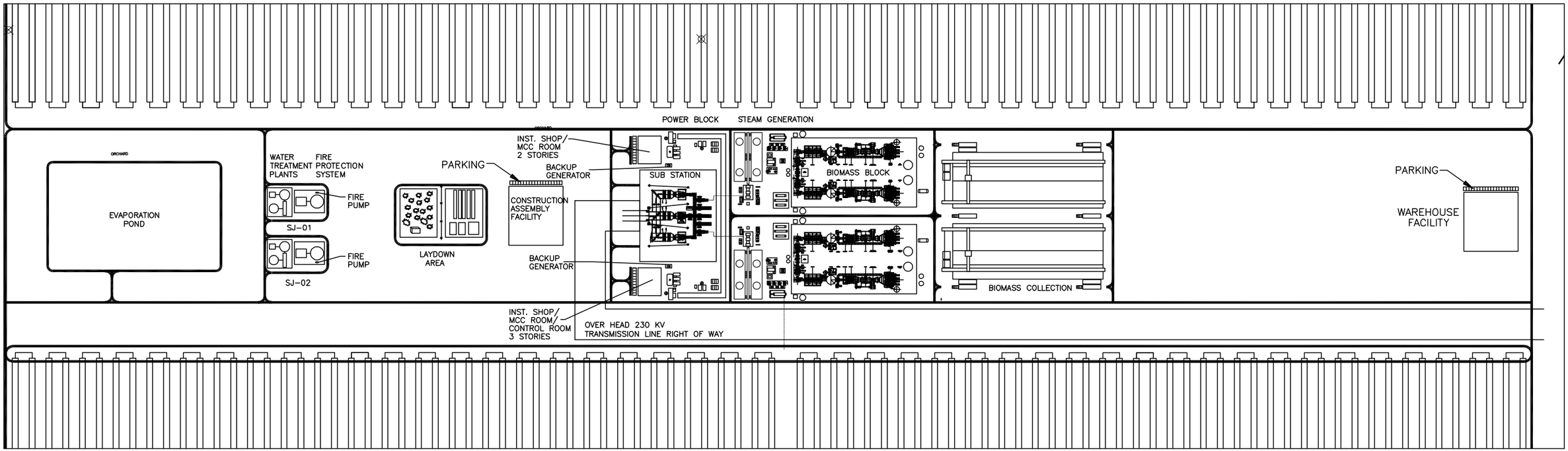
California Climate Action Registry (CCAR) General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.

San Joaquin Valley Air Pollution Control District, SJVAPCD Draft Feasibility Study For Open Burning Biomass Incentive Program, December 2008.

South Coast Air Quality Management District (SCAQMD). CEQA Air Quality Handbook. April 1993.

SCAQMD CEQA Handbook - Mitigation Measures and Control Efficiencies. http://www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html April 2007.

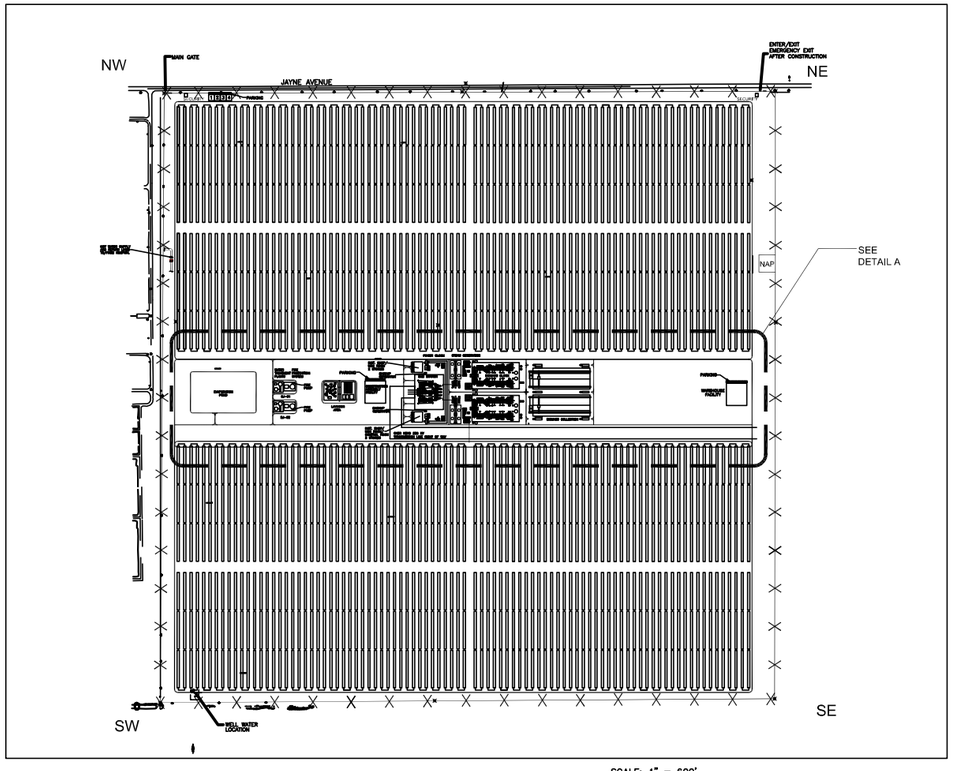
United States Environmental Protection Agency (EPA), AP-42 Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, January 1995.



DETAIL A

SCALE: 1" = 150'

−150 −75' 0' 150'



SITE PLAN

SCALE: 1" = 600'

−600 −300' 0' 600'

LEGEND

- FENCE LINE/PROPERTY BOUNDARY
- UTILITY ROAD
- ON-SITE GROUNDWATER WELL

SOURCE:
Ford, Davis and Bacon (drawing 2009)

(REVISED) SITE PLAN
SAN JOAQUIN SOLAR 1 & 2

URS	NO SCALE	CREATED BY: CM	DATE: 06-29-09	FIG. NO: 5.2-2
		PM: AR	PROJ. NO: 27658031	

OVERVIEW MAP

LEGEND

Maximum Predicted Ground-Level Pollutant Plus Background Concentrations per Averaging Time

- NO_2 1-hour (191.13 µg/m³)
- SO_2 1-hour (15.88 µg/m³)
- CO 1-hour (169.39 µg/m³)
- SO_2 3-hour (5.14 µg/m³)
- CO 8-hour (11.12 µg/m³)
- SO_2 24-hour (2.78 µg/m³)
  PM_{10} 24-hour (5.54 µg/m³)
  $PM_{2.5}$ 24-hour (5.54 µg/m³)
- NO_2 annual (0.66 µg/m³)
  SO_2 annual (0.72 µg/m³)
  PM_{10} annual (1.43 µg/m³)
  $PM_{2.5}$ annual (1.43 µg/m³)
- San Joaquin Solar 1 & 2

SOURCES:
TOPO 24K(various dates);
ESRI (roads).

(REVISED) LOCATIONS OF MAXIMUM PREDICTED GROUND LEVEL POLLUTANT CONCENTRATIONS FOR THE OPERATION PROJECT AREA SAN JOAQUIN SOLAR 1 & 2

URS

2000 0 2000 4000 Feet

SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 06-28-09	FIG. NO: 5.2-6
PM: AR	PROJ. NO: 27658031.00900	

Path: G:\gis\projects\15777\27658031\alternative\map_docs\mxd\air\sjs_12_maxpredict_GLPC_construction_revised.mxd, 06/30/09, colin_mattson

TECHNICAL AREA: AIR QUALITY

Data Request 1: Please identify any existing stationary sources of air pollution at the Coalinga State Hospital that would be affected by the proposed project and provide copies of existing permits issued by the San Joaquin Valley Air Pollution Control District (SJVAPCD), if non-exempt.

Response: SJS is in discussion with the Coalinga State Hospital regarding the project supplying heat via hot condensate to offset some of the hospital's energy needs. Heat transfer to the hospital will be achieved by a pipeline of hot condensate from SJS 1 to an exchanger located near the project's western border. The heat received by the hospital would offset natural gas consumption used in their boilers for building heating, water heating, cooking and cleaning by about 10,000,000 Btu/hour (approximately 10,000 ft^3 /hour of natural gas). Copies of the air permit for the hospital's three boilers are provided in the Appendix AQ-7 separately.

Data Request 2: Please describe the existing emissions for the past two years from any stationary sources at the hospital that would be affected by the proposed project and whether emission reductions would occur at these sources as a result of delivering steam to the hospital.

Response: The Coalinga State Hospital has 3 identical boilers that would be affected by the proposed project. Actual emissions from these 3 boilers for 2007 and 2008 are listed below. Based on the boiler's permit limits, reducing the boilers natural gas consumption by 10 MMBtu/hr could potentially reduce emissions as follows: 964 lb/year of NOx, 250 lb/year SOx, 666 lb/year of PM_{10}, 7,008 lb/year of CO, and 482 lb/year of VOC.

Table DR-2
Emissions Data from the Boilers at Coalinga State Hospital

Pollutant	2006 Annual Emissions (lb/year)			2007 Annual Emissions (lb/year)		
Fuel	Natural gas	Diesel	Total	Natural gas	Diesel	Total
NO_x	1,539.74	2.99	**1,542.73**	2,339.38	-	**2,339.38**
SO_x	398.93	3.16	**402.10**	606.11	-	**606.11**
PM_{10}	1,063.82	8.96	**1,072.78**	1,616.30	-	**1,616.30**
CO	11,198.13	5.97	**11,204.10**	17,013.70	-	**17,013.70**
VOC	769.87	0.15	**770.02**	1,169.69	-	**1,169.69**

Note:
1. The above emissions are the total emissions from the boiler #1, 2, and 3 in the Coalinga State Hospital.
2. 3 boilers have identical design, heat output, and emission rate.
3. Emissions factors and the annual operating hours are from the permit information from the SJVPACD.

Data Request 3: Please identify the section in the AFC's description of air quality impacts where the work needed to connect the hospital steam system to SJS Plant 1 on the hospital property is addressed, such as in the construction-phase emissions.

Response: Air quality impacts for construction of the SJS project are presented in Sections 5.2.2.1, 5.2.2.4.6, and 5.2.2.5.1. The necessary equipment, manpower and construction activities required for construction of the condensate line was included in the construction emissions estimate and subsequent air quality impacts modeling, although not specifically called out.

Data Request 4: Please explain the discrepancy between the 75-mile radius (150 mile round trip) for the fuel supply study (AFC Appendix A-4) and the assumption in emission calculations that trucks would travel 120 miles round trip for delivering the fuel supply.

Response: Because a 75 miles radius represents the outer edge of the fuel supply zone, it would not have been reasonable to assume that all truck deliveries would travel 150 miles round trip. A round trip of 150 miles would assume that all deliveries originate at the outer 75 mile edge of the study area. In fact, deliveries will originate at varying distances within the study area.

Emission calculations for the biomass delivery trucks have been revised. As presented in the general comments, the average historical one way distance for power plants currently in the FSA is 39 miles. This is an average based on actual data, some distances are greater and some are less than 39 miles. Most deliveries will originate in close proximity to the project, and due to the increased density of power plants in the FSA, 35 miles was assumed to be the average post project one way delivery distance for agricultural biomass.

For urban wood waste, a one way average distance of 60 miles was used. Urban wood waste is expected to be sourced from municipalities and diverted from landfills. Four landfills are located in the FSA, with the nearest one in Coalinga.

Data Request 5: Please identify what fraction of the San Joaquin Fuel Supply Area shown in AFC Table 3.4-1 would be within a 60-mile radius of the project site.

Response: A 60-mile radius equals 80% of the FSA so it can be concluded the fraction of fuel is roughly 80%. Based on the discussion presented in the general comments regarding fuel delivery distance, a 60 mile radius from the project site is not relevant to the expected fuel supply sources.

Data Request 6: Please estimate the volume of the gross biomass material generated within a 60-mile (each way) trip from the project site and whether the mix of biomass fuel available to the project would be substantially different than shown in AFC Table 3.4-1.

Response: Since the land uses within the 60-mile radius from the plant are generally the same as the land uses within the 75-mile radius study area, the fuel mix will not be substantially different than shown in AFC Table 3.4-1. However, based on the discussion presented in the general comments regarding fuel delivery distance, a 60 mile radius from the project site is not relevant to the expected fuel supply sources.

Data Request 7: Please confirm that cow manure would not be used as a fuel in the proposed project.

Response: Cow manure will not be used as any portion of the proposed fuel mix.

Data Request 8: Please describe the options that exist today in the baseline, pre-project conditions, for disposing of or handling the biomass fuel in the vicinity of the proposed project.

Response: Five other biomass plants are located within the 75 mile FSA for this project. These biomass plants are the Covanta Energy-Delano, Covanta Energy-Mendota, Dinuba Energy, Rio Bravo-Fresno, and Sierra Power. These plants consume approximately 50% of the biomass fuel in the vicinity of the project.

Other disposal methods that exist today include:

- Open burning
- Chipping and grinding waste and transporting it off-site (usually by truck) to landfills
- Tilling field and pruning waste back into the soil
- Mulching, composting, soil conditioning, and landscaping uses
- Manufacturing of fiberboard and wood paneling at Sierra Pine facilities
- Cattle feed
- Firewood

Sources:

San Joaquin Valley Air Pollution Control District (SJVAPCD), 2008. Draft Feasibility Study for Open Burning Biomass Incentive.

TSS Consultants, 2008. Biomass Fuel Supply Review for the San Joaquin Solar I and II Projects.

Data Request 9: Please describe whether any of the biomass fuel generated in the fuel supply area today is transported for disposal and/or disposed of through open burning. This response should include citations to relevant studies or references.

Response: The disposal options listed in response to Data Request 8 are all currently used in the FSA. Aside from open burning, each option requires transportation for disposal.

As presented in the draft feasibility study for an open burning biomass incentive, prepared by SJVAPCD and presented as Attachment AQ-5, about 178,000 acres of agricultural waste were approved for open burn in 2007. About 50% of the FSA is located in the SJVAPCD. The general land use in the FSA is similar to the general land use through out the SJVAPCD, so it can be estimated that approximately 36% of the open burning occurring in SJVAPCD is located in the FSA. (This value was achieved by the ratio of the area of the San Joaquin Valley Air District to half the area of the FSA).

Data Request 10: Please describe whether the proposed project would have the indirect effect of reducing fuel transport, disposal, and/or open burning activity that occurs in the baseline, pre-project setting. This response should include citations to relevant studies or references.

Response: SJS 1&2 will be the sixth biomass power plant in the FSA. There is adequate biomass currently produced within and tributary to the FSA to supply these biomass plants but there will be some changes in biomass delivery resulting from the start up of SJS 1&2. For example, some biomass currently delivered to the five existing plants will be diverted to SJS 1&2 if the source is located closer to this project. This shift will result in a decrease of delivery miles for those specific loads of biomass. However, it is anticipated that the competing biomass plants will replace those biomass deliveries with biomass from another source (i.e., the competing plants fuel usage will not decrease but the source locations will change due to SJS 1&2 entering the market.) It is expected that the long term average one way delivery distance for agricultural waste will decrease after SJS 1&2 is in operation due to an increase in power plant density. For estimation purposes a ten percent decrease is assumed, resulting in a one way delivery distance of 35 miles for agricultural biomass. Additionally, SJS 1&2 will create a local option to open burning for agricultural waste generated in the FSA. It is expected that the addition of a biomass plant will reduce the amount of open burning currently experienced in the SJVAPCD. For estimation purposes, a 10% reduction in open burning within the FSA is assumed as a result of increased demand for agricultural biomass.

Data Request 11: Please estimate what number of project-related 28,360 truck trips for fuel delivery annually (AFC Appendix B-3) are already occurring in the baseline conditions and estimate the baseline, pre-project truck trip lengths for handling the fuel supply. This response should include citations to relevant studies or references.

Response: The baseline, pre-project truck trip lengths for handling the fuel supply have been presented in the general comments section. A one way distance for agricultural waste is currently 39 miles and for urban wood waste it is roughly 60 miles. The number of project related delivery truck trips that already occur is difficult to ascertain. However as presented in the general comments section, the overall impact of adding SJS 1&2 will be a slight increase in emissions from biomass deliveries in the FSA.

Data Request 12: Please estimate the criteria pollutant and greenhouse gas (GHG) emissions occurring in the baseline, pre-project conditions attributable to transport, disposal, and/or open burning of the proposed project fuel supply.

Response: Please refer to Tables 5.2-11.2 New, 5.2-16 Revised and 5.2-17 Revised in the general comments section and Attachments AQ-2 and AQ-6 for detailed calculations of the emissions attributable to existing transport and/or open burning of the biomass in the baseline, pre-project conditions relative to the Project related delivery emissions.

Data Request 13: Please estimate the emissions that would be expected to occur due to transport, disposal and/or open burning of the proposed project fuel supply after 2010, when limits in SJVAPCD Rule 4103 become effective.

Response: Please refer to Tables 5.2-11.2 New, 5.2-16 Revised and 5.2-17 Revised in the general comments section and Attachments AQ-2 and AQ-6 for detailed calculations of the emissions attributable to existing transport of the biomass after SJVAPCD Rule 4103 becomes effective relative to the Project related delivery emissions.

Data Request 14: Please review the various construction material and equipment delivery plans (including delivery of concrete, steel, mirrors, and the water supply) and consistently identify the maximum daily truck trips to the site for construction, revising the emissions and air quality impact analysis if necessary.

Response: The construction material and equipment delivery plans are outlined in Appendix AQ-1 showing the number of medium-duty and heavy-duty delivery trucks varying per month. These vehicles will deliver all of the materials needed to construct the SJS1&2 Project, including concrete, steel, mirrors and any offsite water supply. The peak number of daily truck trips occurs in month 13 with 30 medium-duty and 25 heavy-duty delivery trucks. Tables 5.2-10 Revised and 5.2-11 Revised present the revised construction emissions for the month in the construction phase that is anticipated to have the total peak onsite emissions, that being month 6. During month 6 there are expected to be 11 medium-duty and 6 heavy-duty delivery trucks. The emissions presented in Tables 5.2-10 Revised and 5.2-11 Revised are extremely similar to the construction emissions presented in the AFC, thus no new construction air quality impact analysis was conducted, as the impacts are expected to be similar to those presented in the AFC.

Data Request 15: Please summarize the origin of construction materials and basis for assuming a 100-mile round trip distance, given that Fresno is approximately 70 miles from the project site.

Response: The origin of construction material has not been finalized since purchase agreements are not is place. Priority for locally supplied materials will be given. For materials not readily available locally, rail transit to a local rail yard (likely Coaling or Fresno) will be used. To ensure the emissions from the delivery of the construction materials are not underestimated, we make the worst case, unrealistic assumption, that all construction deliveries will originate in Fresno, and the round trip distance for each delivery vehicle was modified to be 140 miles, approximately the distance from Fresno to the site and back.

Data Request 16: Please identify why the more recent factors from U.S. EPA AP-42 Sections 13.2.1 and 13.2.2 were not used to determine road dust emissions.

Response: The SCAQMD unpaved and paved road emission factors used in the AFC are based on the same research used to derive the EPA AP-42 emission factors. Thus either SCAQMD or EPA emission factors are reasonable emission factors to determine the dust from travel on roads. As both the construction and operations emissions were being reanalyzed due to other new data refinements from the project engineers, the EPA AP-42 Section 13.2.1 and 13.2.2 emission factor calculation methodologies were incorporated into the new emission estimates for construction and operations that are presented above and in Appendices AQ-1 and AQ-2.

Data Request 17: Please confirm whether wet-surface air coolers would be included in the project description, and, if so, describe the equipment, the potential emissions, and air quality impacts.

Response: A wet surface air cooler (WSAC) condenser combines a conventional cooling tower and turbine condenser in one unit (cell). Two cells will be required for each steam turbine at the project. Therefore, in total there will be 4 two-cell WSACs for the entire SJS 1&2 project. The total emissions from the 4 two-cell WSACs remains the same as the emissions presented in the AFC for the cooling towers. In the AFC the cooling emissions were released from 4 one-cell cooling towers, thus the only difference is that the WSAC emissions will be released from 8 cells versus the 4 cells presented in the AFC. Since the total emissions are the same, the air quality impacts from WSACs will be approximately the same as those predicted in the AFC from the cooling towers.

Data Request 18: Please verify the inventory of sources making up the onsite biomass handling equipment list and confirm that no onsite sources other than a front-end loader need to be identified for the biomass feed, lime, limestone, and ash systems or auxiliary facilities. This response should confirm whether any other equipment like excavators, screeners, or grinders would be needed to handle the biomass fuel onsite in the steps leading up to fuel delivery to the combustors.

Response: It is anticipated that two front-end loaders will be needed to move the biomass. The majority of the biomass handling will occur in an enclosed system with slight negative pressure for dust control. Biomass delivery trucks will be unloaded directly into two enclosed hoppers, which will feed a screen to separate the wood chips according to size. The oversized chips will be processed by a grinder, then combined with the rest of the biomass. The biomass will then travel on a covered a conveyor to the stacker which creates the biomass storage pile. Biomass will be picked up from the storage pile by a reclaim conveyor that will load the biomass into an interim storage silo which feeds a metering bin and ultimately the combustor. There will be seven dust capture points along the biomass handling system that will feed a baghouse. Each plant will have its own biomass handling system. The dust removal/control efficiency for the baghouses is anticipated to be at least 99%. One front end loader for each plant will be used intermittently in the biomass storage area.

Fugitive particulate matter emissions from the unloading and handling of the limestone, lime and fly ash were estimated using *EPA AP-42 AP-42 Section 13.2.4 Aggregate Handling and Storage Piles Equation 1* (EPA 2006/11) material handling emission factor and using the 99% design control efficiency provided by the biomass facility equipment designer. The emissions from unloading and handling of the limestone, lime and fly ash were estimated based on 12 hours per day and 365 days per year operation schedule.

Data Request 19: Please verify the emission calculations making up the onsite biomass handling equipment emissions and confirm that all emissions from the biomass feed, lime, limestone, and ash systems, and auxiliary facilities, are included.

Response: The emissions from the biomass handling equipment and fugitive dust releases are presented in Table 5.2-12 Revised. The emissions vary slightly from those presented in the AFC due to the addition of one front-end loader to move biomass, the removal of the biomass storage building and its replacement with the two biomass handling systems that each include a baghouse.

Data Request 20: Please verify that the expected hours of operation and emissions for the front-end loader, and any other onsite biomass handling equipment, used for purposes other than "spill clean-up."

Response: Each front-end loader will operate 4 hours per day, 5 days per week for a total of 1,040 hours per year. The front-end loaders will be used to clean up spills from the biomass piles.

Data Request 21: Please verify that all emissions from pumps and mechanical drives for the solar system are included in the onsite emissions totals.

Response: All pumps and mechanical drives in the solar field are either electric or hydraulic and have no emissions.

Data Request 22: Please provide an update on the progress to procure ERCs to satisfy SJVAPCD permitting requirements.

Response: The applicant has retained the services of an ERC broker and is progressing in ERC procurement process. The following letter details the progress to date.

Data Request 23: Please identify the specific proposed ERCs that would be used for offsets and mitigation.

Response: The project will identify the specific ERCs to be used for offsets and mitigation upon execution of purchase agreements. This information cannot be released sooner as it may jeopardize ERC procurement negotiations.

ELEMENT MARKETS

May 27th, 2009

California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

To Whom It May Concern:

Element Markets has been engaged by Martifer Renewables Solar Thermal to facilitate the San Joaquin ERC procurement process for San Joaquin Solar 1 & 2 hybrid power plant project. Element Markets is actively in discussions with sellers and we have determined that there is enough supply to fulfill the project's offset requirements. Element Markets expects to wrap up negotiations in order to establish control of the offsets required in the near term. Once the ERC contracts are executed by the buyer and seller, the contracts and the certificate numbers will be provided to San Joaquin Valley Air Pollution Control District and The California Energy Commission to facilitate the issuance of the PDOC and FDOC. Should you have any questions or concerns, please do not hesitate to contact me.

Kindest Regards,

Randall Lack, Managing Director
Element Markets LLC
281-207-7213
rlack@elementmarkets.com

Data Request 24: Please provide a mitigation proposal for the proposed project's total direct operational criteria pollutant emissions [190.4 tons per year (tpy) of NOx, 50.9 tpy VOC, 49.7 tpy SO2, 389.7 tpy PM10, and 158.5 tpy PM2.5 (AFC Table 5.2-12)].

Response: The project's direct onsite stationary source emissions will be mitigated by obtaining emission reduction credits from the SJVAPCD for these sources. The emissions values presented in Data Request 24 have been modified as presented in the General Comments and Table 5.2.-12 Revised. The Applicant is working with an ERC Broker to obtain the required offsets.

Mitigation of onsite fugitive emissions will be achieved through operator training and dust control plans.

A mitigation proposal for offsite mobile emissions is not necessary for the following reasons: (1) Mitigation is required under CEQA only where there will be an increase in emissions resulting in a significant adverse impact. As shown in Table 5.2-11.2 New, the project will not result in a significant increase in offsite mobile emissions, when compared to current baseline conditions. Therefore, no mitigation is required for offsite mobile emissions. (2) Before the Commission could find any increase in offsite mobile emissions to be significant, it would be necessary for the Commission to set a threshold of significance. Neither the Commission nor any agency with jurisdiction over the Project has set a threshold of significance for offsite mobile emissions. Therefore, the Project has not exceeded any applicable threshold of significance. (3) Offsite mobile emissions that may be related to the Project are outside the control of the Applicant. While the Applicant will encourage delivery trucks to optimize delivery routes and properly maintain transportation vehicles, the Applicant has no means of enforcing these measures.

Data Request 25: Please provide a discussion of Best Available Control Technology (BACT) that identifies the available control technologies and achievable emission rates, based on a review of relevant databases and guidelines maintained by the U.S. EPA, CARB, and SJVAPCD. This response should include citations to relevant databases or references.

Response: Table DR-25a summarizes the available control technologies and emission rates that have been achieved in practice for industrial biomass, wood and wood waste combustion boilers. They were identified based on a review of the U.S. EPA RACT/BACT/LAER Clearinghouse, the CARB BACT Clearinghouse and the SJVAPCD BACT clearinghouse for comparable processes, for the past ten (10) years. It should be noted that a query of the CARB database did not produce any records for wood-fired boilers.

A top-down analysis of the available control technologies lead to the selection of the lowest achievable emission rates in terms of mass per energy throughput (lb/MMBtu) listed in Table DR-25b. Table DR-25b also shows the control technologies associated with these emission rates as well as the proposed SJS 1&2 BACT emission levels and control technologies.

The achieved-in-practice BACT are good combustion practices for VOC, regenerative selective catalytic reduction (RSCR) for NOx, oxidation catalyst for CO, electrostatic precipitation (ESP) for PM_{10} and lime injection for SO_2. The SJS 1&2 proposed BACT are selective non catalytic reduction (SNCR) and selective catalytic reduction (SCR) for NOx, mulit-cyclone, baghouse and wet scrubber for PM_{10}, and limestone injection for SO_2 in addition to wet and dry scrubbers for further emission reductions. The SJS 1&2 proposed BACT are the same or more stringent than those presently achieved in practice.

It should be noted that the PM_{10} emission limit of 0.020 lb/MMBtu presented in the U.S. EPA database for a wood waste boiler in the State of Washington was for filterable PM_{10}, not total PM_{10}. SJS 1&2 proposed an emission limit of 0.010 lb/MMBtu for filterable PM_{10} and 0.025 lb/MMBtu for total PM_{10}. Thus the PM_{10} emission controls from the SJS 1&2 project would reduce emissions to a level lower than presently achieved BACT.

Table DR-25a
BACT Clearinghouse Review For Boilers Burning Wood or Biomass

Facility	Location	Description	Permit Date	Fuel	Throughput (MMBtu/hr)	Pollutant										Source
						VOC		NO_x		CO		Filterable PM_{10}		SO_2		
						Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	
Concord Steam Corporation	NH	10.7 MW biomass power plant	Feb-09	Biomass	305	NA	NA	0.065	RSCR	NA	NA	NA	NA	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Koda Energy	MN	Sugar mill and refinery	Aug-07	Biomass (bagasse)	308	NA	NA	0.25	SNCR	NA	NA	0.03	Cyclone & ESP	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Simpson Tacoma Kraft Company	WA	Kraft pulp and lineboard manufacturing	May-07	Wood waste	595	NA	NA	0.2	Combustion controls with overfire air	0.35	Combustion controls with overfire air	0.02	ESP	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Grays Harbor Paper	WA	Paper mill	Nov-06	Wood waste	379	NA	NA	NA	NA	NA	NA	52.5 lb/hr	Multiclones; 2 parallel impringement wet scrubber	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Grays Harbor Paper	WA	Paper mill	Nov-06	Wood waste	227	NA	NA	NA	NA	NA	NA	78.4 lb/hr	Multiclones; secondary multiclones; secondary scrubber packed wet ventury	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Stevenson Mill	AL	Pulp and paper mill	Jul-06	Biomass	620	NA	NA	NA	NA	NA	NA	NA	NA	93 lb/hr	NA	EPA RACT/BACT/LAER Clearinghouse
Northern Sun	ND	Vegetable oil plant and refinery	May-06	Biomass (hulls and wood)	NA	NA	NA	0.2	Combustion controls	0.63	Good combustion practices	0.08	ESP	0.47	NA	EPA RACT/BACT/LAER Clearinghouse
South Point Biomass Generation	OH	Biomass power plant	Apr-06	Wood	318	0.013	Good combustion practice and use of oxidation catalyst	0.44	SCR	0.1	Oxidation catalyst	3.97 lb/hr	Pulse jet baghouse	0.087	Spray dryer adsorber or dry sodium bicarbonate injection system	EPA RACT/BACT/LAER Clearinghouse
Boise White Paper	WA	Pulp and paper mill	Feb-06	Wood/Bark	343	NA	NA	0.3	Combustion controls with overfire air; ESP	500 ppmvd	Combustion controls with overfire air	NA	NA	NA	NA	EPA RACT/BACT/LAER Clearinghouse

Table DR-25a
BACT Clearinghouse Review For Boilers Burning Wood or Biomass
(Continued)

Facility	Location	Description	Permit Date	Fuel	Throughput (MMBtu/hr)	Pollutant										Source
						VOC		NO_x		CO		Filterable PM_{10}		SO_2		
						Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	
Skagit County Lumber Mill	WA	Lumber mill	Jan-06	Bark/Wood waste	430	0.019	NA	0.13	SNCR	0.35	NA	0.02	ESP	0.025	NA	EPA RACT/BACT/LAER Clearinghouse
Potlatch Corporation	AR	Sawmill	Jul-05	Wood chips	110,000 lb/hr of steam production	0.034	Good combustion practices	NA	NA	NA	NA	NA	NA	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Darrington Energy Cogeneration Power plant	WA	Cogeneration facility	Feb-05	Wood waste	403	NA	NA	0.12	SNCR	0.35	Good combustion practices	0.02	ESP	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Bogalusa Mill	LA	Pulp and paper mill	Nov-04	Bark	787.5	NA	NA	0.45	Good combustion practices; overfire air system with low NOx burners	0.6	Good combustion practices; overfire air system	0.15	Wet scrubber	1.54	Limit annual fuel oil capacity to <= 10%	EPA RACT/BACT/LAER Clearinghouse
Schiller Station	NH	Power plant	Oct-04	Biomass	720	0.005	Good combustion practices	0.075	SNCR	0.1	Good combustion practices with the fluidized bed design	0.025	Fabric filter	0.02	Lime injection	EPA RACT/BACT/LAER Clearinghouse
Inland Paperboard	GA	Kraft lineboard manufacturing	Oct-04	Bark	856	0.05	Stage combustion and good combustion practices	NA	NA	368 ppm @ 3% O2	Stage combustion and good combustion practices	0.025	ESP	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Clewiston Sugar Mill and Refinery	FL	Sugar mill and refinery	Nov-03	Bagasse	936	0.05	Good combustion and operating practices	0.14	SNCR	0.38	Good combustion and operating practices	0.026	Wet cyclone; ESP	0.06	Fuel specification < 0.05% S wt	EPA RACT/BACT/LAER Clearinghouse
Deridder Paper Mill	LA	Pulp and paper mill	Nov-03	Bark	454.29	0.034	Good equipment design and proper combustion techniques	NA	NA	0.33	Good equipment design and proper combustion techniques	NA	NA	NA	NA	EPA RACT/BACT/LAER Clearinghouse

Table DR-25a
BACT Clearinghouse Review For Boilers Burning Wood or Biomass
(Continued)

Facility	Location	Description	Permit Date	Fuel	Throughput (MMBtu/hr)	Pollutant										Source
						VOC		NO_x		CO		Filterable PM_{10}		SO_2		
						Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	Emission Limit (lb/MMBtu)	Control	
Aberdeen Division	WA	Lumber mill	Oct-02	Wood waste	310	NA	NA	0.15	SNCR	0.35	Good combustion	0.02	ESP	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Meadwestvaco	KY	Pulp and paper mill	Feb-02	Bark	631	NA	NA	0.4	NA	NA	NA	0.1	ESP	0.8	NA	EPA RACT/BACT/LAER Clearinghouse
S.D. Warren Co	ME	Kraft pulp mill	Nov-01	Wood waste	1300	0.007	Good boiler design and combustion practices	0.2	SNCR	0.4	Good boiler design and combustion practices	0.03	Mechanical dust collector; ESP	0.27	Sodium-based wet scrubber	EPA RACT/BACT/LAER Clearinghouse
District Energy St. Paul	MN	District heating and electricity cogeneration	Nov-01	Wood	550	NA	NA	0.15	SNCR	0.3	Good combustion	0.03	Cyclone; ESP	NA	NA	EPA RACT/BACT/LAER Clearinghouse
Tri-Gen Biopower	GA	Biomass power plant	May-01	Wood waste/Papermill sludge	302.2	NA	NA	NA	NA	0.3	Good design and combustion principles	0.026	ESP; wet scrubber	NA	NA	EPA RACT/BACT/LAER Clearinghouse
US Sugar Corporation	FL	Sugar mill and refinery	Nov-99	Bagasse	633	0.5	Good combustion practices	0.2	Good combustion practices	6.5	Good combustion practices	0.15	Good combustion practices; scrubber; wet impingement	0.06	Low sulfur fuel <= 0.7% S wt	EPA RACT/BACT/LAER Clearinghouse
Wheelabrator Sherman Energy Company	ME	Electric generating facility	Apr-99	Wood	315	0.03	Good combustion practices	0.25	Good combustion practices	0.45	Good combustion practices	0.036	ESP; cyclone	0.12	NA	EPA RACT/BACT/LAER Clearinghouse
Thermal Energy Development Corp	CA	Power production	Sep-04	Biomass	259	NA	NA	NA	NA	400 ppmvd @ 3% O2	NA	NA	NA	NA	NA	SJVAPCD BACT Determination Clearinghouse
AES Delano	CA	Power plant	Nov-02	Biomass	315	0.02	NA	0.1	Amonia injection	0.14	NA	0.045	Baghouse	23 ppmvd @ 3% O2	Limestone injection	SJVAPCD BACT Determination Clearinghouse
Minimum Emission Limit (lb/MMBtu)						**0.005**		**0.065**		**0.1**		**0.02**		**0.02**		

Table DR-25b
Available BACT and Proposed SJS 1&2 BACT for Boilers Burning Wood or Biomass

Pollutant	Available BACT		SJS 1& 2 Proposed BACT	
	Lowest Achievable Emission Rate (lb/MMBtu)	Control Technology	Lowest Achievable Emission Rate (lb/MMBtu)	Control Technology
VOC	0.005	Good combustion practices	0.005	Good combustion practices with fluidized bed technology
NO_x	0.065	Regenerative Selective Catalytic Reduction (RSCR)	0.012	Selective Non-Catalytic Reduction (SNCR) and Selective Catalytic Reduction (SCR)
CO	0.1	Oxidation catalyst or good combustion practices with fluidized bed technology	0.039	Good combustion practices with fluidized bed technology
Filterable PM_{10}	0.02	Electrostatic Precipitator (ESP)	0.01	Multi-cyclone, Baghouse and Wet Scrubber
SO_2	0.02	Lime injection	0.012	Limestone injection and Wet Scrubber

Data Request 26: Please confirm that the analysis of control technologies considers all available technologies for reducing emissions during startup and partial-load modes of operation.

Response: The SJS 1&2 biomass combustor proposes the installation of four natural gas burners in each of the biomass combustors that will be used only during combustor cold startup. Only two cold startups per year per combustor are anticipated lasting a total of 8 hours each startup. The natural gas burners and combustor exhaust emissions will be vented out of the combustor stack and will be controlled by the primary combustor controls listed in Data Request Response 25, which will become partially functional by hour eight of the startup sequence and fully functional the following hour. Startup emissions and controls are presented in Table DR-29.

Emission controls will be fully functional during partial-load operations for NOx, SO_2 and particulate emissions. Emissions for partial load operations are presented in Tables DR-30a and 30b.

The CO and VOC emission rates are estimated to be higher at 50% load (0.039 lb/MMBtu and 0.005 lb/MMBtu, respectively) than at 75% or 100% load (0.020 lb/MMBtu and 0.003 lb/MMBtu, respectively). The reason is that there will be some heat transfer surface (boiler steaming) located in the vessel, that will be removing heat all of the time regardless of the capacity level. As a result, this heat removal needs to be compensated for by reducing the excess air into the furnace so that the furnace temperatures can be maintained. When the capacity is 50%, the surface duty is significant, and even though the excess air levels are reduced to 35%, the furnace temperature is reduced down to approximately 1600 F. At lower excess air and lower furnace temperatures, potential CO and VOC levels increase. Since CO and VOC emissions are fairly low for full load operations, it is likely that the 50% load emissions could rise significant, hence until testing is conducted on the combustors at the SJS 1&2 project for operations at 50% load, the combustor engineers estimate the CO and VOC emissions to be 0.039 lb/MMBtu and 0.005 lb/MMBtu, respectively, for a 50% load capacity.

Data Request 27: Please identify the lowest achievable emission rates identified in the review of BACT for the startup and partial-load modes of operation.

Response: Many of the combustors listed in Table DR-25a are equipped with auxiliary fossil-fuel burners that can be used for combustor startup, backup systems, and/or to augment the combustion capacity when running at partial-load mode. These combustors used oil, #2 fuel oil, diesel or natural gas for startup. The proposed combustors at SJS 1&2 will use natural gas burners to warm up the fluidized bed in the combustors during startup.

In general, emissions from the auxiliary burners are vented out of the main combustor stacks and are controlled with the primary combustor controls. However, the information included in the three databases that were reviewed does not allow for the identification of the lowest achievable emission rates of BACT for the startup and partial load modes of operation. Therefore, the specific emission rate achieved by BACT for the startup and partial load modes alone are not available. Section 5.3 of the SJVAPCD Rule 4352 allows Tier 2 emission limits of 115 ppmvd and 400 ppmvd @ 3% O_2 for NO_x and CO respectively for a solid-fired boiler if the startup duration does not exceed 96 hours. The proposed SJS 1&2 startup burners will be operated up to 8 hours per event, for 2 events per year, emissions will be substantially below the SJVAPCD thresholds.

Data Request 28: In order to compare project performance with other similar biomass power plants, please provide the maximum NOx and VOC emission limits in terms of exhaust concentrations (parts per million, by volume, dry or ppmvd).

Response: The maximum NOx and VOC emission limits in terms of exhaust concentrations for each combustor are presented in Appendix AQ-2 and in Table DR-28.

Table DR-28
Emission Limits per Combustor

Pollutant	Emission Limit (ppm)
NOx	7.3
VOC	3.0

Data Request 29: Please provide technical information, including vendor specifications, that expands on AFC Appendix B-3 "Table #-#" and characterizes the proposed emissions during startups as a function of time. This should show how exhaust concentrations would vary during startups and how electrical output would vary, as the biomass combustors and emission control devices come online.

Response: Vendor specifications for a cold startup sequence are shown below in Table DR-29, this table updates and expands the old Table #-# in AFC Appendix B-3. It provides stack parameters for each hour in the startup sequence. By hour eight of the cold start sequence the natural gas heaters would be off, the combustor would be operating at full capacity and emissions would be partially controlled. By hour nine all control devices would be operating with maximum controlling efficiencies.

Table DR-29
Start Up Emissions for One Biomass Combustor

Table 1587 BFB Cold Start-up Sequence

Startup time (hrs)	1	2	3	4	5	6	7	8	NOTES
Parameters									
Main steam flow (%MCR)	16%	24%	29%	39%	44%	48%	77%	100%	Ratio calculated based on total heat input.
Wood flow (pph)	0	0	0	0	0	0	13,028	53,847	Maximum wood firing rate from short-term emission calcs.
Gas heat (MMBtu/hr) (HHV) max 165 M Btu/hr	50	75	90	120	135	150	165	0	3 x 50 M Btu/hr overbed and 1 x 15 M btu/hr underbed.
Wood heat input (MMBtu/hr) (HHV)	0	0	0	0	0	0	75	310	
Total heat input (MMBtu/hr) (HHV)	50	75	90	120	135	150	240	310	Calculated as the sum of nat gas startup and wood MMBtu.
Bed temperature (degrees F)	100	300	500	650	725	725	1,200	1,300	
vapor temp	450	600	750	950	1200	1200	1500	1700	
gas flow	308,704	362,051	336,057	322,391	248,592	294,449	302,398	363,716	
stack temp	100	120	150	200	230	230	230	230	
Stack exit flow (scfm) approx	68,601	80,456	74,679	71,642	55,243	65,433	67,199	80,826	
Controls:									
NOx Removal Efficiency - (%)	0	0	0	0	0	0	0	77	Not until SNCR is activated
SO2 Removal Efficiency - (%)	0	0	0	0	0	0	0	71	No acid gas scrubbing till hour 7
HCL Removal Efficiency (%)	0	0	0	0	0	0	0	96	No acid gas scrubbing till hour 7
Emission Factors	B-100	(B-100 & Wood Blends) (weighted average for now)						Wood	
NOx Emissions (lb/MMBtu)	0.062	0.062	0.062	0.062	0.062	0.062	0.157	0.084	0.02 after SCR @ 9 hr
SO2 Emissions (lb/MMBtu)	0.000	0.000	0.000	0.000	0.000	0.000	0.159	0.150	0.012 after wet scrub @ 9 hr
PM/PM10 Emissions (lb/MMBtu)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0141	0.045	0.025 after wet scrub @ 9 hr
CO Emissions (lb/MMBtu)	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.0500	0.050	0.02 after 9 hr
VOC Emissions (lb/MMBtu)	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0047	0.012	0.003 after 9 hr
HCl Emissions (lb/MMBtu)	0	0.000	0.000	0.000	0.000	0.000	0.039	0.005	after scrubber @ hr 7
Emission Rates									
NOx Emissions (lb/hr)	3.10	4.65	5.58	7.44	8.37	9.30	37.62	26.04	
SO2 Emissions (lb/hr)	0.00	0.00	0.00	0.00	0.00	0.00	38.14	46.50	
PM/PM10 Emissions (lb/hr)	0.00	0.00	0.00	0.00	0.00	0.00	3.38	13.95	
CO Emissions (lb/hr)	2.50	3.75	4.50	6.00	6.75	7.50	12.00	15.50	
VOC Emissions (lb/hr)	0.07	0.11	0.13	0.17	0.19	0.21	1.14	3.72	
HCl Emissions (lb/hr)	0.00	0.00	0.00	0.00	0.00	0.00	9.37	1.55	

Data Request 30: Please provide information that characterizes how biomass combustor emission rates and exhaust concentrations vary at load-settings above and below 50 percent. Ideally, this information would show how emission rates and exhaust concentrations would ramp with increasing load from zero to 100 percent.

Response: The lowest load at which each combustor will operate is 50%. The biomass combustor emission rates and exhaust parameters vary with load. Tables DR-30a, 30b and 30c show the vendor provided emission rates and exhaust parameters for the 50%, 75% and 100% load scenarios, respectively. It should be noted that the annual emissions estimates for the 50% and 75% load scenarios are not the total annual emissions anticipated for the SJS 1&2 project, the annual emissions anticipated from the project are presented in Table DR-30c.

Table DR-30a
Combustor Emissions and Stack Parameters for 50% Load Scenario
(One Combustor)

EMISSIONS AT STACK

EPI Reference Number	1587			Performed by:	mlm
Customer	Spinnaker - Steam cycle -004-C			Date:	27-May-09
Project Name	San Juaquin, ca			Revision:	4
50%				Filename:	permit info 5 21 09
emissions per boiler				Page	1a

Flue Gas @ ID Fan Outlet						
	Mass Flow	188,130	lbs/hr		O2	5.48 % vol.(dry)
	Vol. Flow	56,735	acfm	56735	CO2	14.95 % vol.(dry)
	Temp.	230	deg. F		N2	79.56 % vol.(dry)
	Dry MW	30.63	moles/lb		density	0.055 lb/ft3
	Wet MW	27.84	moles/lb			
	Std. Vol.	43,579	scfm		Moisture	14.30 % by wt.
	Std. Dry Vol.	33,944	sdcfm		Moisture	22.11 % by vol.

Flue Gas @ Stack				%of Total
	Mass Flow	188,130	lbs/hr	100.00%
	Vol. Flow	56,735	acfm	100.00%
	Temp.	230	deg. F	
	Std. Vol.	43,579	scfm	100.00%
	Std. Dry Vol.	33,944	sdcfm	100.00%

capacity factor 75.00%

Emissions @ Stack		Potential Unabated Emissions			Abated Emissions @ Stack			
Pollutant	mole. wt.	ppmdv	lbs/hr	lbs/MBtu	ppmdv	lbs/hr	lbs/MBtu	Ton/yr
CO	28.01				40.0	5.90	0.039	19.38
SO2	64.07	115	38.84	0.254	4.3	1.46	0.010	4.79
NOx	46.01	269	65.09	0.425	7.3	1.77	0.012	5.82
HCl	36.47	91	17.48	0.114	3.6	0.70	0.005	2.30
VOC	44.09				3.0	0.70	0.005	2.29
NH3	17.03				*5.0*	0.45	0.003	

Particulate -Front Half Catch

	Potential From FBI	Loading To Cleanup	Abated @ Stack
gr/SDCF	4.44	1.15	0.005
lbs/hr	1,292	333	1.50
lbs/day	31,013	7,996	35.99
tons/yr	4,245	1,094	4.93
lbs/MMBTU	8.437	2.175	0.010

Particulate Back Half Catch - Only

abatement efficier 80.00%

	Potential From FBI	Loading To Stack	Abated @ Stack	Total Particulate Abated @ Stack
gr/SDCF	0.035	0.035	0.007	0.012
lbs/hr	10	10	2	3.536
lbs/day	244	244	49	84.875
tons/yr	33	33	7	11.617
lbs/MBTU	0.066	0.066	0.013	0.023

TABLE DR-30B
COMBUSTOR EMISSIONS AND STACK PARAMETERS FOR 75% LOAD SCENARIO (ONE COMBUSTOR)

EMISSIONS AT STACK

EPI Reference Number	1587	Performed by:	mlm
Customer	Spinnaker - Steam cycle -004-C	Date:	28-May-09
Project Name	San Juaquin, ca	Revision:	4
75%		Filename:	permit info 5 21 09
emissions per boiler		Page	1a

Flue Gas @ ID Fan Outlet							
	Mass Flow	294,977	lbs/hr		O2	6.04	% vol.(dry)
	Vol. Flow	89,118	acfm	89118	CO2	14.41	% vol.(dry)
	Temp.	230	deg. F		N2	79.54	% vol.(dry)
	Dry MW	30.57	moles/lb		density	0.055	lb/ft3
	Wet MW	27.79	moles/lb				
	Std. Vol.	68,453	scfm		Moisture	14.32	% by wt.
	Std. Dry Vol.	53,316	sdcfm		Moisture	22.11	% by vol.

Flue Gas @ Stack				%of Total
	Mass Flow	294,977	lbs/hr	100.00%
	Vol. Flow	89,118	acfm	100.00%
	Temp.	230	deg. F	
	Std. Vol.	68,453	scfm	100.00%
	Std. Dry Vol.	53,316	sdcfm	100.00%

capacity factor 75.00%

Emissions @ Stack		Potential Unabated Emissions			Abated Emissions @ Stack			
Pollutant	mole. wt.	ppmdv	lbs/hr	lbs/MBtu	ppmdv	lbs/hr	lbs/MBtu	Ton/yr
CO	28.01				20.0	4.63	0.020	15.22
SO2	64.07	111	58.82	0.254	4.4	2.35	0.010	7.73
NOx	46.01	259	98.57	0.425	7.1	2.71	0.012	8.90
HCl	36.47	88	26.47	0.114	3.5	1.06	0.005	3.48
VOC	44.09				2.0	0.73	0.003	2.40
NH3	17.03				*5.0*	0.70	0.003	

Particulate -Front Half Catch

	Potential From FBI	Loading To Cleanup	Abated @ Stack
gr/SDCF	4.28	1.10	0.005
lbs/hr	1,957	504	2.27
lbs/day	46,963	12,104	54.48
tons/yr	6,428	1,657	7.46
lbs/MMBTU	8.437	2.174	0.010

Particulate Back Half Catch - Only

abatement efficier 60.00%

	Potential From FBI	Loading To Stack	Abated @ Stack
gr/SDCF	0.035	0.035	0.007
lbs/hr	16	16	3
lbs/day	384	384	77
tons/yr	53	53	11
lbs/MBTU	0.069	0.069	0.014

Total Particulate
Abated @ Stack
0.012
5.469
131.263
17.967
0.024

TABLE DR-30C
COMBUSTOR EMISSIONS AND STACK PARAMETERS FOR 100% LOAD SCENARIO (ONE COMBUSTOR)

EMISSIONS AT STACK

EPI Reference Number	1587	Performed by:	mlm
Customer	Spinnaker - Steam cycle -004-C	Date:	27-May-09
Project Name	San Juaquin, Ca	Revision:	5
100%		Filename:	permit info 5 21 09
emissions per boiler		Page	1a

Flue Gas @ ID Fan Outlet							
	Mass Flow	395,963	lbs/hr		O2	6.04	% vol.(dry)
	Vol. Flow	119,784	acfm	119784	CO2	14.41	% vol.(dry)
	Temp.	230	deg. F		N2	79.54	% vol.(dry)
	Dry MW	30.57	moles/lb		density	0.055	lb/ft3
	Wet MW	27.75	moles/lb				
	Std. Vol.	92,008	scfm		Moisture	14.53	% by wt.
	Std. Dry Vol.	71,398	sdcfm		Moisture	22.40	% by vol.

Flue Gas @ Stack				%of Total
	Mass Flow	395,963	lbs/hr	100.00%
	Vol. Flow	119,784	acfm	100.00%
	Temp.	230	deg. F	
	Std. Vol.	92,008	scfm	100.00%
	Std. Dry Vol.	71,398	sdcfm	100.00%

capacity factor 75.00%

Emissions @ Stack		Potential Unabated Emissions			Abated Emissions @ Stack			
Pollutant	mole. wt.	ppmdv	lbs/hr	lbs/MBtu	ppmdv	lbs/hr	lbs/MBtu	Ton/yr
CO	28.01				20.0	6.20	0.020	20.38
SO2	64.07	111	78.77	0.254	5.3	3.74	0.012	12.29
NOx	46.01	259	131.99	0.425	7.1	3.63	0.012	11.92
HCl	36.47	88	35.45	0.114	3.5	1.42	0.005	4.66
VOC	44.09				2.0	0.98	0.003	3.21
NH3	17.03				*5.0*	0.94	0.003	

Particulate -Front Half Catch

	Potential From FBI	Loading To Cleanup	Abated @ Stack
gr/SDCF	4.28	1.10	0.005
lbs/hr	2,620	675	3.04
lbs/day	62,890	16,191	72.87
tons/yr	8,608	2,216	9.97
lbs/MMBTU	8.437	2.172	0.010

Particulate Back Half Catch - Only

abatement efficier 80.00%

	Potential From FBI	Loading To Stack	Abated @ Stack
gr/SDCF	0.035	0.035	0.007
lbs/hr	21	21	4
lbs/day	514	514	103
tons/yr	70	70	14
lbs/MBTU	0.069	0.069	0.014

Total Particulate
Abated @ Stack
0.012
7.321
175.701
24.049
0.024

Data Request 31: Please describe the lowest load (or turndown ratio) for the biomass combustors that would be compliant with the applicant's proposed emission limits.

Response: The lowest load each combustor would operate at is 50%. The proposed emissions associated with the 50% load scenario are presented in Table DR-30a. The annual emissions presented in Table DR-30a are not the annual emission limits requested for the SJS 1&2 project, those are presented in Table DR-30c, the 100% load scenario.

Data Request 32: Please confirm whether extended or prolonged (*e.g.,* for multiple hours or overnight, as foreseeable) operation in partial-load modes was considered in the AFC's dispersion modeling and impact analysis, and if not, provide an impact analysis of partial-load scenarios, with appropriate stack conditions (*i.e.,* velocities and flows).

Response: Prolonged partial load operations may occur with one or more of the combustors. To ensure that the maximum impacts were analyzed from these scenarios, the revised modeling presented in the General Comments above included combustor screening to determine the worst-case stack parameters to be used for the subsequent refined modeling. These worst-case stack parameters were determined for each pollutant and averaging time and thereafter used with the maximum emissions possible for that pollutant and averaging time, to ensure that the maximum pollutant concentrations were predicted. The results from the revised air quality impacts analysis are presented in Table 5.2-19 Revised.

Data Request 33: Please provide technical information, including vendor specifications, that describes the commissioning activities and provides evidence for the emission factors used in AFC Appendix B-4. This should describe how natural gas and biomass fuel would be phased and the load or electrical output for the phases of commissioning.

Response: The commissioning emission factors provided in the AFC were updated by the equipment supplier and presented in Table 5.2-14 Revised and again in Appendix AQ-3. These show the amount of natural gas and biomass burned per phase in the commissioning period. Natural gas is only required during the first phase of commissioning. These tables also show the emissions per phase and the combustor load. The combustor vendor, EPI, provided the data outlined in the tables.

Data Request 34: Please provide a description of the techniques that would be used to clean the mirrors of the SCAs. Include in this description the transport of the water supply, the number and types of vehicles that would be used, the frequency of use (daily, monthly and annual) of these vehicles, and the miles traveled (daily, monthly and annual).

Response: Mirror washing will occur nightly, five days per week. Each truck will operate 12 hours using 2,500 gallons per day, for a total of 5,000 gallons per day. Each mirror washing truck will refill its water tank daily from the demineralized water tank. Each mirror washing truck will travel approximately 6 miles per day, 132 miles per month and 1,560 miles per year.

Routine mirror washing will consist of application of high-pressure demineralized water sprayed onto the mirror surfaces. The Applicant will utilize several mirror washing methods on a rotating basis, once each month the mirrors will be washed with a high pressure method; once a month the mirrors will be washed with a high volume method. Details of the methods include:

- High-pressure rig consisting of a tractor-pulled trailer that contains a water tank and hand-held spray nozzles;
- Rotating-head rig consisting of a tractor pulling a wheeled tank-and-pump unit. The tractor is mounted with a controllable arm mounted in the front. The arm, with five movement articulated control from within the tractor cab, supports a configuration of spray arms that are fed by high-pressure water from the tank unit, and,.
- High-volume method using a large-capacity water truck driven with fixed nozzles on each side of the truck to spray the rows of mirrors simultaneously with a “deluge-type” stream of water.

It takes approximately two weeks to complete the washing of one solar field. Therefore, each solar field has one washing crew using either the high pressure or high deluge. After completing the solar field in two weeks, they begin washing the solar field again with the alternate method, so each mirror is cleaned twice each month. See Data Request 92 for photos for the typical mirror washing methods.

Data Request 35: Please describe if the emissions from mirror cleaning in Appendix B-3 include the activity of watering the site to achieve the cited 85 percent dust control efficiency or if site watering would cause additional water truck activity.

Response: The emissions from mirror cleaning do not include the dust control water activity. The additional emissions from the dust control water truck have been included in the operational emissions presented in Table 5.2-12 Revised and in Appendix AQ-2.

Data Request 36: Please provide the list of cumulative sources to be considered, the cumulative analysis of ambient air quality impacts, and the date when the cumulative impacts analysis will be filed with the Commission.

Response: Table DR-36a presents a list of new sources (constructed after 2005) that were considered for inclusion in the cumulative analysis for CEC. None of the sources outlined in Table DR-36a meet the requirements for inclusion in a cumulative analysis for CEC. The rationale for exclusion for each source is provided in Table DR-26a. Table 36b shows the existing sources (constructed before 2005) at the adjacent Coalinga State Hospital and Pleasant Valley State Prison. None of these sources will be included in the cumulative analysis since these sources have been operating since before 2005 and their emissions would be represented in the background air quality data. Thus no cumulative analysis will be conducted for the SJS 1&2 project.

Table DR-36a
New Dources (constructed after 2005) that were Considered for Cumulative Analysis

Facility	Equipment	Year	Emissions	Reasons to Eliminate from Analysis
Coalinga State Hospital (24511 W Jayne Ave, Coalinga, CA)	One transportable 60 bhp John Deere model 4024TF270A tier 2 diesel-fired IC engine powering an air compressor	2009	NO_x 124 lb/yr, SO_2 5 lb/yr, PM_{10} 8 lb/yr, CO 37 lb/yr, VOC 11 lb/yr	It is transportable engine and the emissions associated with the engine are negligible.
	One transportable 115 bhp John Deere model 4045TF2758.C tier 2 diesel-fired IC engine powering a water pump	2009	NO_x 198 lb/yr, SO_2 9 lb/yr, PM_{10} 10 lb/yr, CO 46 lb/yr, VOC 15 lb/yr	It is transportable engine and the emissions associated with the engine are negligible.
California State Prison – Coalinga (24863 W Jayne Ave, Coalinga, CA)	Coating operation/ spray booth	2007	-	VOC source, thus not included in the cumulative modeling analysis.
	Gasoline dispensing facility	2008	-	VOC source, thus not included in the cumulative modeling analysis.
Concrete Batch Plant (301 Enterprise Parkway) [4.5 mile west of the project site]	-	Possibly 2009	-	This project is under CEQA process. The California Air Resource Board has not approved the project so the CEQA analysis has not been conducted yet. Thus, there are no data to be reviewed or included in the cumulative analysis.

Table DR-36a
New Dources (constructed after 2005) that were Considered for Cumulative Analysis (Continued)

Table DR-36b
Existing Sources (constructed before 2005) at the Coalinga State Hospital and Pleasant Valley State Prison

Facility	Equipment	Emissions from SJVAPCD Permit
Coalinga State Hospital (24511 W Jayne Ave, Coalinga, CA)	Natural Gas Boiler #1, 19.9 MMBtu/hr with diesel fuel as backup	Emissions from this boiler when combusting natural gas shall not exceed any of the following limits: 9 ppmvd NO_x @ 3% O_2 (0.011 lb-NO_x/MMBtu), 0.00285 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 100 ppmvd CO @ 3% O_2 (0.08 lb-CO/MMBtu), or 0.0055 lb-VOC/MMBtu. Emissions from this boiler when combusting low sulfur diesel fuel shall not exceed any of the following limits: 40 ppmvd NOx @ 3% O_2 (0.05 lb-NOx/MMBtu), 0.053 lb-SOx/MMBtu, 0.015 lb-PM10/MMBtu, 400 ppmvd CO @ 3% O_2 (0.10 lb-CO/MMBtu), or 0.0025 lb-VOC/MMBtu.
Coalinga State Hospital (24511 W Jayne Ave, Coalinga, CA) (Continued)	Natural Gas Boiler #2, 19.9 MMBtu/hr with diesel fuel as backup	Emissions from this boiler when combusting natural gas shall not exceed any of the following limits: 9 ppmvd NOx @ 3% O_2 (0.011 lb-NO_x/MMBtu), 0.00285 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 100 ppmvd CO @ 3% O_2 (0.08 lb-CO/MMBtu), or 0.0055 lb-VOC/MMBtu. Emissions from this boiler when combusting low sulfur diesel fuel shall not exceed any of the following limits: 40 ppmvd NOx @ 3% O_2 (0.05 lb-NOx/MMBtu), 0.053 lb-SOx/MMBtu, 0.015 lb-PM10/MMBtu, 400 ppmvd CO @ 3% O_2 (0.10 lb-CO/MMBtu), or 0.0025 lb-VOC/MMBtu.
	Natural Gas Boiler #3, 19.9 MMBtu/hr with diesel fuel as backup	Emissions from this boiler when combusting natural gas shall not exceed any of the following limits: 9 ppmvd NOx @ 3% O_2 (0.011 lb-NOx/MMBtu), 0.00285 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 100 ppmvd CO @ 3% O_2 (0.08 lb-CO/MMBtu), or 0.0055 lb-VOC/MMBtu. Emissions from this boiler when combusting low sulfur diesel fuel shall not exceed any of the following limits: 40 ppmvd NOx @ 3% O_2 (0.05 lb-NOx/MMBtu), 0.053 lb-SOx/MMBtu, 0.015 lb-PM10/MMBtu, 400 ppmvd CO @ 3% O_2 (0.10 lb-CO/MMBtu), or 0.0025 lb-VOC/MMBtu.

Table DR-36b
Existing Sources (constructed before 2005) at the Coalinga State Hospital and Pleasant Valley State Prison
(Continued)

Facility	Equipment	Emissions from SJVAPCD Permit
Coalinga State Hospital (24511 W Jayne Ave, Coalinga, CA) (Continued)	2,885 HP Caterpillar model #3516 diesel-fired emergency standby IC engine #1 powering an electrical generator	Emissions from this engine shall not exceed any of the following limits: 6.9 g-NOx/hp-hr, 0.36 g-CO/hp-hr, or 0.13 g-VOC/hp-hr. The PM_{10} emissions rate shall not exceed 0.10 g/hp-hr
	2,885 HP Caterpillar model #3516 diesel-fired emergency standby IC engine #2 powering an electrical generator	Emissions from this engine shall not exceed any of the following limits: 6.9 g-NOx/hp-hr, 0.36 g-CO/hp-hr, or 0.13 g-VOC/hp-hr. The PM_{10} emissions rate shall not exceed 0.10 g/hp-hr
	2,885 HP Caterpillar model #3516 diesel-fired emergency standby IC engine #3 powering an electrical generator	Emissions from this engine shall not exceed any of the following limits: 6.9 g-NOx/hp-hr, 0.36 g-CO/hp-hr, or 0.13 g-VOC/hp-hr. The PM_{10} emissions rate shall not exceed 0.10 g/hp-hr
	2,885 HP Caterpillar model #3516 diesel-fired emergency standby IC engine #4 powering an electrical generator.	Emissions from this engine shall not exceed any of the following limits: 6.9 g-NOx/hp-hr, 0.36 g-CO/hp-hr, or 0.13 g-VOC/hp-hr. The PM_{10} emissions rate shall not exceed 0.10 g/hp-hr.
	Gasoline dispensing operation with one 8,000 gallon underground storage tank.	VOC emissions only.
	Wood, metal parts and products coating and powder coating operation with HVLP spray gun(s), electrostatic applicator, an open face paint spray booth with dry exhaust filters, and an electric bake oven.	VOC emissions only.
California State Prison – Coalinga (24863 W Jayne Ave, Coalinga, CA)	587 BHP Caterpillar model 3406 DITA diesel-fired emergency standby IC engine powering an electrical generator (building 623 - water booster station)	Emissions from the engine shall not exceed of the following limits: 29.8 lb-PM_{10}/day, 28.8 lb-SOx/day, 223.2 lb-NO_x/day, 33.6 lb-CO/day, or 2.4 lb-VOC/day.
	2,847 BHP Caterpillar model 3516 DITA diesel-fired emergency standby IC engine powering an electrical generator (area 600) #1	Emissions from the engine shall not exceed of the following limits: 144.0 lb-PM_{10}/day, 139.9 lb-SO_x/day, 1,219.2 lb-NOx/day, 348.0 lb-CO/day, or 12.5 lb-VOC/day.
	2,847 BHP Caterpillar model 3516 DITA diesel-fired emergency standby IC engine powering an electrical generator (area 600) #2	Emissions from the engine shall not exceed of the following limits: 144.0 lb-PM_{10}/day, 139.9 lb-SO_x/day, 1,219.2 lb-NO_x/day, 348.0 lb-CO/day, or 12.5 lb-VOC/day.

Table DR-36b
Existing Sources (constructed before 2005) at the Coalinga State Hospital and Pleasant Valley State Prison
(Continued)

Facility	Equipment	Emissions from SJVAPCD Permit
California State Prison – Coalinga (24863 W Jayne Ave, Coalinga, CA) (Continued)	Woodworking operation #1 including: one table saw, one band saw, one disc and belt sanding station, one radial arm saw, one planer/jointer, one compound miter saw, one shaper, and one drum sander	PM_{10} emissions from the dust collector shall not exceed 0.004 gr/dscf.
	Woodworking operation #2 including: one table saw, one band saw, one disc and belt sanding station, one radial arm saw, one planer/jointer, one compound miter saw, one shaper, and one drum sander	PM_{10} emissions from the dust collector shall not exceed 0.004 gr/dscf.
	Woodworking operation #3 including: one table saw, one band saw, one disc and belt sanding station, one radial arm saw, one planer/jointer, one compound miter saw, one shaper, and one drum sander	PM_{10} emissions from the dust collector shall not exceed 0.004 gr/dscf.
	Woodworking operation #4 including: one table saw, one band saw, one disc and belt sanding station, one radial arm saw, one planer/jointer, one compound miter saw, one shaper, and one drum sander	PM_{10} emissions from the dust collector shall not exceed 0.004 gr/dscf.
	motor vehicle, mobile equipment, metal parts and products coating operation with hvlp spray gun, paint spray booth with dry exhaust filters, and an enclosed spray gun cleaner (building 527)	VOC emissions only.
	Metal parts and products and wood products coating operation with HVLP spray gun, a paint spray booth with dry exhaust filters, and an enclosed spray gun cleaner (building 551)	VOC emissions only.
	3.0 bhp offset lithographic printing operation (building 521)	VOC emissions only.
	1.5 bhp offset lithographic printing operation including an A.B. dick model 9810xc duplicator #1 (building 521)	VOC emissions only.
	1.5 bhp offset lithographic printing operation (building 521)	VOC emissions only.

Table DR-36b
Existing Sources (constructed before 2005) at the Coalinga State Hospital and Pleasant Valley State Prison
(Continued)

Facility	Equipment	Emissions from SJVAPCD Permit
California State Prison – Coalinga (24863 W Jayne Ave, Coalinga, CA) (Continued)	1.5 bhp offset lithographic printing operation (building 521)	VOC emissions only.
	82.6 mmbtu/hr propane system calibration flare used to incinerate the propane/air mixture created during the venturi calibration procedure for the propane system to be used as a backup for the natural gas system	-
	1.5 bhp offset lithographic printing operation (building 521)	VOC emissions only.
California State Prison – Coalinga (24863 W Jayne Ave, Coalinga, CA) (Continued)	gasoline dispensing operation with one 10,000 gallon underground storage tank	VOC emissions only.
	5 bhp offset printing press (building 521)	VOC emissions only.
	wood products coating operation with HVLP	VOC emissions only.
	guns, roll coat, brush application equipment, a paint spray booth with dry exhaust filters and spray gun cleaner	VOC emissions only.
	woodworking operation including: one combo sander, one table saw, and one band saw	Negligible particulate emissions
	2.0 bhp offset lithographic printing	VOC emissions only.

San Joaquin Solar 1 & 2 Hybrid Project
Supplemental Information
In Response to CEC Data Request Set #1
08-AFC-12

TECHNICAL AREA: BIOLOGY

Data Request 37: Please provide a detailed report of the rare plant and BNLL surveys, including methodology, survey areas, results, and names/credentials of biologists involved in the field surveys. If surveys have not been conducted, please provide a status report and schedule for completion.

Response: The rare plant and BNLL surveys are ongoing at this time. The final of three rare plant survey visits will occur during the week of May 18, 2009. No rare plants have been detected at this time. Twelve adult BNLL surveys will occur along the transmission line route within non-agricultural lands during the months of May, June, and July, ending by July 15, 2009. Five juvenile BNLL surveys will be completed between August 1 and September 15, 2009. A report will be provided in October after completion of the BNLL surveys. If any special-status species are detected the location will be reported to CEC and CDFG.

Data Request 38: Please provide copies of California Natural Diversity Database (CNDDB) field survey forms for any special-status species, including the BNLL, observed at the California Department of Fish and Game (CDFG) Pleasant Valley Ecological Reserve in June 2008. These should also be submitted to CDFG for incorporation into the CNDDB.

Response: A field survey form was provided to CNDDB on May 6, 2009. A copy of this form is attached (next page).

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/29/2008

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Gambelia sila*

Common Name: Blunt-nosed leopard lizard

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☐ yes ☑ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☑ no ☐ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Theresa Miller, URS Corporation
Address: 1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108
E-mail Address: theresa_miller@urscorp.com
Phone: (619) 294-9400

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
1				

☑ breeding ☐ wintering ☐ burrow site ☐ rookery ☐ nesting ☐ other

Location Description *(please attach map AND/OR fill out your choice of coordinates, below)*

County: Fresno Landowner / Mgr.: CDFG - Pleasant Valley Reserve
Quad Name: Guijarral Hills Elevation: 570 ft
T 21S R 16E Sec 2, SW ¼ of SW ¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin Rino
DATUM: **NAD27** ☐ **NAD83** ☑ **WGS84** ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☑ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 10S 0750900 4001344

Habitat Description *(plant communities, dominants, associates, substrates/soils, aspects/slope):*

The habitat is disturbed non-native grassland adjacent to row crops, non-native grasslands and grazed areas. Dominant vegetation within the area is comprised of non-native grasses such as red brome, soft chess, Mediterranean schismus, Russian thistle, mustards, and red-stem filaree. The site is flat.

Other rare taxa seen at THIS site on THIS date:
(separate form preferred)

Site Information

Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Row crops, non-native grasslands, other agriculture; Zapato Chino Creek is southwest of sighting

Visible disturbances: Grazing

Threats: Agriculture, development, grazing

Comments: This individual was only seen once during the 2008 adult survey season; no subsequent observations occurred.

Determination: *(check one or more, and fill in blanks)*
☑ Keyed (cite reference): Stebbins 2003
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☑
Habitat	☐	☐	☑
Diagnostic feature	☐	☐	☑

May we obtain duplicates at our expense? yes ☑ no ☐

Data Request 39: Please provide any supporting documents (letter or record of conversation) that result from communication with USFWS and CDFG regarding potential impacts to state and/or federally protected species. Communication should be focused on:

A. Permits required for the project (*i.e.,* Incidental Take Permits), the steps the applicant has taken, a description of the process (*i.e.,* Section 7 or Section 10), and the schedule for obtaining the permits.

B. Any measures likely to be included in the Incidental Take Permits, including offsite habitat compensation and the contacts for purchase of mitigation credits/acreage.

Response: All records of conversation that have occurred to date have been provided to CEC at this time, and will continue to be provided as they occur. CEC staff is also included in all email correspondence regarding Project related permits and mitigation.

Data Request 40: Please provide proposed transmission structure locations near Zapato-Chino Creek or an assurance that transmission structures would not be sited within 500-feet of the creek.

Response: The locations of the transmission line poles have not been determined yet.

Data Request 41: Please provide an analysis of the potential impacts to biological resources (direct impacts to vegetation and impacts from bioaccumulation of TACs) resulting from biomass emissions.

Response: Annual emissions were calculated for several Hazardous Air Pollutants and TACs that may occur at relatively high levels as a result of the SJS 1&2 Project. The air pollutants that showed potentially significant deposition values for general impacts within the Project area are shown below. Potential impacts from bioaccumulation near the Project site were researched and evaluated for acetaldehyde, ammonia, benzene, formaldehyde, lead, manganese, toluene, and naphthalene. Information regarding the hydrogen chloride, silica, sulfate and diesel particulate were not available; thus these compounds were not discussed. Based on the information that was available from the EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), and other sources direct impacts to vegetation and wildlife that would result from bioaccumulation of biomass emissions are not anticipated to be significant. This includes impacts from bioaccumulation within the nearby plants and soils, as well as food chain bioaccumulation, which are all expected to be less than significant as a result of this project.

Acetaldehyde – Acetaldehyde is an intermediate product of respiration in higher plants and occurs naturally in many foods, and the low bioconcentration values for acetaldehyde indicate that there is little potential for the bioaccumulation or bioconcentration of acetaldehyde in wildlife or plants (EPA 1994).

Ammonia - Ammonia is a naturally-occurring compound and a key intermediate in the nitrogen cycle. Since it is continually recycled in the environment, bioaccumulation does not occur. Because ammonia is the main nutrient that is essential for many plants, uptake of soil ammonia by living plants is an important process (ATSDR 1999).

Benzene - Benzene accumulates in leaves and fruits of plants, but has a low to moderate bioaccumulation potential. In California, motor vehicle exhaust accounts for more than 70% of benzene exposure (ATSDR 1999).

Formaldehyde - No evidence of bioaccumulation of formaldehyde has been found. Because formaldehyde is rapidly metabolized (Casanova et al. 1988), bioaccumulation is not expected to be important (ATSDR 1999).

Lead - Lead adversely affects survival, growth, reproduction, development, and metabolism of most species under controlled conditions, but its effects are highly variable. Food chain biomagnification of lead is negligible, and younger, immature organisms are most susceptible. Uptake of lead by terrestrial plants is limited by the low bioavailability of lead from soils and adverse effects seem to occur at very high concentrations of lead to soil ratios (Eisler 1988).

Manganese - Lower organisms (e.g., plankton, aquatic plants, and some fish) can significantly bioconcentrate manganese, higher organisms (including humans) tend to maintain manganese homeostasis (EPA 1984; Folsom et al. 1963; Thompson et al. 1972). This indicates that there is a low potential for biomagnification or bioaccumulation of manganese from lower trophic levels to higher trophic levels (ATSDR 1999).

Toluene - Since retention time of toluene is usually considered to be less than 24 hours, bioaccumulation of toluene is unlikely (EPA, 1990). Bioaccumulation in most organisms is limited by the metabolism of toluene into more polar compounds that have greater water solubility and a lower affinity for lipids. Bioaccumulation in the food chain is predicted to be low (EPA 1994).

Napthalene - Naphthalene is often readily degraded in the environment and is easily metabolized by a wide variety of organisms. Studies indicate that although naphthalene may bioconcentrate to a moderate degree for brief periods, it will not significantly bioaccumulate in organisms (ATSDR 1999).

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for Formaldehyde. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Eisler, R. 1988. Lead hazards to fish, wildlife, and invertebrates: a synoptic review. U.S. Fish Wildl. Serv. Biol. Rep. 85(1.14).

EPA 1994. EPA Pollution Prevention and Toxics website. http://www.epa.gov/chemfact/f_acetal.txt. Updated October 2006. Accessed 6/25/09

Hazardous Air Pollutant Emissions from The SJS 1&2 Project

Pollutants	Sources of Emissions	Total Annual HAP Emissions All Sources (ton/yr)
Acetaldehyde	Biomass combustors, natural gas burners	0.55
Ammonia	Biomass combustors	12.35
Benzene	Biomass combustors, natural gas burners	0.63
Formaldehyde	Biomass combustors, natural gas burners	4.71
Hydrogen Chloride	Biomass combustors	18.66
Lead	Biomass combustors, fly ash fugitives	1.97E-02
Manganese	Biomass combustors, fly ash fugitives	1.77
Silica	Cooling towers	1.09E-01
Sulfate	Cooling towers	3.21E+00
Toluene	Biomass combustors, natural gas burners	0.10
Diesel Particulate (PM10)	Emergency generators, fire pumps, biomass mover, delivery trucks, cleaning vehicles	0.13
Polycyclic Aromatic Hydrocarbons (PAHs)		
Naphthalene	Biomass combustors, natural gas burners	1.15E+00

Data Request 42: Please identify any groundwater-dependent plant species or sensitive plant communities in the Pleasant Valley Groundwater Sub-basin.

Response: No plants that are dependent upon groundwater lower than 200 feet below the surface were identified on the SJS 1&2 Project site or within 2,000 feet of the boundary. Also, none have been identified within the Pleasant Valley Groundwater Sub-basin.

Data Request 43: Should such species or plant communities be identified, please provide an analysis of potential impacts and mitigation options for biological resources resulting from groundwater usage in the Pleasant Valley Groundwater Sub-basin.

Response: Groundwater levels vary depending upon the amount of overall pumping and recharge in the groundwater basin. At the time of the SJS 1&2 onsite well testing in February 2009, groundwater depths on and near the site were approximately 321-327 feet below ground surface. With the anticipated pumping rate (680 gpm) for the project, there would be only 10 feet of drawdown within 2,000 feet of the existing onsite well location (southwestern corner of the site). This decrease in water level would cause less than significant impacts to sensitive plants or plant communities in the vicinity of the Project area.

Data Request 44: Please provide proposed evaporation pond design specifications, including but not limited to, number of ponds, surface area, minimum and maximum operational capacity depth, expected maximum depth, and slope of banks.

Response: The proposed evaporation pond design is not yet finalized. The following evaporation pond sizing is based upon a recently revised water treatment system, that reduces the amount of wastewater effluent to the pond to 15 gpm (average annual) at approximately 1,850 ppm TDS. This results in a pond size of approximately 6 to 7 acres assuming an average evaporation rate of 4 feet per year (typical average for Coalinga area). Operational capacity depth would be approximately 6 to 8 feet, with a maximum depth of approximately 10 feet and 2 to 1 (2 horizontal to 1 vertical) or steeper side slopes.

Data Request 45: Please provide an assessment of alternatives to the use of evaporation pond(s) (e.g., zero liquid discharge system).

Response: See response to Data Request 111.

Data Request 46: Please provide specific design, construction, and operation elements that would discourage wildlife use.

Response: Design measures to discourage wildlife use of the evaporation pond include a minimum water depth of 2 feet, construction of the slopes as steep as practicable, and vegetation control surrounding the evaporation pond.

During operation of the Project, trace element concentrations (i.e., selenium, arsenic, and sodium) of the evaporation pond water will be monitored quarterly to determine if there is a concern regarding toxicity effects on wildlife as a result of access to the pond water. If toxicity effects on wildlife become apparent, the evaporation pond will be covered to minimize wildlife access. The cover will be designed to minimize attraction of predator and scavenger species. Wildlife access could also be prevented by constructing perimeter fences and installing wire mesh screens 10 feet above and over the ponds. Specific design implements regarding wire mesh size and fencing design, if needed, would ensure that implementation of these exclusion methods would be successful and that smaller wildlife would not be trapped by the pond covers, and that waterfowl would not be more susceptible to predation. To minimize the potential for destruction of waterbird nests, if present, maintenance activity schedules will be adjusted based on seasonal patterns as well as direct field observations of waterbird nesting.

Data Request 47: Please provide an analysis of impacts to biological resources, including the resident and migratory species that could be at risk.

Response: Impacts to biological resources from evaporation ponds are considered to be significant if they individually or collectively increase mortality, reduce growth or physical condition, result in reproductive impairment, or cause post-hatch juvenile mortality (Evaporation Ponds Technical Committee, 1999).

Evaporation ponds can become an attractive nuisance with a potential for increased mortality risk to bird species. While not common, migratory ducks in North Dakota, Texas, and California have been reported to suffer from salt toxicosis after ingesting water from highly saline lakes or other water sources (**Windingstad** et. al. 1986, Gordus et al. 2002, **Stolley and Meteyer 2004**). Evaporation ponds in arid climates can become highly saline as the water evaporates and could cause salt toxicity if certain bird species (waterfowl) are allowed to access the ponds and drink the water. Waterfowl are not common in the immediate SJS 1&2 project vicinity; however, a variety of waterfowl and shorebirds may seasonally utilize evaporation ponds as resting, foraging, and nesting areas. It is not likely that most resident or migrant birds and other small wildlife species would ingest large amounts of highly saline water or water with high concentrations of selenium from the evaporation pond because the majority of these species obtain their water from their food. Therefore, wildlife impacts from evaporation ponds may occur but are not expected to be significant.

Wildlife species inhabiting areas adjacent to evaporation ponds may be susceptible to potential indirect effects from the uptake and bioaccumulation of selenium from evaporation ponds**,** including lizards, snakes, rabbits, kit fox, kangaroo rats, raccoons, skunks, owls, hawks, falcons, and golden eagles. Bird species such as raptors have been observed foraging on insects at evaporation basins and ponds. Predation by wildlife species on prey having selenium and other constituent accumulations also provides a trophic pathway for exposure of these wildlife species. Wildlife species are not likely to drink water from evaporation ponds due to the salty taste of the water. Larger seed-eating birds such as doves would be most at risk since they typically require a source of free water. Although selenium is the main issue, salts and boron levels in the evaporation ponds are also important. Site- and species-specific factors, including spatial and temporal variabilities, affect the levels of potential risk to wildlife. Many other uncertainties exist in evaluating potential biological risks of selenium in ponds, including post-hatch juvenile mortality, the form of selenium in the pond system, sub-lethal exposure effects, and short-term exposure on migratory birds.

A list of wildlife species potentially at risk of being impacted by the evaporation pond at the SJS 1&2 Project Site is provided below and is a subset from the list included in the *Wildlife Species Observed within the San Joaquin Solar 1&2 Site and Transmission Line Alignment* table in the Biological Resources Technical Report (URS 2008). In addition, a 10-mile radius query of the California Natural Diversity Data Base (CNDDB) revealed that several sensitive species historically occur within the Project vicinity that may be affected by the presence of the evaporation pond; however, impacts to special-status wildlife from the evaporation pond are not expected to be significant.

Aquila chrysaetos (CSSC)	golden eagle
Bubo virginianus	great-horned owl
Buteo jamaicensis	red-tailed hawk
Eremophila alpestris (CSSC)	horned lark
Falco sparverius	American kestrel
Lanius ludovicianus (CSSC)	loggerhead shrike
Tyto alba	barn owl
Canus latrans	coyote
Lepus californicus	black tailed jackrabbit
Lynx rufus	bobcat
Mustela frenata	long-tailed weasel
Spermophilus beecheyi	California ground squirrel
Sylvilagus audubonii	cottontail rabbit
Taxidea taxus (CSSC)	American badger
Mustela frenata latirostris	long-tailed weasel

CSSC = California Species of Special Concern

References:

Evaporation Ponds Technical Committee, The San Joaquin Valley Drainage/Implementation Program and The University of California Salinity/Drainage Program. 1999. Task 4 Final Report: Technical Committee on Evaporation Ponds for San Joaquin Valley Drainage Implementation Program. February 2, 1999. 79pp.

Data Request 48: Please develop and provide a draft monitoring/remediation action plan for the evaporation pond(s), including:
A. A discussion of the frequency and nature of the monitoring;
B. The elements that will be monitored (e.g., selenium, sodium);
C. Remedial actions if the ponds become a hazard for wildlife; and
D. The triggers for implementation of remedial actions.

Response: The following is a draft monitoring/remediation plan:

During operation of the Project, trace element concentrations (i.e., selenium, arsenic, boron, and sodium) of the evaporation pond water will be monitored quarterly.

a.) Should the water contain substantial concentrations of trace elements, such as selenium or arsenic, a detailed initial monitoring program of the evaporation pond water will be designed and implemented (Bradford et al. 1991). It would be necessary to characterize water trace element content initially and monitor the pond water quarterly for threshold levels of trace elements that may be harmful to wildlife (i.e., selenium, arsenic, and sodium).

b.) Trace elements that have the potential to harm wildlife and that will be monitored include selenium, arsenic, boron, and sodium.

c.) Remedial actions that could be taken if the ponds become a hazard for wildlife include frequent decanting of the pond water to increase the percent solids and reclaim some of the water, and/or covering the evaporation pond to minimize wildlife access. The cover would be designed to minimize attraction of predator and scavenger species. Wildlife access could also be prevented by constructing perimeter fences and installing wire mesh screens 10 feet above and over the ponds. The mesh screens would be designed ensure successful exclusion of wildlife, with focus on preventing smaller wildlife from being trapped by the pond covers and waterfowl from becoming more susceptible to predation.

d.) Events that might trigger implementation of the aforementioned remedial actions include results of the quarterly monitoring of the pond water that suggest a high concentration of harmful trace elements or detection of wildlife mortality directly linked to the pond water.

References:

Bradford, D.F., L.A. Smith, D.S. Drezner, and J.D. Shoemaker. 1991. Minimizing contamination hazards to waterbirds using agricultural drainage evaporation ponds. Environmental Management 15 (6): 785-795.

Gordus, A.G., H.L. Shivaprasad, and P.K. Swift. 2002 Salt toxicosis in ruddy ducks that winter on an agricultural evaporation basin in California Journal of Wildlife Diseases, 38(1): 124-131.

Stolley, D.S. and C.U. Meteyer. 2004. Peracute Sodium Toxicity in Free-ranging Black-bellied Whistling Duck Ducklings. Journal of Wildlife Diseases, 40(3): 571-574.

Windingstad, R.M., F.X. Kartch, R.K. Stroud, and M.R. Smith. 1987. Salt Toxicosis in Waterfowl in North Dakota. Journal of Wildlife Diseases, 23(3):443-446.

Data Request 49: Please provide a map depicting the proposed natural gas pipeline and water supply pipelines with an overlay of vegetation communities, potentially jurisdictional waters and wetlands, sensitive species locations, and CDFG Pleasant Valley Ecological Reserve boundaries.

Response: Please see Figure DR-49, attached.

Data Request 50: Please describe the baseline environment with regard to biological resources, including special-status and common species as well as vegetation communities and sensitive habitats present and/or potentially occurring along the pipeline routes.

Response: The pipeline route traverses along a gravel agricultural access road (West Firestone Avenue) that starts at the wastewater plant location on Alpine Avenue and continues east to the southwestern corner of the SJS 1&2 Project site. The existing habitat within 90 feet of the alignment is comprised of actively cultivated row crops and orchards. This land use continues throughout the length of the proposed pipeline route. No sensitive habitats or special-status species were detected along the pipeline route.

A non-jurisdictional, artificial detention basin that is used for the adjacent agriculture is located along the south side of Firestone Avenue within the 90-foot buffer of the alignment. The ditch begins approximately 0.4 mile west of the southeastern corner of the SJS 1&2 Project site and continues west for approximately 0.3 mile. Mulefat (*Baccharis salicifolia*) and salt cedar (*Tamarix* sp.) are present on the banks at the eastern and western ends of the basin, with a small area of curly dock (*Rumex crispus*) in the central portion of the basin. The remainder of the basin supports upland species. There is no downstream connection to the creek to the west; therefore, it was determined to be non-jurisdictional artificial ditch in uplands. Two great horned owls were detected in the ditch during the survey.

At the southern boundary of the Pleasant Valley State Prison along the proposed water line, a pipe was being installed that crosses the road in a perpendicular direction. At this location, there is another agricultural drainage located further than 90 feet south of the proposed alignment that supports salt cedar and mulefat. The waterline is also not expected to impact this ditch in uplands.

OVERVIEW MAP

LEGEND

Vegetation

- Orchards/row crops
- 90-foot Pipeline buffer
- Pleasant Valley Ecological Reserve
- San Joaquin Solar 1 & 2
- Proposed Waste Water Pipeline
- City of Coalinga Waste Water Treatment Facility

W Phelps Ave

S Calavaras Ave

W Jayne Ave

S Alpine Ave

W Jayne Ave

S El Dor

San Joaquin Solar 1 & 2

W Firestone Ave

S Sutter Ave

W Cohn Ave

Alpine Ave

SOURCES:
USDA FSA Aerial Photography Field Office (aerial 2005); CNDDB (Mar. 2008); ESRI (roads).

VEGETATION MAP
PROPOSED WASTE WATER PIPELINE ROUTE
SAN JOAQUIN SOLAR 1 & 2

URS

1000 0 1000 2000 Feet

SCALE: 1" = 2000' (1:24,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 7-7-09	FIG. NO: DR-49
PM: AR	PROJ. NO: 27658031	

Path: G:\gis\projects\15777\27658031\mxd\Data_Requests\FigDR_58_WWpipeline_veg_map.mxd, 07/07/09, colin_mattison

Data Request 51: Please provide a discussion of direct, indirect, and cumulative impacts to biological resources from construction, operation, and maintenance of the pipelines. Include a discussion of temporary impacts to San Joaquin kit fox habitat and resultant mitigation as well as where habitat credits would be purchased.

Response: Loss of San Joaquin kit fox habitat is not expected from installation of the pipeline because the pipeline is located along an existing 25-foot wide gravel road surrounded by actively cultivated agriculture fields and orchards. No dens or other sign of kit fox were detected within 180 feet of this road in the area of potential impact; therefore, direct removal of denning or foraging habitat is not anticipated. It is likely that kit fox use the existing road and agricultural lands as pass-through habitat. Temporary and indirect impacts to kit fox may occur from noise, dust, and construction-related traffic during construction of the pipeline. Standard kit fox BMPs will be required during construction of the waterline that will mitigate these impacts.

Data Request 52: If any pipeline routes are proposed through Zapato-Chino Creek, please contact CDFG and RWQCB and provide a summary of their suggested impact avoidance and minimization measures and other mitigation measures.

Response: The water line will not pass through Zapato-Chino Creek; therefore, no impacts will occur to the creek.

San Joaquin Solar 1 & 2 Hybrid Project
Supplemental Information
In Response to CEC Data Request Set #1
08-AFC-12

TECHNICAL AREA: CULTURAL

Data Request 53: Please provide the depths of the excavations required for the following features and foundations for proposed equipment

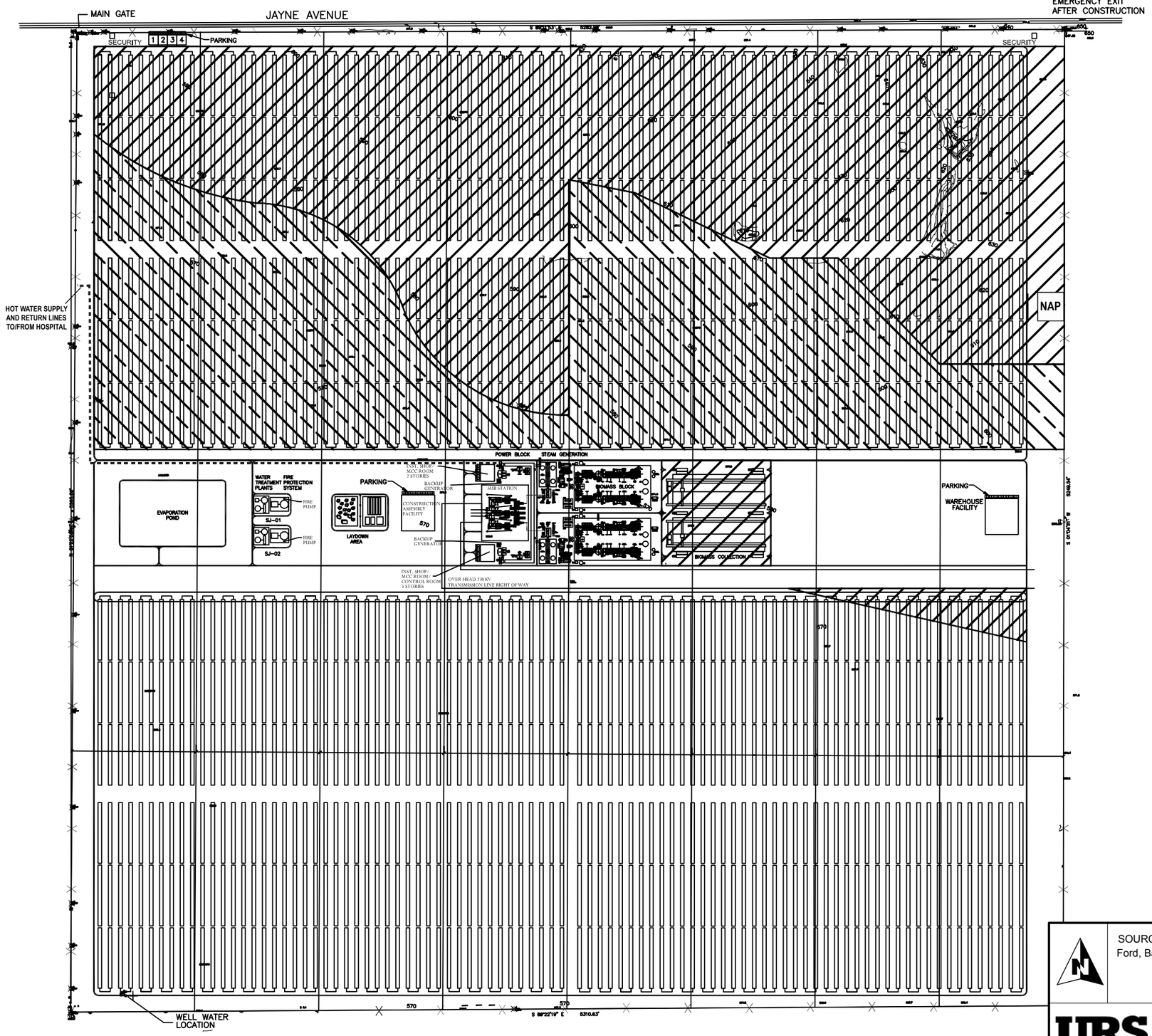
Response:

A.	biomass combuster and boiler trains	3.0 Ft.
B.	stream turbine generators	8.0 Ft.
C.	air cooling units	2.0 Ft.
D.	transformers	2.0 Ft.
E.	water treatment piping system	4.0 Ft. *
F.	service water piping system	4.0 Ft. *
G.	fire protection piping system	6.0 Ft.
H.	potable water piping system	4.0 Ft. *
I.	water treatment buildings	2.0 Ft.
J.	treated reclaimed water tank	2.0 Ft.
K.	raw reclaimed water tank	2.0 Ft.
L.	raw well water and fire water tank	2.0 Ft.
M.	demineralized water tanks (4)	2.0 Ft.
N.	potable water tanks (2)	2.0 Ft.
O.	ammonia storage tanks (4)	3.0 Ft.
P.	construction assembly building	2.0 Ft.
Q.	warehouses	2.0 Ft.
R.	biomass unloading buildings	3.0 Ft.
S.	control buildings	2.0 Ft.
T.	solar collector assemblies	6.0 Ft.
U.	stormwater evaporation pond	10.0 Ft. - 12 Ft
V.	stormwater drainage collection system (infiltration basins)	10.0 Ft. - 12 Ft
W.	poles for the on-site 230-kV overhead transmission line	22.0 Ft.
X.	poles for the off-site 230-kV overhead interconnection to the Gates Substation	22.0 Ft.
Y.	off-site reclaimed water pipeline between the plant and the City of Coalinga's future Waste Water Treatment Facility	6.0 Ft.
Z.	off-site steam pipeline between SJS 1 and Coalinga State Hospital	6.0 Ft.

* If buried.

Data Request 54: Please provide a project site plan showing the locations where excavation would exceed three feet below the surface by shading or other such convention.

Response: Please see the attached figure (next page), which details the locations where excavation activities would exceed three feet below the surface.



LEGEND

BUILDING 1– VISITOR'S CENTER
BUILDING 2– GENERAL OFFICES
BUILDING 3– ADMINISTRATIVE OFFICES
BUILDING 4– TECHNICAL TRAINING BUILDING

FENCE LINE

UTILITY ROAD

NAP — NOT PART OF THIS PROJECT

WELL WATER/ DIESEL ENGINE LOCATION

DIESEL FUEL TANK LOCATION

GREATER THAN 3'–0" CUT

GREATER THAN 3'–0" FILL

SOURCES:
Ford, Bacon, & Davis; 10/24/2008.

PRELIMINARY CUT AND FILL PLAN
SAN JOAQUIN SOLAR 1 & 2

URS

Not to Scale

CREATED BY: JS | DATE: 5-29-09

PM: AR | PROJ. NO: 27658033.00200

FIG. NO: **DR-54**

G:\gis\projects\157\27658031\support\Data_Requests_0509\AllFigDR-54_Cut_Fill_Plan

San Joaquin Solar 1 & 2 Hybrid Project
Supplemental Information
In Response to CEC Data Request Set #1
08-AFC-12

Data Request 55: Please identify the structures in the described location as to function, age, and potential status as historical resources.

Response: The "large, elongated white structures" which appear in the Google Earth imagery are loosely stacked piles of irrigation pipe, which are presently stockpiled in the southwest portion of the southeast corner of the proposed plant site. This stockpile area is used for temporary outdoor storage for some of the irrigation equipment that is used in the nearby fields and farms. The pipes are metal, cylindrical, approximately twenty-feet long, and feature approximately six- to eighteen-inch diameter openings. In addition to the irrigation pipes, there are four cylindrical storage tanks, used primarily for fertilizer storage. The storage tanks sit on graded earth, and do not rest on a foundation, piers, or other type of substructure. Photographs of this area, as it appeared in May 2009, are presented below.

The actual tanks and pipes in the stockpile area to do not appear to be from the historic-period. They appear to be less than 45 years old. They are examples of common, mundane agricultural equipment from the late 20th century which are present throughout agricultural and rural properties in the west and United States. Of note, a review of historic-period aerial photographs from 1957, 1965, 1981, 2002, and 2005 indicates that the southwest portion of the southeast corner of the proposed plant site has not been used consistently for stockpile purposes. Based on these photographs, it appears the stockpiling activities are recent, and that this portion of the proposed plant site has been historically vacant. Beginning in the 1950s, none of the photographs depict similar concentrations or clusters of agricultural or irrigation equipment in this portion of the proposed plant site.

The pipes and storage tanks do not appear to be CRHR- or Fresno County List of Historic Places-eligible or considered historical resources for purposes of CEQA. The pipes and storage tanks do not appear to be visible in the 1965 aerial photograph and, accordingly, are less than 45 years old and do not meet the general age requirements for eligibility. As a property that is less than 50 years old, to be a significant historical resource, the pipes and storage tanks would have to possess *exceptional importance* (per NRHP Criterion Consideration G). However, they are not considered exceptional, since they are not representative of a fragile resource type (where surviving property of any age is unusual) or associated with an extraordinary important event or person. According to the Caltrans and JRP statewide historic context *Water Conveyance Systems in California*, irrigation agriculture has existed in the San Joaquin Valley since the 1860s (peaking between the 1870s and the 1910s). Therefore, irrigation and agricultural activities from the last half of the 20th century would not be representative or associated with these locally significant developments.

View to the North

View to the West

PHOTOS OF STRUCTURES IN SE CORNER OF PROJECT SITE

URS	NO SCALE	CREATED BY: JH	DATE: 05-28-09
		PM: AR	PROJ. NO: 27658033.00200

FIG. NO: DR-55

Data Request 56: Please provide copies of any letters received from Fresno County, or from local historical and archaeological societies, or from contacted Native Americans in response to the applicant's inquiries about local cultural resources.

Response:

As part of preparation of the AFC and technical report, URS Corporation Architectural Historian, Mr. Jeremy Hollins contacted the County of Fresno Public Works and Planning Departments and Fresno Historical Society on July 3, 2008 and October 27, 2008 to identify cultural resources within a 1-mile radius around the Project footprint and for a ¼-mile on either side of the transmission line corridors, pursuant to ordinance or recognized by a local historical society or museum. To date, no written responses have been received from the local agency and historical society. Copies of correspondence with the local agency and historical society were included in Confidential Appendix G-3, Cultural Resources.

Additionally, on October 30, 2008, Mr. Bill Morris, of the RC Baker Memorial Museum in Coalinga, visited two of the historic-period properties (MRS-7, MRS-9) with URS Corporation Architectural Historian, Mr. Brian Shaw. Mr. Morris previously worked in the Fresno County oil fields for more than 30 years, and potentially had insight regarding the history and development of APE environs. While Mr. Morris provided insight regarding the operations of the area, he did not identify cultural resources recognized by the RC Baker Memorial Museum. He sent a brief undated memorandum to URS Corporation, which was received on December 10, 2008, that explained the purpose and function of a Trap Setting associated with MRS-9. A copy of the memorandum is presented below.

Lastly, The Native American Heritage Commission (NAHC) was contacted on May 8, 2008 to request 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 Area. A list of Native American contacts that may have knowledge of known cultural resources or sacred sites within the Project Area was also requested. The NAHC responded on May 12, 2008 and indicated a records search of the SLF failed to indicate the presence of Native American cultural resources in the immediate Project Area. Each Native American contact on the list was sent a notification of the proposed undertaking by mail on June 17, 2008, with a request that they respond with information regarding any known cultural resources or sacred sites within the Project Area. Follow-up phone calls were made on June 30 and July 2, 2008. To date, no written responses have been received regarding the Project.

Data Request 57: Please provide a copy of the project's geotechnical study when it is available.

Response: A copy of the project's geotechnical study is presented in the Cultural Appendix.

Bill, here are those pictures. Hopefully you can see them.
R.C. Baker Museum
Coalinga, Ca.

The photos are the Poluadero Unit trap setting. This is where the liquid and gas come from each well and is separated in the large vessels. The Oil and water go out the bottom the gas out the top. the gas was sent to the compressor plant where it was pressured up and pumped back into the wells. (Compressor Plant was east of Traps) the liquid was sent to a wash Tank where the water went off the bottom and the oil off the top. the compressor plant was shut down in 1969. The last well 5-51H stopped producting in 2002 I think.

Bill Morris

Union Oil operated Field from 1955 until 1996.

Data Request 58: Please provide a map showing the detailed routes of the reclaimed water pipeline to the water treatment facility and of the steam pipeline to the hospital, including the routes within the plant boundaries and the site plan.

Response: Please see attached figure (next page), which details the routes of the reclaimed water pipeline to the water treatment facility and the steam pipeline to the hospital, including the routes within the plant boundaries and the site plan.

Data Request 59: If the reclaimed water pipeline route and the steam pipeline route have not been surveyed for cultural resources, please have a qualified archaeologist survey these routes and record on Department of Parks and Recreation (DPR) 523 forms any cultural resources that are identified.

REVISED Response: As part of preparation of the AFC and technical report, the route of the water and steam pipelines within the proposed plant site boundaries were surveyed for cultural resources and reported in accordance with the CEC Rules of Practice and Procedure and Power Plant Site Regulations Revisions, Appendix B (g)(2). The route of the reclaimed water pipeline was surveyed on June 15, 2009. A supplemental records search was conducted prior to survey. No cultural resources greater than 45 years of age were identified. Therefore, no Department of Parks and Recreation (DPR) 523 forms were completed.

Data Request 60: Please submit to staff a report, under confidential cover, on the methods and results of these surveys, with recommendations for the treatment of any cultural resources identified in the surveys, and copies of any completed DPR 523 forms.

REVISED Response: A letter report presenting results of the June 15, 2009 cultural resources survey of the proposed reclaimed water pipeline is submitted under confidential cover. Where appropriate, the letter report references the previously completed *Cultural Resources Assessment Report for the San Joaquin Solar Hybrid Power Station, Fresno County, California* (Glenn and Hollins 2008). Given that no cultural resources were discovered greater than 45 years in age, no DPR-523 forms were completed and no recommendations for treatment were provided aside from precautionary statements should previously unidentified cultural resources be discovered during ground disturbing activities.

OVERVIEW MAP

LEGEND

- San Joaquin Solar 1 & 2
- City of Coalinga Waste Water Treatment Facility
- Proposed Waste Water Pipeline

W Jayne Ave

S Alpine Ave

W Firestone Ave

W Jayne Ave

San Joaquin Solar 1 & 2

S El Dorado Ave

S Sutter Ave

W Cohn Ave

Alpine Ave

W Lost Hills Rd

SOURCES:
USDA FSA Aerial Photography Field Office (aerial 2005); CNDDB (Mar. 2008); ESRI (roads).

PROPOSED WASTE WATER PIPELINE ROUTE
SAN JOAQUIN SOLAR 1 & 2

URS

1000 0 1000 2000 Feet

SCALE: 1" = 2000' (1:24,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: JS	DATE: 5-29-09	FIG. NO: DR-58
PM: AR	PROJ. NO: 27658031	

Path: G:\gis\projects\15777\27658031\mxd\Data_Requests\FigDR_58_WWpipeline.mxd, 06/01/09, jason_sokol

Data Request 61: Please describe the process that is proposed for constructing the underground transmission line under I-5, with an emphasis on ground disturbance and provide the horizontal and vertical dimensions of the disturbed area.

Response: There would be no tunneling or ground disturbance associated with constructing the transmission line near Interstate-5. The transmission line would be constructed using "aerial freeway crossing," which means that the transmission line will be suspended above the ground, and no tunneling would be required for the area near Interstate-5.

Data Request 62: Please provide a scaled plan figure and a scaled profile figure that shows the area that would be subject to ground disturbance from the construction of the underground transmission line.

Response: There would be no ground disturbance associated with the construction of the transmission line and, therefore, a scaled figure and profile were not prepared.

Data Request 63: Please clarify whether the cultural resources survey already completed in support of the AFC covered the entire area that the transmission line tunneling would affect. If it did not, please have a qualified archaeologist survey the additional area and record on Department of Parks and Recreation (DPR) 523 forms any cultural resources that are identified; and

Response: The cultural resources surveys completed as part of the AFC and technical report included all areas that may involve any type of ground disturbance associated with the transmission lines (e.g., pole locations). As detailed in Section 1.1 of *Cultural Resources Assessment Report for the San Joaquin Solar Hybrid Power Station, Fresno County, California*, the cultural resources surveys for the two transmission line corridors (i.e., the northern and southern route) had an archaeological area of potential effect (or survey area) that extended 50' on either side of the 100' wide transmission line corridor right-of-way. Therefore, the archaeological survey areas for the transmission line corridors encompassed an area 200' feet wide, which included all areas that may involve any type of ground disturbance associated with the transmission lines.

Data Request 64: Please submit to staff a report, under confidential cover, on the methods and results of this additional survey, with recommendations for the treatment of any cultural resources identified in the survey, and copies of any completed DPR 523 forms.

Response: The cultural resources surveys completed as part of the AFC and technical report included all areas that may involve any type of ground disturbance associated with the transmission lines and, accordingly, additional surveys did not occur.

Data Request 65: Please indicate whether the proposed project may use any non-licensed, non-commercial soil borrow or disposal sites.

Response: There would be no non-licensed, non-commercial soil borrow or disposal sites used as part of the project. The soil used for cut and fill activities will be balanced, and no soil borrow or disposal sites will be required.

Data Request 66: Please obtain the services of a professional in geoarchaeology: a person who, at a minimum, meets the U.S. Secretary of the Interior's Professional Qualifications Standards for archaeology and is able to demonstrate the completion of graduate-level coursework in geoarchaeology or Quaternary science, or has a level of experience that staff determines is equivalent. Please submit the resume of the proposed geoarchaeologist for staff review and approval.

Response: Mr. Jay Rehor (M.A., RPA) researched and conducted the geoarchaeological analysis for the project. Mr. Rehor's resume was previously included as part of Appendix G-1 of the *Cultural Resources Assessment Report for the San Joaquin Solar Hybrid Power Station, Fresno County, California*. Additionally, Mr. Rehor was previously approved as a qualified geoarchaeologist by the CEC as part of the March 2009, CEC/BLM Data Requests for the Solar II Project.

Data Request 67: Please have the approved geoarchaeologist provide a discussion, based on the available Quaternary science and geoarchaeological literature, of the historical geomorphology of the proposed plant site and the tunneling location proposed for the undergrounding of the transmission line beneath I-5. The discussion should describe the development of the landforms on which the plant site and tunneling location are proposed, with a focus on the character of the depositional regime of each landform since the Late Pleistocene epoch. The discussion should include data on the geomorphology, sedimentology, pedology, hydrology, and stratigraphy of the plant site and tunneling location, and the near vicinity. The discussion should relate landform development to the potential at the plant site and the tunneling location for buried archaeological deposits. The discussion should include maps overlaying the above data on the plant site and tunneling location.

Response: Background and Purpose

The purpose of the following discussion is to identify those portions of the project area that have the potential for containing buried archaeological deposits with no surface manifestation. Although no archaeological resources were identified in the proposed project area during the cultural resources survey, given the subsurface impacts of the project (*i.e.*, foundations, utilities, etc.) and the depositional environment in which the project is located, there is a possibility of encountering subsurface deposits with archaeological sensitivity. The purpose of this geoarchaeological study is to assess that potential– and identify specific areas within the project area that have geoarchaeological sensitivity– based on the existing geological, geomorphological, and archaeological literature and data.

The problem of buried archaeological sites within the San Joaquin Valley and, more generally, the Central Valley as a whole, was recently adeptly summarized as such:

> [T]he Central Valley's archaeological record, as we know it today, is biased by natural processes of landscape evolution. Surface sites are embedded in young sediments set within a massive and dynamic alluvial basin, while most older archaeological deposits have been obliterated or buried by ongoing alluvial processes. Consequently archaeologists have had to struggle to identify and explain culture change in portions of the Central Valley where available evidence spans only the past 2,500 years or in rare cases 5,500 years. (Rosenthal, White, and Sutton 2007:150)

While the assumption that surface sites exist only in younger sediments is not necessarily accurate (as we will see) the general problem of site visibility, in a region that has been geomorphically dynamic over the past 13,500 years– roughly the period of human occupation in California– is highly relevant to the project area.

Geomorphic processes have played a major role in the differential preservation of archaeological sites in the San Joaquin Valley. Paleo-Indian sites (ca. 13,500 – 10,500 before present [B.P.]) and Lower Archaic sites (ca. 10,500 – 7,500 B.P.) are extremely rare throughout the Central Valley (including the more northerly Sacramento Valley). These early sites are typified by sparse lithic remains, often around the edges of late Pleistocene–early Holocene lakes, including nearby Tulare Lake. The end of each of these periods was marked by significant episodes of deposition (at ca. 11,000 and 7,500 B.P.) which covered and/or eroded the existing landforms (Rosenthal, White, and Sutton 2007). Studies throughout Northern California suggest that a period of relative landscape stability was followed by another episode of deposition ca. 2,500 B.P. However, there are also indications that late Holocene landscape changes tend to be more localized, dependent upon local variability in climate and precipitation, than the more regional depositional trends documented for the earlier Holocene and Pleistocene (Meyer and Rosenthal 2007:7-8). Geomorphic studies within the Coalinga area have documented this more localized timing of mid- to late-Holocene depositional events (Rymer and Elsworth 1990; Meyer and Rosenthal 2009); these studies are discussed below.

Geomorphic Setting

The San Joaquin Solar 1 & 2 project (Project) area is located on the western edge of the central San Joaquin Valley. The area is a transitional zone between the deep alluvial plain of the valley and the uplifted Coast Range. This geomorphic contact is a geologically and seismically active area. This activity has had a direct effect on surface geomorphology, deposition, and soils.

The San Joaquin Valley is a deep structural trough that was a large marine embayment (*i.e.*, open to the ocean) during much of its geologic history. The trough became progressively closed off during Pliocene times (ca. 5 MYA) due to uplift and movement along the San Andreas Fault zone, causing a transition from a marine to terrestrial depositional environment. This continued until the Pleistocene, when the valley was finally completely closed off from its outlet through Priest Valley (near Coalinga) and alluvial fan deposits (the Tulare Formation, see below) completed the infilling of the valley. Episodic alluvial sedimentation in the San Joaquin Valley throughout the Quaternary probably has been controlled more by climatic fluctuations than by tectonic activity, though both have played a role (Bartow 1990:7-9).

Tectonic influence on the landscape is evident even within the Project area. The Guijarral Hills, bounding the Project area to the northeast, represent the most southerly surface expression of the Coalinga Anticline (Figure 1) a large structural feature associated with faulting and folding along the eastern margin of the Coast Ranges. The Coalinga Anticline is oriented northwest-southeast, consisting of the larger Anticline Ridge and the Guijarral Hills to the south, where the anticline dips subsurface. The Guijarral Hills, as with other portions of the Coalinga Anticline and the Kettleman Hills Anticline, are part of the Tulare Formation. The formation has been described as Pliocene to Pleistocene (2 to 0.5 MYA) primarily terrestrial deposits over 1000 feet thick. The oldest portions of the formation are exposed along the ridge of the Kettleman Hills, with the more recent (*i.e.* Pleistocene) unconsolidated deposits flanking the western and eastern edges of the hills.

The Guijarral Hills are separated from the remainder of the Coalinga Anticline by Los Gatos Creek, which has incised and buried the structural feature with recent alluvium. Zapato Chino Creek passes over the anticline through Polvadero Gap, just southeast of the project area. These two intermittent watercourses join east of the anticline and their maximum combined floodwaters disperse on the valley floor near Huron (approximately 8 miles northeast of the Project area; USDA 1952).

The Coast Ranges flank the west side of the San Joaquin Valley, several miles west of the project area. They form a natural barrier to coastal moisture and winds, creating a rain shadow on the eastern side of the range that encompasses the current project area. Because of the arid nature of this portion of the Coast Range–Great Valley interface, only a handful of intermittent creeks drain the nearby slopes, including Zapato Chino (which crosses to the southeast of the project area) and Los Gatos (several miles north of the project area). These small intermittent drainages have apparently maintained a low but fluctuating discharge for much of the Late Pleistocene and Holocene, gradually building a series of large gently sloping alluvial fans (USDA 1952:3-5).

This semiarid to arid environment has had a direct effect on the formation of the local geomorphology as well as, likely, on the local archaeological record. Without a steady year-round water source, it is unlikely that any significant long-term settlements are present within the project area. If buried archaeological sites are present within the project vicinity, they will probably be representative of seasonal winter camps, when the vast majority of the annual average 6 inches of rainfall occurs (Rantz 1969). The pollen record from nearby Tulare Lake indicates several periods of cooler wetter climate, particularly during the early Holocene and again between 4,000–2,000 B.P. (Davis 1999). While more water would have been available throughout the southern San Joaquin Valley during these periods (as much as a 100% increase during the early Holocene; Davis 1999:255), the rain shadow effect would still have minimized the suitability of the Project area for year-round habitation.

Throughout the late Pleistocene and Holocene, several large lakes occupied the southern San Joaquin Valley. The largest of these lakes was Tulare Lake. The Tulare Basin is dammed by the coalescent alluvial fans of the Kings River, draining the Sierra Nevada and feeding the basin, and Los Gatos Creek, draining the Coast Ranges and feeding the San Joaquin River aquifer (draining to the north into the Delta). The lake declined rapidly after 1850, when the Kings River (and other tributary streams) began to be diverted for irrigation. At its maximum historic extent, Tulare Lake covered an area of approximately 2,000 square kilometers and had a maximum depth of 10 meters (Davis 1999). The Holocene lakes (Tulare, Buena Vista, etc.) and their shorelines would have provided a rich and diversified ecosystem for prehistoric peoples. However, even at its maximal Holocene extent, Tulare Lake was over 20 km southeast of the current Project area and, thus, likely did not significantly influence permanent settlement directly within the Project area.

Project Area Soils and Geoarchaeology

Four dominant soil series are present in the proposed Project area and transmission line corridor: Kettleman, Lost Hills, Levis (Lethent), and Panoche (see Figure 1). The Kettleman series consists of moderately deep well drained

soils on hills and uplands, with very well-developed cambic (Bw) and calcic (Bk) horizons with distinct carbonate threads (Soil Survey Staff 2009). Within the Project vicinity, Kettleman soils are formed on the pedimented Coalinga (Guijarral Hills) and Kettleman Hills anticlines. These are actually soils developed in place on poorly consolidated, uplifted, and deformed terrestrial sediments of the Tulare Formation which date to the late Pleistocene and Pleiocene (ca. 0.5 to 2 million years old; Lettis 1982; Stein and King 1984). Given the erosional nature of the anticline pediment and the very old age of the Kettleman soils, there is no potential for buried archaeological deposits (without surface manifestation) within this portion of the Project area (Figure 1).
The Lost Hills soil series consist of soils developed on very old alluvial fan remnants (EPA 1946:24). Within the Project vicinity, these alluvial remnants are generally exposed along the eastern margin of the uplifted anticlines and the base of the Coast Ranges (to the west), and inset and/or mantled by younger alluvial fan deposits. The Lost Hills soils have been dated to the early to middle Pleistocene (Meyer and Rosenthal 2009, Meyer 2009). The age of the Lost Hill soil series indicates that there is no potential for buried archaeological deposits (without surface manifestation) within those portions of the Project area (Figure 1).

The Levis soil series renamed “Lethent” more recently– consists of very deep, moderately well drained soils on low-lying alluvial fans, fan remnants, basins and basin rims (Soil Survey Staff 2009). The soils are typified by well-developed calcic horizons with pedogenic clay, gypsum, and sodium accumulations (Btkny). Within the Project area, these soils are exposed on the western side of the Coalinga Anticline, at the base of the Guijarral Hills. Given the gradient of the anticline at nearby Los Gatos Creek (Figure 3) and, presumably, Zapato Chino Creek, Levis soils likely represent the pooling of fine alluvial sediments behind the anticline apex. Such a depositional environment would be ideal for burial of paleosols. Originally it was thought that these soils were similar in age to the Panhill soil series (see below; USDA 1952:20), however, Lethent/Levis soils have been recently dated within the Coalinga area to between approximately 14,000 and 13,500 years before present (*i.e.*, latest Pleistocene; Meyer and Rosenthal 2009, Meyer 2009). These dates are consistent and/or slightly older than the earliest accepted dates for human occupation of western North America and, as such, suggest that there is little to no potential for buried archaeological deposits (without surface manifestation) within those portions of the Project area (Figure 1).

The Panoche soil series– and related Panhill series– consists of very deep, well drained soils on recent alluvial fans and flood plains (Soil Survey Staff 2009). The soils are generally less well-developed than other soils in the project area, with a weak blocky structure and less well defined subsurface horizons. Within the Project area, these soils are found as fan and levee/overbank deposits within the Pleasant Valley Syncline (to the west) and as fan deposits to the east of the Coalinga Anticline. The contour lines on Figure 2 indicate that there may be a low natural levee formed along Zapato Chino Creek on the west side of the anticline; suggesting that surface sediments in this area are likely fine overbank deposits (silty clays and clay loams; Figure 2) that are conducive to the burial and preservation of paleosols. To the east of the anticline, sediments are deposited as a fan, merging with the much larger Los Gatos Creek Fan. There is a large meander in Zapato Chino Creek near the anticline apex. In this area,

there appears to be several small remnants of paleo-channels which have gotten in-filled to the west and covered by more recent Panoche series soils (Figures 1 and 2). These possible paleo-channel features would indicate that Zapato Chino Creek has migrated northward during the period of deposition of the sediments that Panoche soils are formed on. The Panoche series soils represent the youngest soils in the Project area, having been dated to less than 2000 years B.P. (Atwater *et al*., 1990, Meyer and Rosenthal 2009, Meyer 2009).

Areas mapped as Panoche soils along Los Gatos Creek, north of the Project area (Figures 1and 2), were studied in depth after the 1983 Coalinga Earthquake (Atwater *et al*., 1990). Multiple buried soils were identified in the stream cuts of Los Gatos Creek, some of which extend to over 10 meters below surface (Figure 3). Many of these buried surfaces were associated with a distinct red layer of burned sediments and charcoal which the authors attributed to both natural fires and those intentionally set by prehistoric people (Atwater *et al*., 1990:273-4). Over 70 ^{14}C dates were obtained from these charcoal deposits. Based on this extensive dating effort at least four major periods of geomorphic stability (with associated paleosols) were identified at approximately 1,000, 2,000, 2,500, and 5,750 cal. years B.P. (Atwater *et al*., 1990:292). Depending on the location along the stream gradient, these buried surfaces were found from 1 meter to over 10 meters below surface.

In addition to the buried surfaces, the authors identified at least two distinct buried cultural deposits in the bank of Los Gatos Creek, in areas mapped as Panoche surface soils. One chert flake was found in a burned silt lense, believed to be a hearth feature, approximately 2 meters below surface (see Figures 2 and 3; Atwater *et al.,* 1990:284-290). Approximately 700 meters east of this buried feature, a second larger buried cultural deposit was recorded at approximately 7 meters below surface. This burned layer contained midden consisting of numerous chert flakes, faunal bone fragments, and marine bivalve shells, dated to 5,300 cal. years B.P. (approximately 4,600 ^{14}C years B.P.). This cultural deposit likely represents an early Middle Archaic site, which is a very poorly represented period in the archaeological record of the Central Valley (Rosenthal, White, and Sutton 2007:153).

Given its smaller size and the lower sediment load carried by Zapato Chino Creek, it is likely that any paleosols buried below the Panoche soils near the Project area are separated by less sediment (*i.e.*, less depth) and/or fewer in number than those observed in the Los Gatos Creek cutbanks.

Interestingly, the one prehistoric archaeological site identified within the one-mile project search radius (P-10-80) sits on a small remnant area of Levis/Lethent alluvium (Figure 1). The site was recorded in 1950, and reported simply as a "habitation site," and apparently never studied or assigned to a period of occupation. While it is highly doubtful that the site is as old as the Levis deposit (*i.e.*, latest Pleistocene), it does indicate that sites are present on remnant landforms in the Project vicinity, and that they *may* be buried under the younger Panoche alluvium where it has mantled and preserved those older landsurfaces.

Table 1
Geoarchaeological Sensitivity of Major Soil Series
Mapped within the San Joaquin Solar Project Area

Mapped Soil Series	Geoarchaeological Sensitivity
Kettleman	None
Lost Hills	None
Levis	None to Very Low
Panoche/Panhill	Moderate to High (depending on proximity to watercourse)

Conclusions

The vast majority of the 640 acre section for the proposed San Joaquin Solar Project is composed of Kettleman and Levis alluvial sediments that are too old to contain buried archaeological materials. The exception is the Panoche series soils that have been mapped within the southeast quarter-section (Section 3, Township 21 South, Range 16 East). Within the Project vicinity, these soils have been consistently dated to younger than 2000 years B.P., with multiple buried paleosols documented at depth. Along Los Gatos Creek, north of the Project area, these buried soils appear to correspond to at least four major periods of geomorphic stability at approximately 1,000, 2,000, 2,500, and 5,750 cal. years B.P. (Atwater *et al*., 1990:292). Depth to paleosols varied across the stream gradient between 1 and 10 meters below surface. It is likely that depth to these paleosols (if present) in the project area will be slightly less, given the smaller sediment load of Zapato Chino Creek. Based on current Project plans (see Data Responses 53 and 54), it appears that the only planned facilities within the area mapped as Panoche soils are the Solar Collector Assemblies. As such, the chance of encountering buried soils and associated archaeological deposits within this southeast quarter of the Project area is reduced by the fact that associated impacts will not exceed 6 feet below surface (approximately 1.8 meters).

With regards to the transmission line options, impacts greater than one meter appear to be limited to the auguring/excavation of post holes for the overhead transmission poles (see Data Responses 53 and 54) which will be set up to 22 feet below surface (approximately 6.7 meters). While the proposed depth is significant enough to potentially encounter multiple paleosols, the relatively small size of each hole reduces the chance of encountering cultural deposits (compared to, for example, a continuous trench for underground utilities).

References

Atwater, B.F., D.A. Trumm, J.C. Tinsley III, R.S. Stein, A.B. Tucker, D.J. Donahue, A.J.T. Jull, and L.A. Payen
1990 Alluvial Plains and Earthquake Recurrence at the Coalinga Anticline. In *The Coalinga Earthquake of May 2, 1983*, edited by Michael Rymer and William Ellsworth, pp. 273-297. U.S. Geological Survey Professional Paper 1487. United States Government Printing office, Washington.

Bartow, J. Alan
1990 A Summary of the Cenozoic Stratigraphy and Geologic History of the Coalinga Region, Central California. In *The Coalinga Earthquake of May 2, 1983*, edited by Michael Rymer and William Ellsworth, pp. 3-12. U.S. Geological Survey Professional Paper 1487. United States Government Printing office, Washington.

Davis, Owen K.
1999 Pollen Analysis of Tulare Lake, California: Great Basin-like Vegetation in Central California During the Full-Glacial and Early Holocene. *Review of Paleobotany and Palynology,* v.107, pp. 249-257.

EPA (Environmental Protection Agency), Water Quality Division
1946 *Bio-Engineering Aspects of Agricultural Drainage, San Joaquin Valley, California: Nutrients from Tile Drainage Systems.* Prepared by the California Department of Water Resources (DWR), Sacramento. DWR file no. 174-6.

Laudon, Julie and Kenneth Belitz
1991 Texture and Depositional History of Late Pleistocene-Holocene Alluvium in the Central Part of the Western San Joaquin Valley, California. *Bulletin of the Association of Engineering Geologists,* v.28, n.1, pp. 73-88.

Meyer, Jack and Jeffrey Rosenthal
2007 *Geoarchaeological Overview of the Nine Bay Area Counties in Caltrans District 4*. Far Western Anthropological Research Group, submitted to Jennifer Darcangelo, Office of Cultural Resources, California Department of Transportation, District 4, Oakland.
2009 A Geoarchaeological Study of Caltrans District 6. Far Western Anthropological Research Group, to be submitted to California Department of Transportation, District 6, Fresno, Winter 2009 (in press).

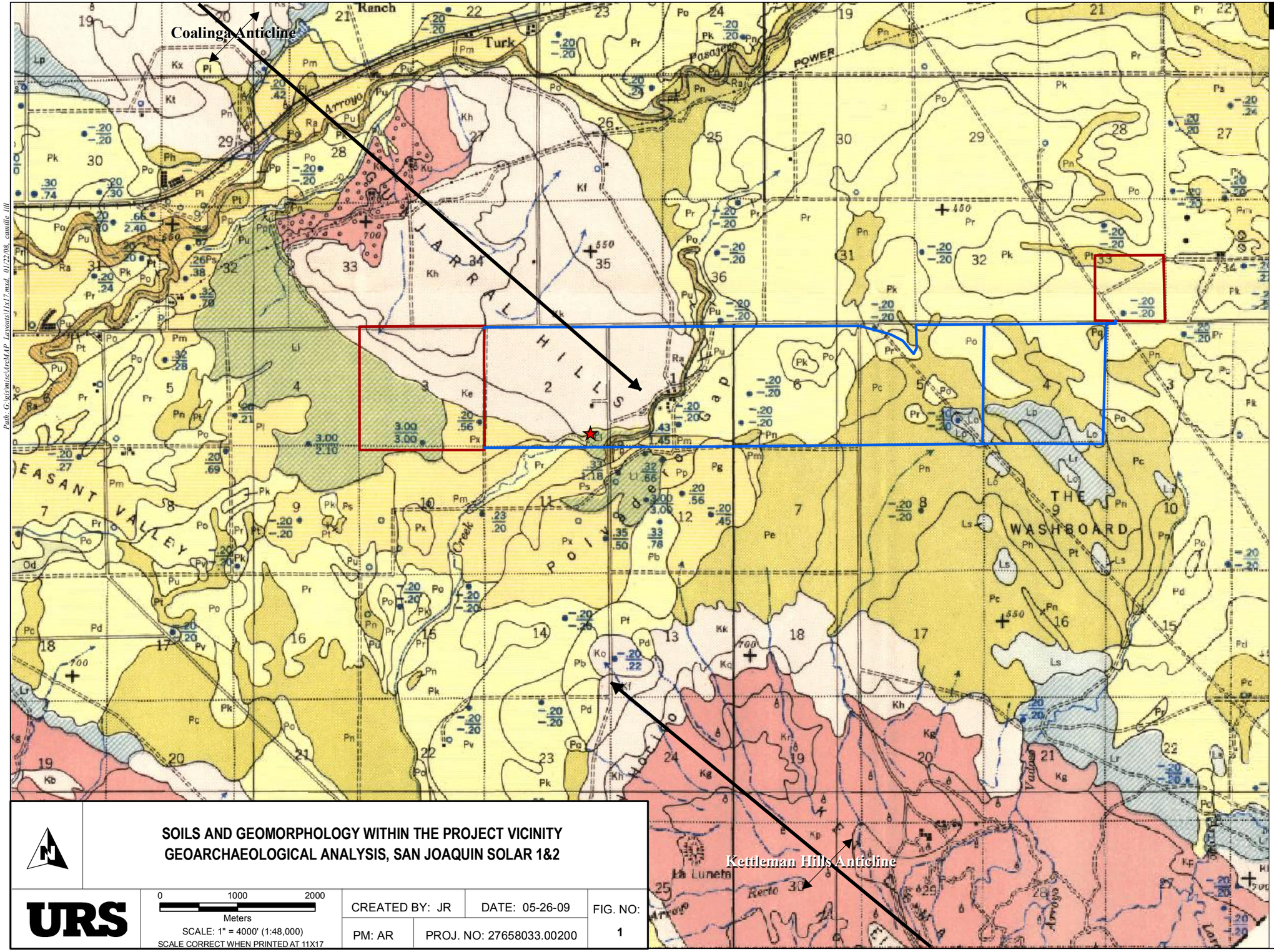
Meyer, Jack
2009 Personal Communication regarding AMS dating results for soil series within the Western San Joaquin Valley. 11 May, 2009.

Rantz, S.E.
1969 *Mean Annual Precipitation in the California Region*. U.S. Geological Survey Open-File Report. USGS, Denver.

Rosenthal, Jeffrey, Gregory White, and Mark Sutton
2007 The Central Valley: A View From the Catbird's Seat. In *California Prehistory: Colonization, Culture, and Complexity*. Edited by Terry Jones and Kathryn Klar. Alta Mira, New York.

Rymer, Michael and William Ellsworth (editors)
1990 *The Coalinga Earthquake of May 2, 1983*. U.S. Geological Survey Professional Paper 1487. United States Government Printing office, Washington.

Path: G:\gis\mxd\ArcMAP Layouts\11x17.mxd, 01/22/08, camille hill



LEGEND

SOIL SERIES

KETTLEMAN

Kg - Kettleman fine sandy loam - hilly, eroded (15-30 percent slope)
Kp - Kettleman loam - hilly, eroded (15-30 percent slope)
Kr - Kettleman loam - steep, eroded (30+ percent slope)
Ku - Ketleman sandy loam - hilly, eroded (15-30 percent slope)
Kw - Kettleman sandle loam - steep, eroded (30+ percent slope)

Kb - clay loam - rolling (7-15 percent slope)
Ke - fine sandy loam - genly sloping (3-7 percent slope)
Kf - fine sandy loam - gently undulating (1-3 percent slope)
Kh - fine sandy loam - rolling (7-15 percent slope)
Kk - fine sandy loam - undulating (3-7 percent slope)
Ko - loam - gently undulating (1-3 percent slope)
Kq - loam - rolling (7-15 percent slope)
Ks - loam - undulating (3-7 percent slope)
Kt - sandy loam - genly undulating (1-3 percent slope)
Kv - sandy loam - rolling (7-15 percent slope)
Kx - sandy loam - undulating (3-7 percent slope)

LOST HILLS

Lp - fine sandy loam - genly undulating (1-3 percent slope)
Lr- fine sandy loam - undulating (3-7 percent slope)

Lo - caly loam - very genly sloping (0-3 percent slope)
Ls - fine sandy loam - very genly sloping (0-3 percent slope)

LEVIS

Ll - silty clay - nearly level, strong alkali (0-1 percent slope)

PANOCHE

Pn - fine sandy loam - genly undulating (1-3 percent slope)
Pq - loam - genly undulating (1-3 percent slope)
Pt - sandy loam - genly undulating (1-3 percent slope)

Pk - clay loam - very genly sloping (0-3 percent slope)
Po - fine sandy loam - very genly sloping (0-3 percent slope)
Pr - loam - very genly sloping (0-3 percent slope)
Pu - sandy loam - very genly sloping (0-3 percent slope)
Pv - silty clay - very genly sloping (0-3 percent slope)

Pl - clay loam - very genly sloping, moderate alkali (0-3 percent slope)
Pm - clay loam - very genly sloping, slight alkali (0-3 percent slope)
Pp - fine sandy loam - very genly sloping, slight alkali (0-3 percent slope)
Ps - loam - very genly sloping, spotted alkali (0-3 percent slope)
Px - silty clay - very genly sloping, slight alkali (0-3 percent slope)

PANHILL

Pc - fine sandy loam - genly undulating (1-3 percent slope)
Pe - loam - genly undulating (1-3 percent slope)
Ph - sandy loam - genly undulating (1-3 percent slope)
Pn - fine sandy loam - genly undulating (1-3 percent slope)

Pb - clay loam - very genly sloping (0-3 percent slope)
Pd - fine sandy loam - very genly sloping (0-3 percent slope)
Pf - loam - very genly sloping (0-3 percent slope)

Pg - loam - very genly sloping, slight alkali (0-3 percent slope)

RIVERWASH

OTHER FEATURES

Approximate location of CA-FRe-80
T-line alternatives (linear APE)
Project boundary and existing transfer station

SOILS AND GEOMORPHOLOGY WITHIN THE PROJECT VICINITY
GEOARCHAEOLOGICAL ANALYSIS, SAN JOAQUIN SOLAR 1&2

URS

0 1000 2000
Meters
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: JR	DATE: 05-26-09	FIG. NO:
PM: AR	PROJ. NO: 27658033.00200	1

SOURCES: F.F. Harradine, et al. (1944) *Soil map: Coalinga area, California*. U.S. Department of Agriculture.

Path: G:\gis\misc\ArcMAP Layouts\11x17.mxd 01/22/08 camille hill

Coalinga Anticline

Approximate location of ethnographic village Oudjiu (CA-FRe-49)

Approximate location of buried hearth feature and chert flake (Atwater et al. 1990)

Approximate location of buried midden deposit (Atwater et al. 1990)

Alluvial fan of Los Gatos Creek

Possible paleo-channel remnant features

Natural levee features

Kettleman Hills Anticline

GEOMORPHOLOGICAL FEATURES AND STUDIES WITHIN THE PROJECT VICINITY
GEOARCHAEOLOGICAL ANALYSIS, SAN JOAQUIN SOLAR 1&2

URS

0 1000 2000
Meters
SCALE: 1" = 4000' (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

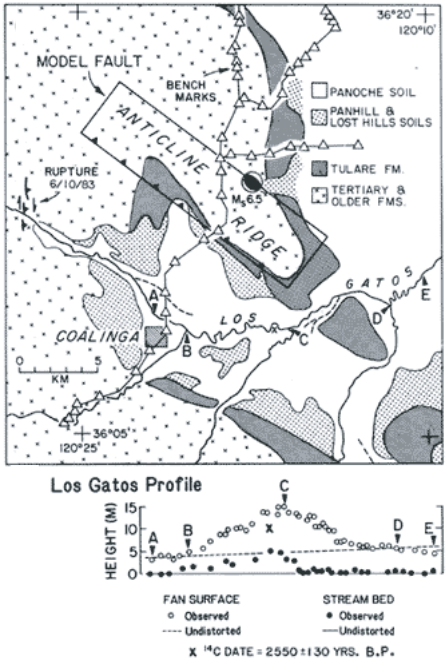
CREATED BY: JR	DATE: 05-26-09	FIG. NO:
PM: AR	PROJ. NO: 27658033.00200	2

LEGEND

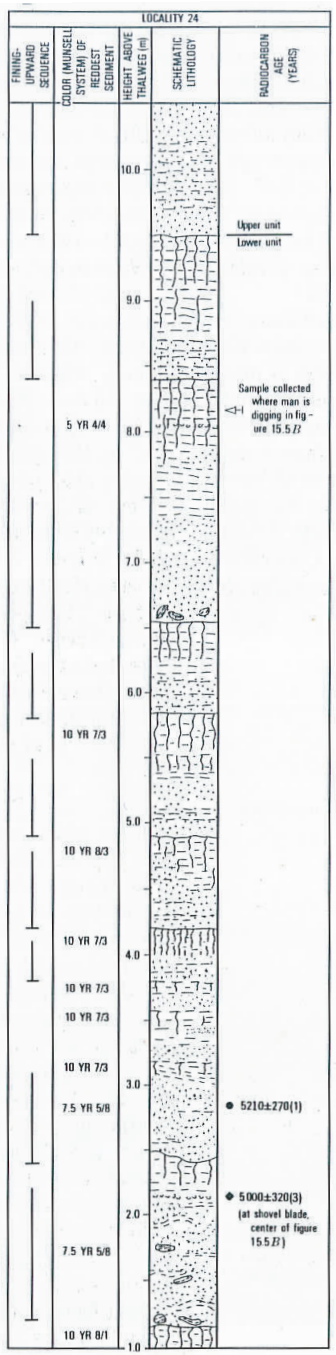
- Approximate area of Atwater et al. (1990) study
- Approximate location of CA-FRe-80
- T-line alternatives (linear APE)
- Project boundary (solar facility and existing transfer station)

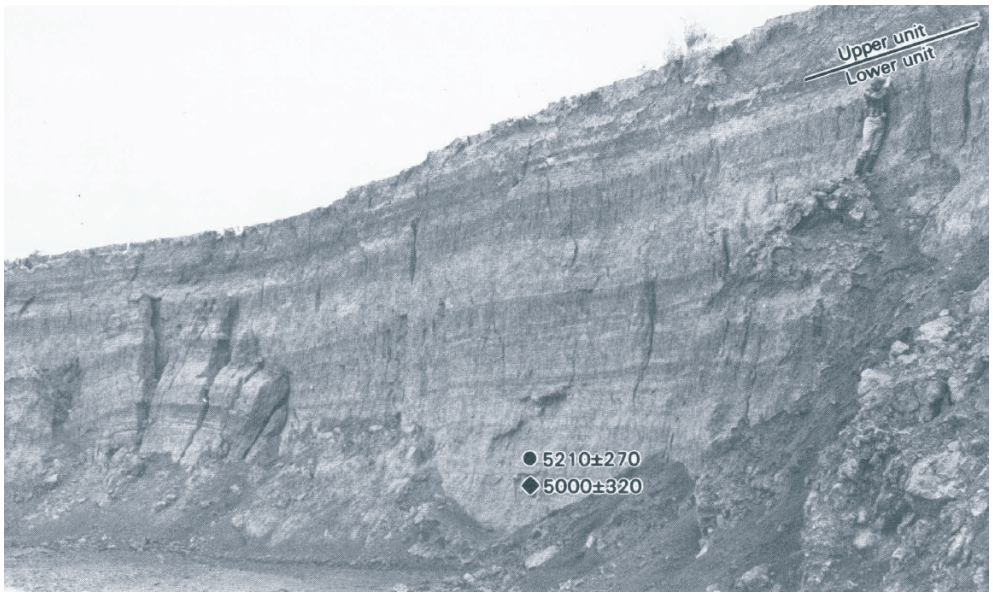
SOURCES: USGS Avenal, Coalinga, Guijarral Hills, Huron, Kreyenhagen Hills, and La Cima 7.5' quadrangles, 1:24,000; Atwater et al. (1990)

A.



B.





(A) Coalinga vicinity geologic setting and profile cross-section across Los Gatos Creek; (B) photo of Los Gatos Creek stream-cut showing paleosols (chert flake and hearth feature identified near man in upper right-hand corner) and generalized profile drawing of location in photo. (from Atwater et al. 1990).

GEOMORPHOLOGY AND PALEOSOL FORMATION
ALONG LOS GATOS CREEK
GEOARCHAEOLOGICAL ANALYSIS, SAN JOAQUIN SOLAR 1&2

URS	Not to Scale	CREATED BY: JR	DATE: 05-26-09	FIG. NO: 3
		PM: AR	PROJ. NO: 27658033.00200	

SOURCES: Atwater et al. (1990) Alluvial Plains and Earthquake Recurrence at the Coalinga Anticline. In *The Coalinga Earthquakeof May 2, 1983,* edited by Michael Rymer and William Ellsworth, pp. 273-297. U.S. Geological Survey Professional Paper 1487.

Soil Survey Staff
2009 Official Soil Series Descriptions [Online WWW]. Natural Resources Conservation Service, United States Department of Agriculture. USDA-NRCS, Lincoln, NE. Available URL: "http://soils.usda.gov/technical/classification/osd/index.html" [Accessed 19 May 2009].

USDA (United States Department of Agriculture)
1952 *Soil Survey, Coalinga Area California*. USDA Agricultural Research Administration, Series 1944, No. 1, Issued December 1952.

Data Request 68: In the absence of sufficient extant Quaternary science and/or geoarchaeological literature pertinent to the reconstruction of the historical geomorphology of the project area, please have the approved geoarchaeologist design a primary geoarchaeological field study of the plant site and tunneling location, submit a research plan for staff approval, and conduct the approved research. The purpose of the study is to facilitate staff's assessment of the likelihood of the presence of archaeological deposits buried deeper than 3 feet on the plant site and tunneling location.

Response: Sufficient extant Quaternary science and geoarchaeological literature pertinent to the reconstruction of the historical geomorphology of the project area are presented in Data Response #67 and, therefore, a primary geoarchaeological field study and research plan is not required.

Data Request 69: Please have the approved geoarchaeologist prepare a report of the primary field study and submit it to staff under confidential cover.

Response: A report of the primary field study is not necessary due to sufficient extant Quaternary science and geoarchaeological literature pertinent to the reconstruction of the historical geomorphology of the project area.

Data Request 70: Please have a qualified historical archaeologist and a qualified architectural historian collaborate on recording this site on Department of Parks and Recreation (DPR) 523 forms and on conducting historical research to establish a historic context as the basis for a determination of the resources eligibility or non-eligibility for the CRHR.

Response: DPR 523 forms have been prepared and submitted under separate confidential cover.

Data Request 71: Please provide to staff, under confidential cover (because this is a potential historical archaeological site), completed DPR 523 forms for this resource, with recommendations on its CRHR eligibility, as both a historic-period archaeological site and as a historic property, and recommendations for appropriate mitigation for its destruction.

Response: DPR 523 forms have been prepared and submitted under separate confidential cover.

San Joaquin Solar 1 & 2 Hybrid Project
Supplemental Information
In Response to CEC Data Request Set #1
08-AFC-12

TECHNICAL AREA: EFFICIENCY

Data Request 72: Please discuss whether any additional biomass fuel or auxiliary fuel, such as natural gas, would be necessary for cold starts of the boiler in the event that the biomass facilities are not dispatched during the 48 hour hot start window.
Please quantify, in British thermal units (Btu), how much additional fuel would be needed for boiler start up, if necessary.

Response: A detailed discussion of the biomass boiler start up is presented in the Air Quality General Comments Section 5.2.2.1. It is expected that a maximum of two cold start ups per boiler train will occur each year. Natural gas is used during a cold start totaling approximately 785 MM BTU/start up per train. Biomass is initiated near the end of the cold start up at a reduced rate until steady state is achieved.

Data Request 73: Please quantify the anticipated annual average transportation fuel consumption, in BTUs, needed to convey the required biomass fuel supplies to the project site.

Response: Based on the post project net increase in biomass delivery miles (net increase between Case C and Case D, presented in Appendix AQ-5), the anticipated annual fuel consumption is roughly 18,900 MM BTU.

Data Request 74: Please discuss the anticipated heat rates, providing values in Btu/kWh, for the boiler during each mode of operation, including daytime operation for winter months.
Please describe the steam turbine generators chosen for the project, including estimated heat rates in Btu/kWh for each mode of operation (*i.e.,* solar only, boiler only, and solar and boiler).

Response: The EPI biomass boilers will provide 455,045 LB/Hr. of 1400 psig - 730oF during nighttime operation. This steam is used in the steam turbine generator to produce 49,240 KW (Gross) and 40,000 KW (Net). The night time heat rate is 9,495 Btu/kWh (Gross) and 11,688 Btu/kWh (net)

The steam turbine generator consists of a high pressure section turbine and a low pressure section turbine with the generator mounted between the high pressure and low pressure sections.
The high pressure section turbine receives 1400 psig - 730oF steam and has uncontrolled extraction at 467psig and 310psig with back pressure at 300 psig.
Thermal heating oil reheaters are located between the high pressure and low pressure section turbines. The steam passing through the thermal oil preheaters flows to the throttle of the low pressure section turbines at a nominal 300 psib steam pressure. The low pressure section turbine has uncontrolled extraction at 80 psig and 20 psig and has an axial turbine exhaust configuration.
The generator is a nominal 60 MW unit operating at a voltage of 13.8KV to onsite stepup transformers.
Heat Rates are as follows:

	Summer Daytime (Solar Only)	Night time (Biomass Only)	Hazy Day, Biomass Boiler at 120,000 #/HR steam flow, Solar System Heats all hot oil (Solar and Biomass)
Gross Heating Rate	9,450Btu/kWh	9,495Btu/kWh	10,012Btu/kWh
Net Heat Rate	10,653Btu/kWh	11,688Btu/kWh	11,330Btu/kWh

TECHNICAL AREA: HAZARDOUS MATERIAL HANDLING

Data Request 75: Please provide the estimated frequency of aqueous ammonia deliveries to the project, the capacity of the tanker trucks that would be used to ship the aqueous ammonia, and the designated transportation route from Interstate-5.

Response: The project is estimated to have 257 trucks of ammonia delivered to the site annually. Trucks will make ammonia delivery Monday through Friday. Therefore, there will be approximately one ammonia truck delivery to the project site per day. Each delivery truck has a capacity of 8,000 gallons of ammonia. The ammonia distributor for the project has not yet been determined. Therefore the designated transportation route has not been established. The anticipated route will be on I-5 to West Jayne Avenue.

Data Request 76: Please identify a contractor who will be used to contain and clean-up hazardous materials spills that might occur at the project.

Response: The project has identified several emergency spill response contractors that would be available to respond to a hazardous material spill at the project site. These contractors include:

- Double Barrel Environmental Services (12420A Jomani Drive, Bakersfield, 661-587-5000),
- PARC Environmental (2706 South Railroad Avenue, Fresno, 559-233-4284),
- Bowen Engineering (4664 S Cedar Avenue, Fresno, 559-233-7464), and
- Eagle SWS (Visalia, 886-465-9829).

These companies and others will be evaluated and a spill response contractor will be in place prior to construction of the proposed project.

TECHNICAL AREA: NOISE

Data Request 77: Please conduct 25-hour ambient noise surveys at noise monitoring locations ST6, ST7, SR1, H2, and P1 as identified in the AFC. These surveys should be conducted during calm weather conditions.

Please provide the resultant noise levels in terms of L_{eq}, L_{min}, L_{max}, $L_{10,}$ L_{50}, and L_{90}.

Response: During a field survey performed from May 13th through May 15th, 2009, the Applicant conducted long-term noise monitoring during periods of calm weather conditions at the following locations:

"SR1" – A currently unoccupied residence known as 23436 W. Jayne Avenue. The monitor was secured to outdoor furniture approximately 45' south of the southern-most mobile home. This position is approximately 4,600' from the center of the Applicant's proposed Project site. Please see photographs 1-4, attached.

"ST6" – An occupied residence known as 40445 S. El Dorado Avenue. The monitor was secured to a fence post approximately 40' west of the residential structure. This position is approximately 7,000' from the center of the Applicant's proposed Project site. Please see photographs 5-8, attached.

"P1" – A location on the Coalinga State Hospital (CSH) grounds, along the eastern fence line of two that separate the CSH facility from the adjacent Pleasant Valley State Prison (PVSP) property. The monitor was secured to the fence, approximately 400' west of the H2 measurement position, and intended to represent the ambient noise conditions for the modeled "P1" as appearing in the AFC. This position is approximately 5,200' from the center of the Applicant's proposed Project site.

"ST7" – An occupied residence known as 41360 Sutter Avenue. The monitor was secured to a fence post approximately 75' north of the residential structure, the closest point at which access was granted by the adjacent property owner. This position is approximately 8,000' from the center of the Applicant's proposed Project site. Please see photographs 9-10, attached.

"H2" – A location on the Coalinga State Hospital (CSH) grounds, external to and immediately west of the secured hospital areas. The monitor was secured to a light post and positioned within approximately 100' of a secured hospital building. The location is approximately 1000' west of, and intended to represent the ambient noise conditions for, the modeled "H2" position appearing in the AFC. This position is approximately 4,800' from the center of the Applicant's proposed Project site.

"GCR" – An occupied residential unit on the Polvadero Community Golf Course accessed from Sutter Avenue. The noise monitor was secured to a telephone pole (used as a fence element) approximately 120' south of the residence. This position is approximately 7,500' from the center of the Applicant's proposed Project site. Please see photographs 11-12, attached.

The Applicant applied reasonable judgment in the selection of the above measurement positions on the basis of a number of factors including as follows: proximity to the modeled positions as appearing in the AFC, logistical consideration such as security and right-of-entry, proximity to the actual or

potentially occupied residential structure, and distance to likely nearby producers of sound such as trees and mechanical equipment. In all cases, measured noise levels were considered to be accurate characterizations o the ambient noise environment.

Hourly noise levels for periods of twenty-five (25) continuous hours for each of these locations are shown in the following tables.

Table DR-77a
SR1: 25-Hour Noise Measurement Results (dBA)

Date	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$
5/14/2009	5:00 a.m.	6:00 a.m.	46	33	56	47	43	40
	6:00 a.m.	7:00 a.m.	44	33	72	46	41	37
	7:00 a.m.	8:00 a.m.	44	35	60	45	41	38
	8:00 a.m.	9:00 a.m.	40	33	57	43	37	35
	9:00 a.m.	10:00 a.m.	39	32	58	41	36	34
	10:00 a.m.	11:00 a.m.	40	33	59	41	37	34
	11:00 a.m.	12:00 p.m.	39	32	53	41	36	34
	12:00 p.m.	1:00 p.m.	45	33	61	48	41	37
	1:00 p.m.	2:00 p.m.	46	34	62	49	43	39
	2:00 p.m.	3:00 p.m.	47	36	66	50	44	40
	3:00 p.m.	4:00 p.m.	48	39	62	51	45	41
	4:00 p.m.	5:00 p.m.	47	34	64	49	44	39
	5:00 p.m.	6:00 p.m.	47	34	69	48	42	39
	6:00 p.m.	7:00 p.m.	44	34	61	46	40	37
	7:00 p.m.	8:00 p.m.	42	33	60	45	39	36
	8:00 p.m.	9:00 p.m.	37	33	56	39	35	34
	9:00 p.m.	10:00 p.m.	36	33	49	38	35	33
	10:00 p.m.	11:00 p.m.	35	32	55	37	34	33
	11:00 p.m.	12:00 a.m.	37	32	49	38	35	33
5/15/2009	12:00 a.m.	1:00 a.m.	39	32	56	41	35	33
	1:00 a.m.	2:00 a.m.	39	32	68	39	35	33
	2:00 a.m.	3:00 a.m.	37	33	53	39	36	35
	3:00 a.m.	4:00 a.m.	36	33	47	38	35	34
	4:00 a.m.	5:00 a.m.	38	33	51	41	36	34
	5:00 a.m.	6:00 a.m.	42	33	53	44	40	37

Notes:

a.m.	=	morning	L_{eq}	=	equivalent sound energy level
dBA	=	"A-weighted" decibels	L_{max}	=	maximum sound level
$L_{(10)}$	=	sound level exceeded 10 percent of time	L_{min}	=	minimum sound level
$L_{(50)}$	=	sound level exceeded 50 percent of time	p.m.	=	afternoon, evening, or nighttime
$L_{(90)}$	=	sound level exceeded 90 percent of time			

33 = Quietest nighttime L_{90} (arithmetic average of quietest four consecutive nighttime hours, 10:00 p.m. through 2:00 a.m., as shaded above).

35 = Quietest nighttime hourly L_{eq}.

48 = Community Noise Equivalent Level (CNEL).

= Day-night Level (L_{dn}).

Source: URS 2009.

Table DR-77b
ST6: 25-Hour Noise Measurement Results (dBA)

Date	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$
5/14/2009	5:00 a.m.	6:00 a.m.	44	28	59	46	41	37
	6:00 a.m.	7:00 a.m.	43	30	58	46	38	34
	7:00 a.m.	8:00 a.m.	38	30	53	40	35	33
	8:00 a.m.	9:00 a.m.	39	29	56	41	35	32
	9:00 a.m.	10:00 a.m.	41	29	64	42	35	32
	10:00 a.m.	11:00 a.m.	39	28	59	40	34	31
	11:00 a.m.	12:00 p.m.	43	29	63	44	39	35
	12:00 p.m.	1:00 p.m.	49	38	60	51	47	43
	1:00 p.m.	2:00 p.m.	50	38	64	53	48	44
	2:00 p.m.	3:00 p.m.	51	40	63	54	50	45
	3:00 p.m.	4:00 p.m.	51	40	64	54	50	46
	4:00 p.m.	5:00 p.m.	50	39	61	53	48	45
	5:00 p.m.	6:00 p.m.	49	38	63	51	48	44
	6:00 p.m.	7:00 p.m.	48	36	62	51	46	43
	7:00 p.m.	8:00 p.m.	45	33	56	47	44	40
	8:00 p.m.	9:00 p.m.	41	28	55	45	38	34
	9:00 p.m.	10:00 p.m.	39	29	59	42	36	33
	10:00 p.m.	11:00 p.m.	41	28	62	43	36	32
	11:00 p.m.	12:00 a.m.	39	28	64	39	35	32
5/15/2009	12:00 a.m.	1:00 a.m.	37	28	60	40	34	31
	1:00 a.m.	2:00 a.m.	38	28	61	37	32	31
	2:00 a.m.	3:00 a.m.	37	29	64	37	33	31
	3:00 a.m.	4:00 a.m.	35	27	55	35	30	29
	4:00 a.m.	5:00 a.m.	40	26	63	39	31	29
	5:00 a.m.	6:00 a.m.	44	29	62	48	39	34

Notes:

a.m.	=	morning	L_{eq}	=	equivalent sound energy level
dBA	=	"A-weighted" decibels	L_{max}	=	maximum sound level
$L_{(10)}$	=	sound level exceeded 10 percent of time	L_{min}	=	minimum sound level
$L_{(50)}$	=	sound level exceeded 50 percent of time	p.m.	=	afternoon, evening, or nighttime
$L_{(90)}$	=	sound level exceeded 90 percent of time			

30 = Quietest nighttime L_{90} (arithmetic average of quietest four consecutive nighttime hours, 1:00 a.m. through 5:00 a.m., as shaded above).
35 = Quietest nighttime hourly L_{eq}.
49 = Community Noise Equivalent Level (CNEL).
49 = Day-night Level (L_{dn}).

Source: URS 2009.

Table DR-77c
P1: 25-Hour Noise Measurement Results (dBA)

Date	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$
5/13/2009	2:00 p.m.	3:00 p.m.	59	46	70	62	57	52
	3:00 p.m.	4:00 p.m.	55	45	68	58	53	49
	4:00 p.m.	5:00 p.m.	56	45	69	59	53	49
	5:00 p.m.	6:00 p.m.	54	45	67	57	51	48
	6:00 p.m.	7:00 p.m.	53	45	66	56	52	48
	7:00 p.m.	8:00 p.m.	51	44	65	54	49	46
	8:00 p.m.	9:00 p.m.	49	44	60	51	48	46
	9:00 p.m.	10:00 p.m.	47	45	57	48	47	46
	10:00 p.m.	11:00 p.m.	48	44	61	49	47	46
	11:00 p.m.	12:00 a.m.	47	45	53	48	47	46
5/14/2009	12:00 a.m.	1:00 a.m.	45	39	59	46	44	42
	1:00 a.m.	2:00 a.m.	45	39	67	47	44	42
	2:00 a.m.	3:00 a.m.	44	40	52	46	44	42
	3:00 a.m.	4:00 a.m.	44	39	53	46	44	42
	4:00 a.m.	5:00 a.m.	43	39	54	44	42	41
	5:00 a.m.	6:00 a.m.	45	39	56	47	44	41
	6:00 a.m.	7:00 a.m.	45	39	55	47	44	42
	7:00 a.m.	8:00 a.m.	42	37	52	43	41	39
	8:00 a.m.	9:00 a.m.	46	36	68	45	42	40
	9:00 a.m.	10:00 a.m.	41	36	54	43	40	39
	10:00 a.m.	11:00 a.m.	43	36	59	45	42	40
	11:00 a.m.	12:00 p.m.	45	41	61	47	44	43
	12:00 p.m.	1:00 p.m.	52	42	67	54	50	46
	1:00 p.m.	2:00 p.m.	55	45	69	58	53	49
	2:00 p.m.	3:00 p.m.	58	45	70	61	56	51

Notes:

a.m.	=	morning	L_{eq}	=	equivalent sound energy level
dBA	=	"A-weighted" decibels	L_{max}	=	maximum sound level
$L_{(10)}$	=	sound level exceeded 10 percent of time	L_{min}	=	minimum sound level
$L_{(50)}$	=	sound level exceeded 50 percent of time	p.m.	=	afternoon, evening, or nighttime
$L_{(90)}$	=	sound level exceeded 90 percent of time			

41.5 = Quietest nighttime L_{90} (arithmetic average of quietest four consecutive nighttime hours, 2:00 a.m. through 6:00 a.m., as shaded above).

43 = Quietest nighttime hourly L_{eq}.

54 = Community Noise Equivalent Level (CNEL).

54 = Day-night Level (L_{dn}).

Source: URS 2009.

Although the quietest four consecutive nighttime hours are highlighted in Table DR-77c, the four quietest consecutive hours for the entire 25-hour monitoring period occurred from 7:00 a.m. through 11:00 a.m. and have an average L_{90} of 39.5 dBA.

Table DR-77d
ST7: 25-Hour Noise Measurement Results (dBA)

Date	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$
5/13/2009	3:00 p.m.	4:00 p.m.	59	49	71	61	58	54
	4:00 p.m.	5:00 p.m.	59	50	78	62	58	54
	5:00 p.m.	6:00 p.m.	58	48	67	60	57	54
	6:00 p.m.	7:00 p.m.	57	46	72	59	56	53
	7:00 p.m.	8:00 p.m.	54	41	72	57	52	48
	8:00 p.m.	9:00 p.m.	54	44	69	55	52	49
	9:00 p.m.	10:00 p.m.	49	41	70	50	46	43
	10:00 p.m.	11:00 p.m.	48	39	66	49	45	42
	11:00 p.m.	12:00 a.m.	46	39	64	48	43	41
5/14/2009	12:00 a.m.	1:00 a.m.	48	39	71	47	43	41
	1:00 a.m.	2:00 a.m.	46	39	68	46	41	39
	2:00 a.m.	3:00 a.m.	47	39	74	50	45	42
	3:00 a.m.	4:00 a.m.	45	39	67	46	42	40
	4:00 a.m.	5:00 a.m.	46	39	65	47	41	40
	5:00 a.m.	6:00 a.m.	50	41	70	52	46	44
	6:00 a.m.	7:00 a.m.	53	40	69	55	49	44
	7:00 a.m.	8:00 a.m.	50	40	72	50	43	41
	8:00 a.m.	9:00 a.m.	49	39	75	46	41	40
	9:00 a.m.	10:00 a.m.	49	39	69	47	42	40
	10:00 a.m.	11:00 a.m.	49	39	71	48	42	40
	11:00 a.m.	12:00 p.m.	51	39	70	52	46	42
	12:00 p.m.	1:00 p.m.	56	42	70	58	55	51
	1:00 p.m.	2:00 p.m.	58	47	69	60	57	53
	2:00 p.m.	3:00 p.m.	59	48	78	61	57	54
	3:00 p.m.	4:00 p.m.	58	39	74	54	51	48

Notes:

a.m.	=	morning	L_{eq}	=	equivalent sound energy level
dBA	=	"A-weighted" decibels	L_{max}	=	maximum sound level
$L_{(10)}$	=	sound level exceeded 10 percent of time	L_{min}	=	minimum sound level
$L_{(50)}$	=	sound level exceeded 50 percent of time	p.m.	=	afternoon, evening, or nighttime
$L_{(90)}$	=	sound level exceeded 90 percent of time			

40.3 = Quietest nighttime L_{90} (arithmetic average of quietest four consecutive nighttime hours, 1:00 a.m. through 5:00 a.m., as shaded above).

45 = Quietest nighttime hourly L_{eq}.

57 = Community Noise Equivalent Level (CNEL).

57 = Day-night Level (L_{dn}).

Source: URS 2009.

Although the quietest four consecutive nighttime hours are highlighted in Table DR-77d, the four quietest consecutive hours for the entire 25-hour monitoring period occurred from 7:00 a.m. through 11:00 a.m. and also have an average L90 of 39.5 dBA.

Table DR-77e
H2: 25-Hour Noise Measurement Results (dBA)

Date	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$
5/13/2009	2:00 p.m.	3:00 p.m.	52	44	72	54	49	47
	3:00 p.m.	4:00 p.m.	52	43	77	53	48	46
	4:00 p.m.	5:00 p.m.	53	44	68	56	49	46
	5:00 p.m.	6:00 p.m.	53	43	77	53	48	46
	6:00 p.m.	7:00 p.m.	52	44	69	54	50	47
	7:00 p.m.	8:00 p.m.	51	43	68	53	48	46
	8:00 p.m.	9:00 p.m.	50	44	70	52	47	45
	9:00 p.m.	10:00 p.m.	47	44	66	48	46	45
	10:00 p.m.	11:00 p.m.	48	43	63	50	47	45
	11:00 p.m.	12:00 a.m.	45	42	52	46	45	44
5/14/2009	12:00 a.m.	1:00 a.m.	45	41	60	46	44	43
	1:00 a.m.	2:00 a.m.	46	42	76	46	44	43
	2:00 a.m.	3:00 a.m.	43	41	53	44	43	42
	3:00 a.m.	4:00 a.m.	43	41	49	44	43	42
	4:00 a.m.	5:00 a.m.	43	40	64	44	42	41
	5:00 a.m.	6:00 a.m.	46	40	67	44	42	41
	6:00 a.m.	7:00 a.m.	46	40	68	46	42	41
	7:00 a.m.	8:00 a.m.	49	40	73	46	42	40
	8:00 a.m.	9:00 a.m.	50	40	70	48	42	40
	9:00 a.m.	10:00 a.m.	52	39	77	48	42	40
	10:00 a.m.	11:00 a.m.	50	40	72	48	42	40
	11:00 a.m.	12:00 p.m.	50	40	76	47	42	41
	12:00 p.m.	1:00 p.m.	50	41	74	50	45	43
	1:00 p.m.	2:00 p.m.	52	43	71	53	47	45
	2:00 p.m.	3:00 p.m.	54	44	79	53	47	45

Notes:

a.m.	=	morning	Leq	=	equivalent sound energy level
dBA	=	"A-weighted" decibels	Lmax	=	maximum sound level
L(10)	=	sound level exceeded 10 percent of time	Lmin	=	minimum sound level
L(50)	=	sound level exceeded 50 percent of time	p.m.	=	afternoon, evening, or nighttime
L(90)	=	sound level exceeded 90 percent of time			

41.3 = Quietest nighttime L_{90} (arithmetic average of quietest four consecutive nighttime hours, 3:00 a.m. through 7:00 a.m., as shaded above).

43 = Quietest nighttime hourly L_{eq}.

54 = Community Noise Equivalent Level (CNEL).

54 = Day-night Level (L_{dn}).

Source: URS 2009.

Although the quietest four consecutive nighttime hours are highlighted in Table DR-77e, the four quietest consecutive hours for the entire 25-hour monitoring period occurred from 7:00 a.m. through 11:00 a.m. and have an average L_{90} of 40 dBA.

Table DR-77f
GCR: 25-Hour Noise Measurement Results (dBA)

Date	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$
5/13/2009	2:00 p.m.	3:00 p.m.	56	44	74	59	52	48
	3:00 p.m.	4:00 p.m.	54	43	69	57	50	47
	4:00 p.m.	5:00 p.m.	53	43	69	56	49	46
	5:00 p.m.	6:00 p.m.	50	42	74	52	48	45
	6:00 p.m.	7:00 p.m.	50	41	78	49	46	43
	7:00 p.m.	8:00 p.m.	46	38	65	46	43	41
	8:00 p.m.	9:00 p.m.	46	39	66	47	44	42
	9:00 p.m.	10:00 p.m.	43	37	59	45	40	38
	10:00 p.m.	11:00 p.m.	42	37	58	43	40	38
	11:00 p.m.	12:00 a.m.	40	36	53	41	38	37
5/14/2009	12:00 a.m.	1:00 a.m.	41	36	62	42	38	37
	1:00 a.m.	2:00 a.m.	47	36	77	42	38	37
	2:00 a.m.	3:00 a.m.	39	36	68	41	38	37
	3:00 a.m.	4:00 a.m.	41	36	58	42	39	38
	4:00 a.m.	5:00 a.m.	42	36	59	42	39	37
	5:00 a.m.	6:00 a.m.	48	37	63	50	44	42
	6:00 a.m.	7:00 a.m.	49	38	64	52	45	41
	7:00 a.m.	8:00 a.m.	44	37	62	45	41	39
	8:00 a.m.	9:00 a.m.	42	37	63	44	39	38
	9:00 a.m.	10:00 a.m.	43	37	60	45	40	38
	10:00 a.m.	11:00 a.m.	44	37	70	44	40	38
	11:00 a.m.	12:00 a.m.	48	37	75	48	41	39
	12:00 p.m.	1:00 p.m.	52	40	71	55	48	44
	1:00 p.m.	2:00 p.m.	54	41	79	57	50	46
	2:00 p.m.	3:00 p.m.	55	44	71	58	51	47

Notes:

a.m.	=	morning	Leq	=	equivalent sound energy level
dBA	=	"A-weighted" decibels	Lmax	=	maximum sound level
L(10)	=	sound level exceeded 10 percent of time	Lmin	=	minimum sound level
L(50)	=	sound level exceeded 50 percent of time	p.m.	=	afternoon, evening, or nighttime
L(90)	=	sound level exceeded 90 percent of time			

37 = Quietest nighttime L_{90} (arithmetic average of quietest four consecutive nighttime hours, 11:00 p.m. through 3:00 a.m., as shaded above).
39 = Quietest nighttime hourly L_{eq}.
53 = Community Noise Equivalent Level (CNEL).
53 = Day-night Level (L_{dn}).

Source: URS 2009.

Given these new ambient noise measurement results, Table DR-77g summarizes a revised impact assessment.

Table DR-77g
Revised Noise Impact Assessment Summary

Location	Predicted Project Operations Noise (L_{eq}, dBA)	Average of Four Consecutive Quietest Nighttime Measured Ambient Hours (L_{90}, dBA)	Predicted Cumulative Exterior Noise (L_{90}, dBA)	Difference Between Predicted Cumulative and Average Ambient (L_{90}, dBA)
SR1	39.7	33	40.5	7.5
ST6	33.5	30	35.1	5.1
P1	38.4	41.5	43.2	1.7
ST7	31.7	40.3	40.9	0.6
H2	41	41.3	44.2	2.9
GCR	33.5	37	38.6	1.6

The summarized impact assessment involves conservatively comparing the predicted cumulative exterior L_{90} noise level (i.e., the logarithmic sum of predicted Project operation noise levels and an average of the measured nighttime ambient L_{90} statistical levels) with the average of the four consecutive quietest nighttime hours of measured ambient noise (L_{90}). Increases above ambient at the other four locations are considered less than 5 dBA.

The Applicant believes the noise impacts at SR1 and ST6 would not be significant for the following reasons:

- The operational noise model prepared for the AFC considered a worst-case condition with the facility systems operating at full plant capacity (106 MW). But at night, there is no solar energy input and hence the plant can only operate up to 80 MW. With the majority of predicted Project operation noise sources involving rotating machinery (fans, turbines, etc.), acoustic principles suggest that on the basis of this reduced power output, predicted aggregate noise might be less by about 1-2 dBA, which would have the effect of rendering the differences for SR1 and ST6 in Table DR-77g to less than 7 dBA and less than 5 dBA, respectively.
- The residential structure associated with SR1 is currently unoccupied and apparently in no condition to house residents in the near future.
- The predicted cumulative levels are nearly 5 dBA less than the 45 dBA threshold as described by both the Fresno County Ordinance and the General Plan Noise Element.

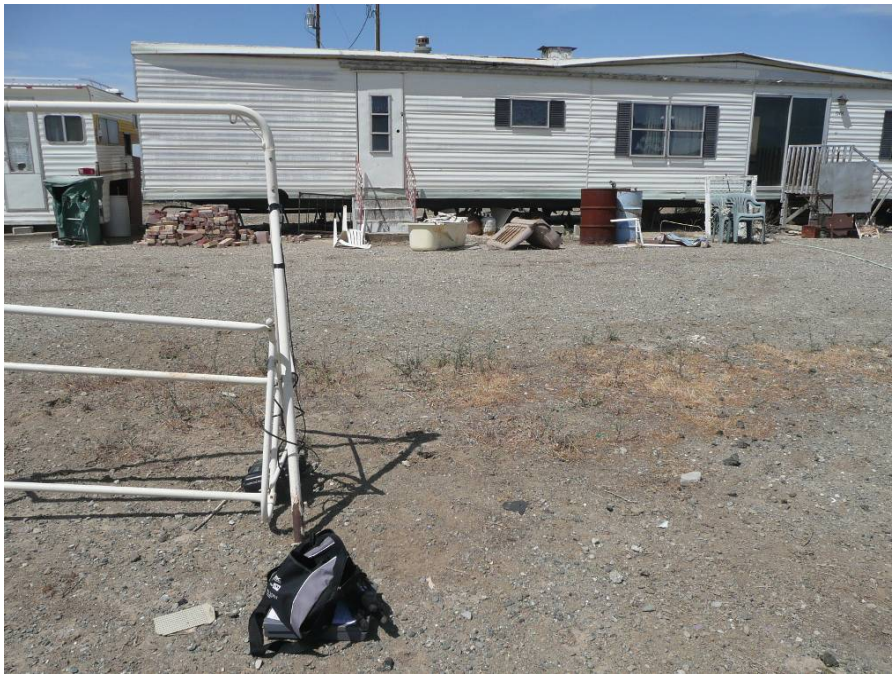
For SR1, the quietest measured nighttime hourly L_{eq} is quite close (*i.e.*, only 2 dBA different) to the average of the four consecutive quietest nighttime L_{90} hourly values. If one were to make a substitution, so that L_{eq} values are used consistently in the assessment, Table DR-77h shows that the anticipated increase over ambient is only 6 dBA.

Table DR-77h
SR1 Noise Impact Assessment Using L_{eq} Consistently

Location	Predicted Project Operations Noise (L_{eq}, dBA)	Quietest Nighttime Measured Ambient Hourly (L_{eq}, dBA)	Predicted Cumulative Exterior Noise (L_{eq}, dBA)	Difference Between Predicted Cumulative and Average Ambient (L_{eq}, dBA)
SR1	39.7	35	41	6

Alternately, if the Project operational noise prediction was presented in terms of L_{90}, there is a possibility that it might be 1-2 dBA less than the presented L_{eq} value and would thus also result in an increase over ambient of only 6 dBA. This does not include the potential influence of the aforementioned 1-2 dBA predicted operation noise reduction due to biomass-only operation at night, which if true would help reduce the increase over ambient to less than 5 dBA.

- The predicted cumulative noise level is very nearly or below 40 dBA, which is consistent with the noise limit recommended by the California Model Community Noise Control Ordinance for rural environments such as the vicinity of the proposed Project site.

	**Photograph 1** **Date:** 05/13/09 **Comments:** SR1: Long-term noise monitoring locations, looking North.
	**Photograph 2** **Date:** 05/13/09 **Comments:** SR1: Long-term noise monitoring locations, looking West.

	**Photograph 3** **Date:** 05/13/09 **Comments:** SR1: Long-term noise monitoring locations, looking South.
	**Photograph 4** **Date:** 05/13/09 **Comments:** SR1: Long-term noise monitoring locations, looking East.

	**Photograph 5** **Date:** 05/13/09 **Comments:** ST6: Long-term noise monitoring location, looking North.
	**Photograph 6** **Date:** 05/13/09 **Comments:** ST6: Long-term noise monitoring location, looking West.

	**Photograph 7** **Date:** 05/13/09 **Comments:** ST6: Long-term noise monitoring location, looking South.
	**Photograph 8** **Date:** 05/13/09 **Comments:** ST6: Long-term noise monitoring location, looking East.

	**Photograph 9** **Date:** 05/13/09 **Comments:** ST7: Long-term noise monitoring location, looking South.
	**Photograph 10** **Date:** 05/13/09 **Comments:** ST7: Long-term noise monitoring location, looking East.

	**Photograph 11** **Date:** 05/13/09 **Comments:** GCR: View of residence at Polvadero Community Golf Course, looking Southwest.
	**Photograph 12** **Date:** 05/13/09 **Comments:** GCR: Long-term noise monitoring location, looking South. .

TECHNICAL AREA: PUBLIC HEALTH

Data Request 78: Please provide a health risk assessment (HRA) for construction vehicle diesel emissions.

Response:

Construction Activities Diesel Particulate Matter Health Risk Analysis

The potential human health risks due to construction phase diesel particulate matter (DPM) were assessed using procedures consistent with the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot Spots Program Guidance Manual for Preparation of HRA (OEHHA 2003).

The HRA was conducted in three steps by: (1) determining the construction phase DPM; (2) calculating the ground-level concentrations of DPM for the general grid with census receptors, sensitive receptors and off-site worker receptors, as defined in Section 5.16, Public Health and Safety of the AFC; and (3) characterizing the health risks for all three receptor systems based on the DPM ground level concentrations, and toxicological data. DPM only has long-term health risk thresholds, thus only cancer risk and the chronic non-cancer THI are calculated in this construction related HRA. No acute non-cancer reference exposure level (REL) has been established for diesel particulate, thus no acute non-cancer THI is calculated.

The DPM (as PM10) emissions from the construction equipment were calculated using equipment-specific emissions factors from the OFFROAD model for Fresno County. Emissions from on-road delivery trucks were estimated using DPM emission factors for on-road vehicles from the EMFAC2007 model for Fresno County. A detailed description of the emissions calculations can be found in the General Comments section above before Data Request Response 1. Detailed emissions calculations can be found in Appendix AQ-1. Table DR-78a presents the construction related onsite DPM emissions used in the construction HRA.

Table DR-78a
Peak Annual Onsite Construction Phase DPM Emission Rates

Equipment	Annual Emission Rate (tons/yr)
Construction Equipment	1.705
Delivery Trucks	0.020
Total DPM Emissions	**1.725**

Note: Emissions are for months 1-12

Dispersion modeling was performed using the AERMOD model to estimate the DPM ground-level concentrations for the three receptor systems. The methods used in the dispersion modeling were consistent with the approach for modeling criteria pollutants from the Project construction emissions, as described in Section 5.2, Air Quality of the AFC. DPM only has health risk factors for cancer and chronic non-cancer risks, thus, only annual ground-level particulate concentrations were calculated. The maximum annual ground level DPM concentrations are presented in Table DR-78b for each of the three receptor systems. Modeling files are provided on the modeling CD/DVD submitted with these Data Request Responses.

Table DR-78b
Maximum Annual Ground-Level DPM Concentrations (µg/m^3)

General Receptors		Sensitive Receptors		Off-Site Worker Receptors	
Concentration	Location (UTM NAD27)	Concentration	Location (UTM NAD27)	Concentration	Location (UTM NAD27)
0.45	(748807, 400200)	0.36	(748729, 4001966)	0.36	(748729, 4001966)

Risk characterization was performed to integrate the health effects and public exposure information and provide quantitative estimates of health risks from the construction phase DPM emissions. Carcinogenic and chronic non-carcinogenic health risks corresponding to the maximum modeled annual DPM concentrations were estimated using an Excel spreadsheet for the 3 receptor systems. The chronic non-cancer risk is calculated by dividing the annual ground level particulate concentration by the DPM chronic REL from OEHHA. The cancer risk is calculated by estimating the inhalation dose (milligrams per kilogram per day [mg/kg-day]) from the annual ground level particulate concentration, which is then multiplied by the DPM inhalation cancer potency factor from OEHHA. The DPM cancer potency factors and chronic REL used in the HRA are 1.1 (mg/kg-day)-1 and 5 µg/m3, respectively.

Adverse health effects are expressed in terms of cancer or non-cancer health risks. The cancer risk is calculated by estimating the inhalation dose (mg/kg-day) from the annual ground level particulate concentration, and then multiplying by the diesel particulate inhalation cancer potency factor from OEHHA. Inhalation dose is calculated using the following equation:

Inhalation dose (mg/kg-day) =
(Annual concentration (µg/m3)) * DBR * A * EF * ED * 10-6 / AT

DBR = daily breathing rate (L/kg-day) is 393 for the general and sensitive receptors and

149 for the off-site worker receptors.

A = Inhalation absorption factor (fraction of chemical absorbed), default = 1

EF = Exposure frequency (days/year) is 350 for the general and sensitive receptors and

250 for the off-site worker receptors.

ED = Exposure duration (years) is 1.25 for all receptors.

AT = Averaging time period over which exposure is averaged (days), default = 25,550

Non-cancer risk is typically reported as a total hazard index (THI). The THI is calculated for each target organ as a fraction of the maximum acceptable exposure level to a pollutant. The acceptable exposure level is generally the level at (or below) which no adverse health effects are expected. THI in this analysis is calculated for long-term (chronic) exposure by dividing the maximum predicted annual ground level concentration of diesel particulate by the DPM chronic REL.

According to the SJVAPCD, for carcinogenic health effects, an exposure to a new emissions source is normally considered potentially significant when the predicted incremental lifetime cancer risk of the source exceeds 10 in 1 million. For non-carcinogenic health effects (chronic or acute), an exposure that affects each target organ is considered potentially significant when the THI exceeds a value of 1.

Table DR-78c presents the results of the construction phase DPM emissions HRA for cancer and chronic non-cancer health risks. Detail HRA calculations are presented in Appendix PH-1. Based on the risk assessment methodology described above, the maximum incremental cancer risk resulting from the construction activities DPM were estimated to be 3.44, 2.65, and 0.72 in 1 million for the general, sensitive and off-site worker receptors respectively. The maximum cancer risk was predicted to occur at the nearest property line, approximately 817 meters west of the center of the property for the general receptors. For both the sensitive and off-site worker receptors, the maximum cancer risks were predicted to occur approximately 895 meters west of the center of the project's property, at the nearest eastern portion of the Coalinga State Hospital.

The estimated cancer risk at all locations is well below the significance criteria of 10 in 1 million. Thus, it is concluded that the construction phase DPM emissions from the diesel equipment engines will not pose a significant cancer risk to any population that would potentially be exposed to these emissions.

The maximum chronic THI resulting from the construction activities DPM were estimated to be 0.09, 0.07, and 0.07 for the general, sensitive and off-site worker receptors respectively. The locations of the maximum predicted chronic THI are the same as the location of the maximum cancer risks since these risk calculations were both based on the maximum annual PM10 concentrations.

The estimated chronic THIs are well below the significance criteria of 1. Thus, it is concluded that the construction phase DPM emissions from the diesel equipment engines will not pose a significant chronic non-cancer health risk to any population that would potentially be exposed to these emissions.

Table DR-78c
Estimated Cancer Risk and Chronic Total Hazard Index

Cancer Risk at Point of Maximum Impact (excess risk in 1 million)			Chronic Risk at Point of Maximum Impact (Total Hazard Index)		
General Receptors	Sensitive Receptors	Off-Site Worker Receptors	General Receptors	Sensitive Receptors	Off-Site Worker Receptors
3.44	2.65	0.70	0.09	0.07	0.07

Data Request 79: Please provide fugitive emission factors for dioxins and furans on fly ash and all project-related emissions, including DPM emissions from the estimated 28,360 truck trips for biomass fuel delivery annually (if not already included in the HRA) and revise the health risk assessment to include these emissions.

Response: It is anticipated that no more than trace amounts of dioxins and furans might be found in the fly ash produced from the combustion of biomass. Dioxins and furans are found in the fly ash from combustion of coal, although the combustion of wood and agricultural wastes would produce negligible amounts of dioxins and furans. For this reason, CARB and SJVAPCD do not require wood based biomass power plants to test their fly ash for dioxins and furans, but do require testing for other TACs.

The HRA presented in the AFC included the DPM emissions from the trucks delivering biomass, limestone, hydrated lime, ammonia and removing the fly ash. It also included the DPM emissions from the mirror washing trucks.

The HRA was revised due to revisions in the plant design, although the TAC emissions from the facility did not change significantly. Revised TAC emissions from the operation of the project are presented in Appendix PH-2. The plant design changes are outlined in detail in the General Comments section before the air quality Data Request Responses, and consist of a reduction in combustor stack diameter, revision to combustor stack parameters, change from two 2-cell cooling towers to two 4-cell WSACs, removal of the biomass building and relocation of some minor buildings.

The results from the revised HRA are presented in Table DR-79 and are similar to those presented in the AFC. The estimated cancer risk at all locations for the total SJS 1&2 site is below the significance criteria of 10 in 1 million. Therefore, it is concluded that the Project emissions will not pose a significant cancer risk to any populations potentially exposed to these emissions. The estimated acute and chronic THIs from the total SJS 1&2 site are well below the significance criteria of 1.0. Thus, it is concluded the Project emissions will not pose a significant acute or chronic non-cancer health risk to any populations potentially exposed to the operational Project TAC emissions.

Table DR-79
Estimated Cancer Risk and Acute and
Chronic Total Hazard Indices for SJS 1&2 Site

Receptor Type	Risk	Maximum Risk	NAD 27 UTM Easting (m)[1]	NAD27 UTM Northing (m)[1]	Description of Receptor
PMI	Cancer (in 1 million)	8.703	750416	4001013	on the fence line in the southeastern corner
	Chronic	0.127	748925	4000967	on the fence line in the southwestern corner
	Acute	0.033	755500	3996000	~ 8km southwest from the SJS 1&2 site in the Jacalitos hills
Sensitive	Cancer (in 1 million)	0.306	747569	4001600	Coalinga State Hospital
	Chronic	0.009	747569	4001600	Coalinga State Hospital
	Acute	0.010	747569	4001600	Coalinga State Hospital
Offsite Worker	Cancer (in 1 million)	0.186	748729	4001966	Coalinga State Hospital
	Chronic	0.008	748729	4001966	Coalinga State Hospital
	Acute	0.011	748633	4002174	Coalinga State Hospital

Note:
1 Coordinates are provided in accordance with the Universal Transverse Mercator and North American Datum, 1927, Zone 10.

Data Request 80: Please provide complete copies of all documents used to generate biomass combustor emission factors for dioxins, furans, PAHs, hexavalent chromium, lead, As, Be, Cd, Hg, Ni, and HCl. Please also provide complete copies of all documents used to generate emission factors for the TACs emitted on fly ash.

Response: TAC emissions from the biomass combustors were estimated using emission factors provided by the equipment vendor, EPI, and emission factors provided by SJVAPCD for a similar biomass facility, the Mendota Biomass Power Plant. The EPI emission factors were used for hydrogen chloride and ammonia and reflect the effects of the planned control equipment in reducing emissions of these chemicals. The emission factors provided by SJVAPCD were used for all other TACs.

Fugitive TAC emissions from the unloading and handling of the fly ash produced in the biomass combustors were estimated using SJVAPCD provided emission factors for a similar facility, Thermal Energy Inc., and using the design control efficiency provided by the biomass facility equipment supplier.

The emission factors for the biomass combustors and fly ash handling are provided in Appendix PH-2.

Data Request 81: Please provide a cumulative health risk assessment that includes emissions of TACs from the prison, the hospital, and any other source located within one mile of the proposed power plant, as well as from all project-related sources, including DPM emissions from the estimated 28,360 truck trips for biomass fuel delivery, fugitive emissions of ash, emissions from the wet surface cooling towers, and DPM from vehicles used to wash the mirrors.

Response: The following describes the cumulative health risk assessment that was conducted to answer Data Request 81. In addition to the proposed Project, the Coalinga State Hospital and the Pleasant Valley State Prison were included in this cumulative HRA, no other sources were identified within 1 mile of the Project site.

The potential cumulative human health risks posed by the emissions from the SJS1&2 Project, the Pleasant Valley State Prison and the Coalinga State Prison were assessed using procedures consistent with those used in conducting the HRA for operational emissions as described in Section 5.16, Public Health and Safety of the AFC. Therefore, the approach and methodology used to characterize risk are not repeated here; only the emissions from the Pleasant Valley State Prison and the Coalinga State Prison and the results of the cumulative HRA are presented.

The TAC emissions rates for the Project operational phase used for the cumulative HRA are presented in Appendix PH-2. The emissions rates from the Pleasant Valley State Prison and the Coalinga State Hospital are summarized in Tables DR-81a and DR-81b, respectively. They were derived from data contained in the operating permits of these facilities. Detailed calculations of these emissions are presented in Appendix PH-3.

Table DR-81a
Toxic Air Contaminant Emission Rates from the Pleasant Valley State Prison

TAC	TAC Emission Rate							
	ICE1		ICE2-3*		ICE4-5*		Total All Sources	
	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
DPM	1.49	29.80	7.20	144.00	1.49	59.60	18.87	437.00

* Emissions data for each ICE

Table DR-81b
Toxic Air Contaminant Emission Rates from the Coalinga State Hospital

TAC	TAC Emission Rate									
	Boiler		ICE1-4*		ICE5		ICE6		Total All Sources	
	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
DPM	2.99	8.96	0.64	31.80	0.04	7.94	0.05	10.14	5.62	154.24
Acetaldehyde	1.73E-04	1.85							1.73E-04	1.85
Benzene	8.41E-05	0.90							8.41E-05	0.90
Formaldehyde	4.31E-03	46.08							4.31E-03	46.08

* Emissions data for each ICE

SJVAPCD has significance criteria for cancer and non-cancer health effects from individual facilities, but not from multiple facilities. For carcinogenic health effects, an exposure to an individual facility's emissions is normally considered potentially significant when the predicted incremental lifetime cancer risk of the source exceeds 10 in 1 million. For non-carcinogenic health effects (chronic or acute), an exposure that affects each target organ is considered potentially significant when the THI exceeds a value of one for an individual facility. The results of the cumulative HRA are below these significance thresholds.

Table DR-81c presents the results of the Project cumulative TAC emissions HRA for cancer and acute and chronic non-cancer health risks. Modeling files are provided on the modeling CD/DVD submitted with these Data Request Responses.

Table DR-81c
Estimated Cancer Risk and Acute and Chronic Total Hazard Indices for SJS 1&2 Cumulative HRA

Receptor Type	Risk	Maximum Risk	NAD 27 UTM Easting (m)	NAD27 UTM Northing (m)	Description of Receptor
PMI	Cancer (in 1 million)	8.864	750437	4001188	on the eastern fence line near the southeastern corner
	Chronic	0.127	749124	4000973	on the southern fence line near the southwestern corner
	Acute	0.033	751500	3996000	~ 5.5km south of the SJS1&2 site
Sensitive	Cancer (in 1 million)	0.351	748444	4006926	res32
	Chronic	0.008	748444	4006926	res32
	Acute	0.008	751204	4004310	res8
Offsite Worker	Cancer (in 1 million)	0.246	748732	4001866	Coalinga State Hospital
	Chronic	0.008	748729	4001966	Coalinga State Hospital
	Acute	0.009	748732	4001866	Coalinga State Hospital

Since the cumulative HRA results are below the single facility thresholds, it is concluded that the cumulative emissions of TACs from SJS 1&2, the prison, and the hospital will not pose a significant cancer nor acute and chronic non-cancer health risk to any population that would potentially be exposed to these emissions.

TECHNICAL AREA: RELIABILITY

Data Request 82: Please discuss possible fuel supply fluctuations during the lifetime of the project and provide evidence, such as a will serve letter or a description of terms for contracts currently being negotiated, that the fuel suppliers are willing and ready to supply the required quantities.

Response: Possible fuel fluctuations include variations on the type of orchard wood waste collected (nut crops, stone fruit crops, citrus crops, etc), and seasonal variations in the urban or municipal green waste stream. Significant fluctuations in the overall supply of biomass fuel are not anticipated over the life of the project, biomass supply is expected to increase as open burn bans are implemented. The fuel supply study included in the AFC concludes that 947,000 BDT/year of available biomass fuel is located within the 75-mile FSA. Refined engineering by the biomass boiler equipment supplier (EPI) reduced the annual fuel requirements to 450,000 BDT/yr. This provides a 2.1 fuel coverage ratio for SJS. Additionally, the fuel supply study estimates did not account for the pending enforcement of Rule 4103 (open burning ban). Adding the additional agricultural biomass that will be available after this rule is enforced, the applicant is confident that biofuel resources are sufficient to operate the Project.
The applicant has not begun formal negotiations with biomass suppliers to date, but the original developer of this project received the following letter indicating a desire and ability to supply a large portion of the projects biomass needs.

Data Request 83: Please describe how the biomass fuel would be protected from rain and wind.

Response: Approximately three weeks of biomass fuel inventory will be maintained on site. The biomass (wood chips) will be stored in large piles (potentially 20 feet tall and 100 feet long). The biomass fuel will not need to be protected from the wind and rain. The biomass chips will be too large to be displaced by wind. Rain in the area is minimal which makes the location a good site for a solar energy plant. If rain falls on the piles, rain water will not penetrate the biomass pile more than a few inches. In fact, any rain will help to reduce any potential dust from the piles. The minimal amount of biomass that may get damp from rain will not affect the performance of the biomass boilers. The design of the biomass boilers allows for small variations in fuel moisture.

Brush Control Inc.

November 27, 2007

Steve J. Provol
Bethel Energy
12025 Blue Diamond Court
San Diego, CA 92131

Dear Steve:
Thank you for taking time to meet with us last week. Mike and I were very impressed with your projects and your foresight in the renewable energy industry. We are excited about the possibility of working together to supply you with some of the fuel you are planning to burn in your plants.

We have reviewed our existing contracts and obligations to determine the availability of agricultural wood waste as well as urban green waste and other sources of biomass fuel. As we mentioned in our meeting, we believe there will be an ever increasing supply of fuel as we see more restrictions on open field burning in California. We are aware of virtually every biomass plant currently on the drawing boards, and if all were built within the next 10 years they would still not be able to keep up with the anticipated supply of ag and urban waste.

Your facility planned for the San Joaquin Valley will have easy access to fuel at prices less than $30 per dry ton, delivered to your plant. With the supply expected to exceed demand for the foreseeable future, you will have no difficulty acquiring 200,000 tons per year at those prices. Additional tonnage is available from urban green waste, mostly sourced from landfills that face mandatory reductions in volume. This fuel is less expensive, but lower in BTU's per ton. It also may require screening to remove fines and foreign material, but most facilities burn a combination of both ag and urban during the year.

We anticipate that the Imperial Valley facility will need to depend on urban green waste more than the San Joaquin Valley due to the reduced acreage of orchards in that area. We feel there may be an untapped source of ag waste from row crops to supplement the urban sources of fuel, and look forward to developing that source for you.

We feel that we will be able to provide you with a steady supply of fuel for both facilities from our own production as well as our joint ventures with other grinding companies. We can also source fuel from urban areas and develop new fuel supplies near the Imperial plant. With the acute over-supply at the present, we feel confident that long term contracts can be executed with various suppliers in addition to our own production.

We would like to prepare a proposal for you in the next week or two, detailing our plan for providing you with the fuel you require for both facilities. It appears that your timing is perfect for a mutually beneficial arrangement for all of us. We look forward to that end.

Sincerely,

Brian Blain
President – Brush Control Inc.

P. O. Box 507, Visalia, CA 93279 (559) 732-2060 www.brushcontrol.com

TECHNICAL AREA: SOCIOECONOMICS

Data Request 84: Because a Williamson Act Contract is the legal document that obligates the property owner, and any successors of interest, to the contract's enforceable restrictions, please provide documentation that the Fresno County Board of Supervisors (or the Housing and Community Development Department) adopted (or approved) the project site as an Enterprise Zone.

Response: Documentation from the Fresno County Board of Supervisors is attached.

Agenda Item 37

DATE: December 9, 2008

TO: Board of Supervisors

FROM: John Navarrette, Interim County Administrative Officer

SUBJECT: Resolution in support of the proposed expansion of the Fresno County Regional Enterprise Zone (Phases IV and V)

RECOMMENDED ACTION:

Approve resolution in support of the addition of industrial and commercial areas from the City of Coalinga and fourteen Fresno County business applications to expand the Fresno County Enterprise Zone.

ALTERNATIVE ACTION:

This agenda item is consistent with your Board's support to expand the benefits of the Fresno County Enterprise Zone Program to as many businesses as possible. No other alternatives have been considered.

FISCAL IMPACT:

The City of Coalinga has paid its proportional share for the processing of this Enterprise Zone expansion application ($600.00) and each business application has paid a base fee of $289.56 previously approved by your Board. Total funds received from these applications are $6,338.36. The Enterprise Zone Advisory Board has allowed the County of Fresno to retain these funds for reimbursement of the expenses related to these applications.

IMPACTS ON JOB CREATION:

The expansion of the Fresno County Enterprise Zone enhances the opportunities to increase the creation of jobs in Fresno County.

ADMINISTRATIVE OFFICE REVIEW Jane Lem-Barrera Page 1 of 2

BOARD ACTION: DATE December 9, 2008 APPROVED AS RECOMMENDED X OTHER

Official Action of Board of Supervisors

Deputy

UNANIMOUS X ANDERSON ____ CASE ____ LARSON ____ PEREA ____ WATERSTON ____

FC-017 (eForms-0904)

DISCUSSION:

The City of Coalinga has submitted a request to the Enterprise Zone Advisory Board to add certain commercial and industrial areas that had been previously excluded from the current boundaries of the Fresno County Enterprise Zone. This application also contains certain technical corrections to include only areas zoned industrial and commercial. Additionally, County staff has received fourteen applications from existing and proposed businesses located in various locations in Fresno County. These businesses would like to join the Fresno County Enterprise Zone Program. Attachment 1 provides a resolution recommended for approval by your Board. Exhibits A and B provide maps of the industrial and commercial areas proposed for inclusion by the City of Coalinga and the fourteen businesses requesting to be added to the Enterprise Zone.

According to regulations of the California Department of Housing and Community Development Department, the addition of territory to the Enterprise Zone require that each member of the zone pass a resolution in support of this proposal before it can be forwarded to the California Department of Housing and Community Development. The Fresno County Enterprise Zone Advisory Board has already approved in concept these expansion proposals.

The Enterprise Zone Advisory Board is comprised of representatives from the thirteen-city members, the County, the Fresno County Workforce Investment Board and the Economic Development Corporation serving Fresno County. The Cities of Clovis and Fresno currently serve as ex-officio members.

The original boundaries of the Fresno County Enterprise Zone included 174,725.74 acres. Under State of California rules, the Zone is entitled to a 15% expansion or the possible addition of 26,208.86 acres. So far, the State has approved the addition of territory in Phases I and II (Coalinga, Huron and Kingsburg). The approval of Phase III with the City of Clovis is pending approval (Approval should be coming before the end of 2008). The current size of the Fresno County Enterprise Zone is 184,373.42 acres. There are 16,561.19 acres available for future expansions.

The City of Clovis is proposing to add 1,582 acres of industrial and commercial territory to the enterprise zone. Phases IV and V would add 710.80 acres to the boundaries of the Enterprise Zone.

The proposed additions/changes by the City of Coalinga and the fourteen new business applications broadens the job opportunities to participants of the Enterprise Zone Program by making available tax incentives to more industrial and commercial businesses in Fresno County. After the councils of all participating cities and the Board of Supervisors have passed resolutions in support of this EZ expansion proposal, this application will be forwarded to the California Department of Housing and Community Development for approval consideration.

OTHER REVIEWING AGENCIES:

The State of California's Housing and Community Development Department makes the final determination whether territory of a new city or county territory can be added to the enterprise Zone.

BEFORE THE BOARD OF SUPERVISORS

OF THE

COUNTY OF FRESNO, STATE OF CALIFORNIA

IN THE MATTER OF AUTHORIZING THE SUBMITTAL OF EXPANSION PROPOSALS PHASES IV AND V TO THE CALIFORNIA DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT	RESOLUTION

WHEREAS, Effective June 27, 2007 the County of Fresno, the Cities Firebaugh, Fowler, Kerman, Orange Cove, Mendota, Parlier, Reedley, San Joaquin, Sanger and Selma received official designation as a California Enterprise Zone by the California Department of Housing and Community Development (the Department).

WHEREAS, effective January 6, 2008 the California Department of Housing and Community Development Department approved Phases I and II. Phase I Expansion Proposal included commercial areas located in unincorporated Fresno County, and Phase II included the addition of unincorporated territory and areas from the Cities of Kingsburg, Coalinga and Huron ; and

WHEREAS, the California Department of Housing and Community Development Department is currently reviewing the proposed addition to the Fresno County Enterprise Zone (Phase III) of industrial and commercial areas located in the City of Clovis;

WHEREAS the City of Coalinga would like to add certain commercial and industrial areas previously not included within the boundaries of the Fresno County Enterprise Zone and some technical corrections are necessary to areas located in its vicinity;

WHEREAS fourteen existing and proposed businesses located throughout Fresno County have applied to join the Fresno County Enterprise Zone;

WHEREAS, the Fresno County Enterprise Zone Advisory Board has reviewed and approved the inclusion of industrial and commercial areas located in and around the City of Coalinga and other parts of Fresno County as depicted on maps of Exhibits A and B; and

WHEREAS, the County of Fresno as the lead agency and the Fresno County Enterprise Zone Manager will submit this application on behalf of all the participating cities;

WHEREAS, the expansion of the Fresno County Enterprise Zone enhances the opportunities to increase the creation of jobs in Fresno County and improve the quality of life of its residents; and

WHEREAS, the City of Coalinga and all participating jurisdictions commits to provide incentives equivalent to other Fresno County Enterprise Zone authorized cities and the County of Fresno, to include but not limited, Enterprise Zone targeted fee reductions, reduce permit processing time, appropriately designated business grant or loan programs and the expansion of local infrastructure and industrial park availability; and

WHEREAS, the City of Coalinga and all participating agencies authorize and supports job development, job creation, and economic development;

NOW, THEREFORE, BE IT RESOLVED by the Fresno County Board of Supervisors that the Board approves the submittal of this Phases IV and V Enterprise Zone expansion application, including the attached maps with the proposed City of Coalinga additions/changes, and fourteen business applications to the California Department of Housing and Community Development by the Fresno County Enterprise Zone Manager.

Passed, approved and adopted this _____ day of _____, 2008.

THE FOREGOING was passed and adopted by the following vote of the Board of Supervisors of the County of Fresno this 9th day of December, to-wit:

AYES: Supervisors Larson, Case, Anderson, Waterston, Perea

NOES: None

ABSENT: None

CHAIRMAN, Board of Supervisors

ATTEST:

BERNICE E. SEIDEL

Clerk, Board of Supervisors

By

Deputy

Resolution #08-512

Item #37

EXHIBIT A

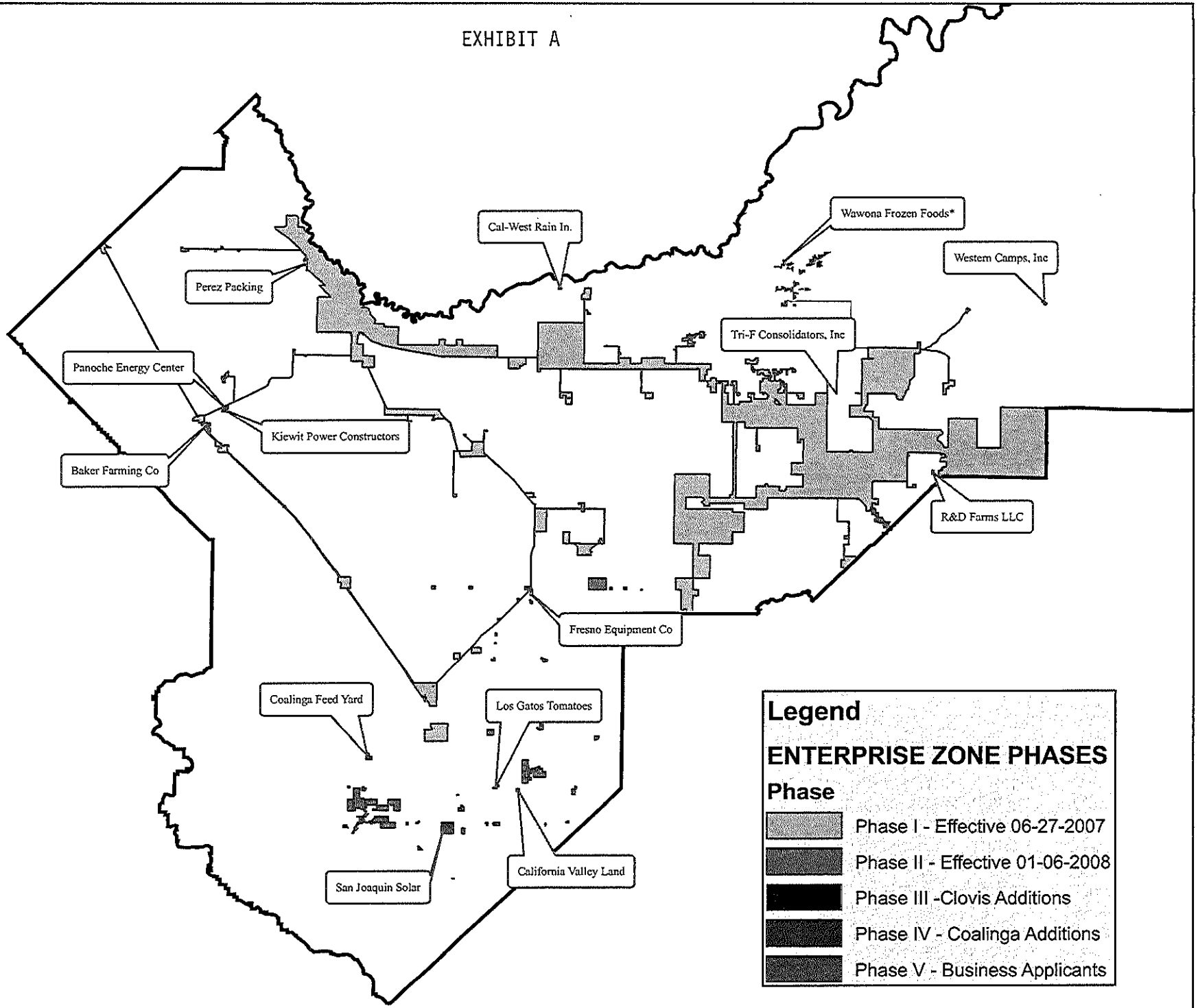
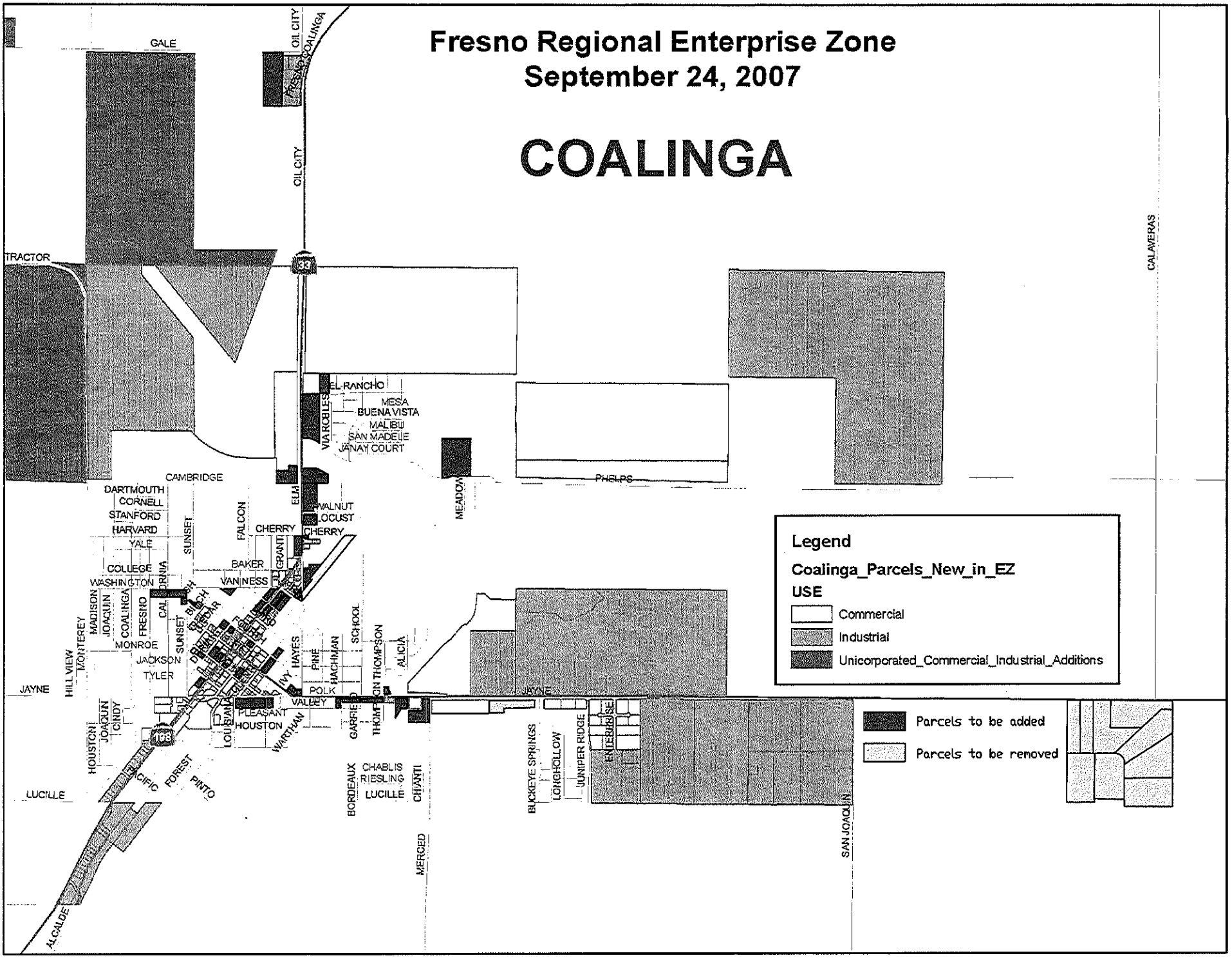

Cal-West Rain In.
Wawona Frozen Foods*
Western Camps, Inc
Perez Packing
Tri-F Consolidators, Inc
Panoche Energy Center
Kiewit Power Constructors
Baker Farming Co
R&D Farms LLC
Fresno Equipment Co
Coalinga Feed Yard
Los Gatos Tomatoes
San Joaquin Solar
California Valley Land
Legend
ENTERPRISE ZONE PHASES
Phase
Phase I - Effective 06-27-2007
Phase II - Effective 01-06-2008
Phase III -Clovis Additions
Phase IV - Coalinga Additions
Phase V - Business Applicants

EXHIBIT B

Fresno Regional Enterprise Zone
September 24, 2007

COALINGA



Data Request 85: Please provide an estimate of expected credit for the sales and use tax paid or incurred on the purchase of qualified machinery.

Response: SJS expects to have over $250 million of qualified property subject to a sales and use tax. As of April 1, 2009, the sales & use tax rate for Fresno County is 8.975%. However, a number of items in the California tax code will affect the EZ credit for sales & use tax:

- Section 3500 of the California Franchise Tax Board's Economic Development Areas Manual, "in any year…limited liability companies (LLCs) taxed as partnerships may claim a credit on the sales and use tax paid or incurred to purchase up to $1 million of qualified property."
- Section 3530 limits the amount of sales or use tax credit and the hiring credit to an amount less than or equal to the amount of tax on the taxpayer's EZ business income in any year.
- Section 3800 notes: "the portion of the credit that exceeds the net tax/tax for the taxable year may be carried over and added to the credit, if any, in the following year. The credit may be carried over to succeeding years until it is exhausted…In the event that a credit carryover is allowable for any taxable year after the EZ designation has expired, the EZ will be deemed to remain in existence for the purpose of computing the business income limitation."
- Section 3830 notes: "there are no recapture provisions for the EZ sales and use tax credit."

Based on the items above and the fact that the project is legally structured using LLCs, SJS expects to recognize an annual EZ sales & use tax credit of $89,750 on its state business income taxes. Any unrecognized basis for qualified property will carry forward to future tax years until the basis is exhausted.

Data Request 86: Please provide an estimate of expected hiring credit for wages paid to qualified employees.

Response: The applicant's preliminary engineering firm currently estimates that SJS will require approximately 1,585,830 manhours during construction and 70 full-time employees during operation (or 145,600 operational manhours/year). The Enterprise Zone hiring credit is subject to the following items:

- Section 2000: "The California Revenue & Taxation Code provides a hiring credit for qualified taxpayers who employ qualified employees within a designated Enterprise Zone and pay qualified wages to these employees…The EZ hiring credit applies to those employees hired after the designation date of the EZ."
- Section 2300: "Qualified wages are wages paid or incurred to qualified employees during the consecutive 60-month period beginning with the first day the employee commences with the taxpayer."
- Section 2330 specifies the maximum hourly wage credit currently in effect as $12/hour.
- Section 2400 defines a qualified employee as an individual who satisfies all of the following:
  - At least 90% of the individual's work for the taxpayer, during the taxable year, is directly related to the conduct of the taxpayer's trade or business located within the EZ
  - At least 50% of the individual's services for the taxpayer, during the taxable year, are performed within the boundaries of the EZ
  - The individual is hired after the area was designated as an EZ (or after the expansion date of an area of an EZ)
  - Immediately prior to commencement of employment with the taxpayer, the individual is…a resident of a Targeted Employment Area (TEA), as defined in Section 7072 of the Government Code.

- Section 2500 defines the credit computation as follows: "For each taxable year a hiring credit is allowed to a qualified taxpayer for hiring a qualified employee for employment within an EZ. The credit is equal to the sum of each of the following:

  - 50% of qualified wages during the first year of employment
  - 40% of qualified wages during the first year of employment
  - 30% of qualified wages during the first year of employment
  - 20% of qualified wages during the first year of employment
  - 10% of qualified wages during the first year of employment

- Section 2530 notes: "The amount of the hiring credit or the sales or use tax credit claimed, including any credit carryover from prior years, may not exceed the amount of the tax on the taxpayer's EZ business income in any tax year."

- Section 2600 notes: "The portion of the credit that exceeds the net tax/tax for the taxable year may be carried over and added to the credit, if any, in the following year. The credit may be carried over to succeeding years until it is exhausted."

- Section 2621 notes that for non-seasonal employees: "Recapture of the hiring credit is required if the employee is terminated before the end of the longer of the following two periods (unless an exception is met):

  - The first 270 days of employment (whether or not consecutive)
  - Ninety (90) days of employment plus 270 calendar days

Based on the items above, the following calculations were made for the hiring credit. During construction, we assume 60% of total manhours will be from qualified employees. This assumption is based on the number of employees coming from a Target Employment Zone and the 270 day work requirement in Section 2621.

Year	Credit	Calculation Explanation
1 (construction)	$3,805,992	=1,057,220 (1,585,830 total construction manhours*66%)*60% (qualified employee/total employee rate)*$12/hr (maximum credit)*50% (per credit calculation formula)
2 (6 months construction/6 months operation)	$1,959,197	= [528,610 (1,585,830 total construction manhours*33%)*60% (qualified employee/total employee rate)*$12/hr (maximum credit)*40% (per credit calculation formula)] + [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*50% (per credit calculation formula)]
3 (12 months of commercial operation)	$786,240	= [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*50% (per credit calculation formula)] + [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*40% (per credit calculation formula)]
4 (12 months of commercial operation)	$611,520	= [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*40% (per credit calculation formula)] + [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*30% (per credit calculation formula)]
5 (12 months of commercial operation)	$436,800	= [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*30% (per credit calculation formula)] + [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*20% (per credit calculation formula)]

Year	Credit	Calculation Explanation
6 (12 months of commercial operation)	$262,080	= [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*20% (per credit calculation formula)] + [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*10% (per credit calculation formula)]
7 (commercial operation – only 6 months allowable under credit)	$87,360	= [72,800 (145,600 operational manhours/year * 0.5)*(100% qualified employee/total employee rate)*($12/hr maximum credit*10% (per credit calculation formula)]

TECHNICAL AREA: WATER AND SOILS

Data Request 87: Please provide a draft Erosion and Sedimentation Control Plan (DESCP) that ensures protection of water quality and soil resources of the project site and all linear facilities during the construction phase of the project. This plan shall address appropriate methods and actions for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, meet local requirements, and identify all monitoring and maintenance activities. The draft plan shall be consistent with the grading and drainage plan and may incorporate by reference any storm water pollution prevention plan developed in conjunction with any NPDES permit.

Response: The Applicant prepared a draft Erosion and Sedimentation Control Plan addressing the construction phase of the project. (See Water Appendix)

Data Request 88: Please provide draft SWPPPs consistent with the requirements for a National Pollutant Discharge Elimination System (NPDES) General Permit for construction and operation of the site and associated linear facilities.

Response: The Applicant prepared a draft SWPPP consistent with the requirements for a NPDES General Industrial Permit (operations phase). A draft construction phase SWPPP in compliance with the State Water Resources Control Board Construction General Permit will be included with the DESCP.

Data Request 89: Please provide a description of the methodology proposed if Caltrans requires a subsurface crossing of I-5 by the transmission line. This description shall provide the excavation and boring method, address soil and water management, erosion control, and provide a contingency plan in the event that groundwater is encountered.

Response: It is currently anticipated that a subsurface crossing of I-5 will not be necessary for the transmission line.

Data Request 90: Please provide the long-term maintenance requirements for access roads, reapplication requirements of herbicides, dust suppressants, and soil stabilizers, and the expected number and size of the maintenance equipment that would be used for all maintenance activities in the facility.

Response: The only road will be concrete is the access road to deliver biofuel to the truck unloading zone of the fuel storage area, the perimeter road will be asphalt, access between SCAs/mirrors will be dirt, permanent access roads in the center of the facility are asphalt, and access areas between equipment in the power block/biomass facilities will be covered with gravel.

Long Term Maintenance Requirements for Access Roads
The main access roads will be concrete with a life expectancy of approximately twenty years. An herbicide application will be applied annually on the shoulders. Roadway shoulder maintenance will consists of grooming and filling the gravel on shoulders every two years.

The asphalt service roads and parking lots have a life expectancy of approximately ten years. Long term maintenance will consist of asphalt cap and gravel every ten years and cracks will be filled and sealed every five years. Roadway shoulder maintenance will consist of grooming and filling gravel every two years. An herbicide application will be applied annually to the shoulders.

Non-Paved access roads have an approximate life expectancy of six years. Initial construction will consist of approximately 10-inches of well compacted, well-graded crusher run aggregate. Maintenance will consist of yearly spot repair of thin spots, with grading and rolling compaction every other year. Herbicide will be applied approximately twice a year. Dust control will be applied as necessary.

Maintenance Equipment
Maintenance equipment will consist of approximately three to four pick-up trucks, one backhoe, one tractor with a scraper blade, one water truck, one bucket truck, and one portable welder/generator. Front end loaders will also be used for the biomass handling.

Data Request 91 Please provide the proposed mirror washing schedule, including the frequency, duration, and quantity of water that would be used.

Response: Mirror washing will occur nightly, five days per week. Each solar field will use one truck per solar field for a total of two water trucks. Each truck will operate 12 hours using 2500 gallons per day, for a total of 5000 gallons per day.

Data Request 92: Please describe in detail the method by which the mirrors would be washed and the volume of water that would run off the mirrors and onto the soil below the mirrors.

Response: Mirror washing will occur nightly, five days per week. Each truck will operate 12 hours using 2500 gallons per day, for a total of 5,000 gallons per day. Routine mirror washing will consist of application of high-pressure demineralized water sprayed onto the mirror surfaces. The Applicant will utilize several mirror washing methods on a rotating basis –once each month the mirrors will be washed with a high pressure method; once a month the mirrors will be washed with a high volume method. Details of the methods include:

- High-pressure rig consisting of a tractor-pulled trailer that contains a water tank and hand-held spray nozzles;
- Rotating-head rig consisting of a tractor pulling a wheeled tank-and-pump unit. The tractor is mounted with a controllable arm mounted in the front. The arm, with five movement articulated control from within the tractor cab, supports a configuration of spray arms that are fed by high-pressure water from the tank unit, and,.
- High-volume method using a large-capacity water truck driven with fixed nozzles on each side of the truck to spray the rows of mirrors simultaneously with a “deluge-type” stream of water.

It takes approximately two weeks to complete the washing of one solar field. Therefore, each solar field has one washing crew using either the high pressure or high deluge. After completing the solar field in two weeks, they begin washing the solar field again with the alternate method, so each mirror is cleaned twice each month. See the attached photos for the typical mirror washing methods.

It is expected that most of the washwater will evaporate from the reflector surface upon application with only a fraction falling to the ground surface where it will evaporate. It is not anticipated that the incidental amount of mirror washwater that falls to the ground will reach the groundwater based on the minimal volume, high evaporation rate, and the depth to groundwater.

High Pressure (twister) method.

High Pressure (hand held) method

High Volume (deluge) Method

Data Request 93: Please describe how vegetation would be managed, including treatment of noxious and invasive species, beneath the mirrors.

Response: General site monitoring of the operating facility will be conducted by grounds personnel on an ongoing basis. Vegetation and weed control will be conducted, as needed, by grounds personnel, at a minimum of every other week during the growing season (March through August), and once a month otherwise. Grounds personnel will be trained to identify weedy and native species.

Vegetation management, including treatment of noxious and invasive species may include both physical control and herbicides.

The type of physical control method employed will depend upon the size and extent of vegetation and weed species targeted for removal as well as the root structures of these plants. Physical control methods range from manual hand pulling of weeds to the use of hand tools to provide enough leverage to pull out the entire plant and associated root systems. In small areas, hoeing and weed whipping may be employed to control weeds.

Herbicide application is a widely employed, effective control method for removing invasive weed species. Prior to application of herbicide, the required permits from state and local authorities will be obtained. Herbicides will be applied in accordance with applicable laws, regulations, and permit stipulations. Only herbicides approved by the State of California will be used within or the project site.

Data Request 94: Please describe the chemical constituents and their concentration in the water that would be used to wash the mirrors.

Response: Washwater is boiler feed water quality. It is demineralized water with no chemical constituents.

Data Request 95: Please discuss how wastewater from the mirror washing would be managed.

Response: Most of the washwater will evaporate from the reflector surface upon application with only a small fraction falling to the ground surface where it will evaporate. Therefore there is no planned wastewater system or stream anticipated for managing the incidental amount of washwater that reaches the ground surface.

Data Request 96: Please describe the specific chemicals compositions of any herbicides, dust suppressors, or soil stabilizers that would be used by the project.

Response: Dust Suppressors and Soil Stabilizers

Currently it is not anticipated that the project will utilize dust suppressant chemicals for road and soil stabilization. Fly ash (by-product from the biomass facility) may be utilized for soil stabilization onsite.

Herbicides

At this time the use of herbicides has not been determined for the project. If herbicides are used in conjunction with physical vegetation and weed control, the following response provides a general characterization of herbicides and chemical constituents.

Herbicides are characterized by the way in which they inhibit plant growth. Herbicides are characterized as pre-emergent, post-emergent, selective and nonselective. A pre-emergent herbicide controls un-germinated seeds by inhibiting germination while a post-emergent herbicide is lethal to emerged plants. Some herbicides have both pre- and post-emergent activity. A selective herbicide will be active on some species of plants and not others, usually distinguishing between grasses (monocots) and broadleaf plants (dicots). A non-selective herbicide is one that is lethal to any plant species to which it is applied.

Pre-emergent herbicides inhibit germination of annuals from seed, but generally do not control perennial plants that germinate from bulbs, corms, rhizomes, stolens, or other vegetative structures. Common pre-emergent herbicide classes include the following:

- Dinitroaniline Type**:** Examples of this class are pendimethalin (Weedgrass™), trifluralin (Treflan™), benefin (Balan™), and combinations of these. These herbicides provide for pre-emergence control of annual grasses and other annuals. These herbicides need to be watered into the soil for proper activation. Some can persist for several months.
- Dithiopyr (Dimension™) belongs to a new class of herbicide known as pyridines. It is a selective herbicide primarily used for pre-emergence annual grass control in established turfgrass. However, it can be used for post-emergence control of young grass seedlings. Dithiopyr is lost from soil by chemical and microbial degradation.

The most commonly used post-emergent, non-selective herbicides contain a family of chemicals called glyphosates (N-[phosphonomethyl] glycine). Glyphosate (Rodeo™, Roundup™, and Accord™) is a non-selective, systemic herbicide that is effective on many annual and perennial plants.
The United States Environmental Protection Agency has deemed glyphosate to have a relatively low degree of oral and dermal acute toxicity. It is considered to be immobile in soil and readily degraded by soil microbes to the metabolite aminomethyl phosphonic acid and then to carbon dioxide. EPA states that it is minimally toxic to birds, fish, aquatic invertebrates, and honeybees.

Data Request 97: Please discuss and quantify the buildup of the mirror wash water, herbicides, dust suppressor, and soil stabilizer chemicals in the soil over the life of the project.

Response: The mirror wash water will consist solely of demineralized water with no added chemical constituents. It is not anticipated that dust suppressor and soil stabilizer chemical will be used.

Herbicides will be applied to control vegetation and weed growth. At this time the specific herbicide product that will be applied has not been determined. Persistence of various herbicides in the soil is discussed in the response to Data Request 96. Dinitroaniline type herbicides can persist in the soil for several months. Dithiopyr type herbicide is lost from soil by chemical and microbial degradation. Glyphosphate type herbicides are considered to be immobile in soil and readily degraded by soil microbes to the metabolite aminomethyl phosphonic acid and then to carbon dioxide. It is not anticipated that their will be a significant buildup of herbicides that will not be degraded by the soil over the life of the project.

Data Request 98: Please quantify the potential environmental impact of using the proposed combination of recycled water and groundwater on the local and regional water supply and on other users of the groundwater basin. This analysis shall include whether the groundwater could be considered a potential drinking water supply, whether pumping could result in long-term overdraft, and whether there may be, if treated, any water quality impacts due to use of recycled water and groundwater.

Response: The Applicant currently proposes to use both groundwater (from an on-site well) and from the proposed Coalinga Wastewater Treatment Facility (WWTF). Currently it is anticipated that approximately half of the water utilized onsite will come from each source, with expected diminishing use of groundwater over the life of the project as expected supply from the Coalinga WWTF increases. From an impacts perspective, it is not expected that use of onsite groundwater would result in significant impacts to any existing nearby wells (URS, Technical Memorandum regarding the aquifer test analysis, dated February 19, 2009, posted to CEC website March 20, 2009, and URS Memorandum regarding anticipated well performance, dated January 23, 2009 and posted to the CEC website as Attachment 14 for the Supplemental Project Information). The proposed groundwater usage rate during operation (approximately 1,000 to 1,100 acre-feet per year [afy]) is similar to recent historic use on the site and vicinity of 1,410 afy (for 510 acres of pistachios, wheat, and cotton), as well as existing agricultural uses in the area on a per acre basis. For example, almond trees typically require between 1 and 4 afy (per acre) (UCCE, 2009). So, if the 640 acre project site was planted in almonds, approximately 640 acre feet of water would be required just to keep the trees alive to 2,560 acre feet of water for a big crop on mature trees. Rainfall would only account for about 426 acre feet of water in an average year. Based upon these comparisons of proposed project groundwater use, recent site vicinity water use, and a typical agricultural use, no impacts are expected from a regional groundwater use perspective.

Existing uses of groundwater in the Pleasant Valley Groundwater Basin (PVGB) are predominately agricultural in nature however, groundwater use for drinking water is not precluded. Existing beneficial uses of groundwater within the Pleasant Valley Groundwater Basin consist of Municipal, Agricultural, and Industrial (CVRWQCB, 2004). However, based upon information provided in the Coalinga WWTP EIR, groundwater in the Coalinga area is not a viable source of potable water due to toxic concentrations of asbestos in some areas. Local groundwater is of poor quality and contains high concentrations of sodium, sulfates, and total dissolved solids (TDS), and is even considered only marginally acceptable for crop irrigation. The City of Coalinga obtains its potable water supply from the California Water Project (Coalinga, 2006, 2009). The state prisons near Coalinga and Avenal also use imported water. Additional recharge may occur as a consequence of this water use. Effluent from the existing WWTP is currently pumped year round for agricultural irrigation (non-human consumption crops). Excess effluent, anticipated during the winter months, is disposed of on City-owned property where effluent can be applied at higher than agronomic rates (Coalinga 2006, 2009). However, the current WWTF effluent disposal practices were listed as temporary practices until such time as the new WWTF is constructed. All current and proposed future uses of the Coalinga WWTP water would be within the Pleasant Valley Groundwater Basin (PVGB). While there maybe small localized reductions in potential percolation to the groundwater by using the future WWTP effluent for the project use in lieu of City use, the proposed recycled water use is consistent with State water policy for use of water for power plants (SWRCB, Policy 75-58).

Both the groundwater and recycled wastewater will be treated onsite to high levels consistent with power plant requirements. Process wastewater will be sent to a lined evaporation pond. The pond will be designed and monitored in accordance with State and Regional Water Quality Control Board permits to ensure water quality requirements are met to avoid surface and groundwater quality impacts.

References:

Central Valley Regional Water Quality Control Board (CVRWQCB), 2004. Water Quality Control Plan for the Tulare Lake Basin, Second Edition, Revised January 2004.

Coalinga, City of. 2006. Wastewater Treatment Plant, Final Program Environmental Impact Report, prepared by Morro Group, a division of SWCA

Coalinga, City of. 2009. Wastewater Treatment Plant, Final Supplemental Environmental Impact Report, prepared by Morro Group, a division of SWCA

State Water Resources Control Board (SWRCB), Use and Disposal of Inland Waters used for Power Plant Cooling - Water Quality Control Policy, Resolution 75-58

University of California Cooperative Extension (UCCE), Sutter/Yuba Counties, Pomology Notes, Almonds, January/February 2009.

Data Request 99: If the groundwater could be considered a potential drinking water supply or have other significant beneficial uses, please quantify and discuss in detail the economic soundness and environmental desirability of using an air-cooled or air-water hybrid system for power plant cooling.

Response: As discussed in Data Request 98 response groundwater in Pleasant Valley is generally not considered viable for drinking water supplies. Additionally, the groundwater is generally of marginal quality for agricultural purposes. The RWQCB Basin plan does however list beneficial uses for Municipal, Agricultural, and Industrial purposes. California State Water Resources Control Board (SWRCB) Resolution No. 75-58, Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling mandates the California Regional Water Quality Control Boards (RWQCB) to implement a consistent program within California to evaluate the use of inland waters for power plant cooling and the disposal of power plant cooling waters. In light of SWRCB Resolution No. 75-58 the Applicant sought the use of recycled water from the proposed City of Coalinga WWTP. During initial operation, approximately half of the required project water will be supplied by the WWTP. Although use of groundwater has potential conflict with Resolution No. 75-58, groundwater usage rates are anticipated to be similar to typical agricultural usage rates in the area.

Wet cooling is more efficient than dry cooling and generally requires less capital outlay, but consumes greater quantities of cooling water. The use of dry cooling generally requires increased capital costs and operational costs while reducing water needs. Hybrid cooling involves using a combination of both dry and wet cooling. Hybrid cooling also generally requires increased capital costs and operational costs while reducing water needs. The lower efficiency of dry cooling is another drawback to the use of dry cooling. To help offset the higher water requirements for wet cooling, the project plans to cycle water to maximize the use of make-up water (maximum number of cycles is limited by influent water quality constraints).

Data Request 100: Please discuss whether the intent is to provide groundwater for both phases of the project if recycled water does not become available in accordance with the anticipated schedule for development of the WWTP.

Response: Groundwater would be used for both phases of the project (construction and operation) if recycled water does not become available in accordance with the anticipated schedule for development of the WWTP.

Data Request 101: If groundwater would be used for both phases, please discuss pump test results and whether the onsite well can yield a sufficient water volume to supply the entire project (SJS1 and SJS2).

Response: An onsite well testing program and drawdown analysis was performed in February, 2009. A summary of the well testing program, methodology, results and drawdown analysis were provided in a technical memorandum dated February 19, 2009, and docketed on March 20, 2009. Based upon the results of this analysis, the project can support the proposed groundwater use assuming a worse case scenario of no supply from the future City Wastewater Treatment Plant (WWTP) through use of multiple onsite wells (at minimum one primary well and one or more backup wells).

The drawdown analysis evaluated both the expected onsite annual average groundwater use of approximately 650 gpm, as well as a more conservative assumption of 1,750 gpm. The greater number is an conservative maximum pumping rate over the life of the project assuming no supply from the recycled water from the future Coalinga WWTP. Based upon results of the drawdown analysis, a continuous pumping rate of 650 gpm would result in approximately 10 feet of drawdown approximately 2,000 feet from the location of the existing onsite well over the duration of the project. Based on drawdown analysis results, an assumed continuous pumping rate of 1,750 gpm over the life of the project would result in approximately 30-35 ft of drawdown approximately 2,000 ft from the existing onsite well location. In both cases, greater drawdown would be anticipated within a 2,000 ft radius of the pumping well, and lesser drawdown would be expected outside of that area. Drawdown in this range is similar to drawdown expected for agricultural use of the well under comparable conditions.

Based upon information provided by the owner of the existing onsite well, the well produces up to 1,400 gpm as it is currently configured. The property owner applies about 1,410 afy of groundwater produced by the well to a mixture of agricultural uses (160 acres of pistachios at about 560 afy; 200 acres of wheat at about 400 afy; and 150 acres of cotton at about 450 afy). Proposed groundwater use assuming a rate of 650 gpm annually would be approximately 1,050 afy. Proposed project use assuming no water supply from the future City WWTP would require approximately 2,057 afy.

Although the conservative maximum average annual use assuming no recycled water supply from the future City WWTP is greater than the current onsite well groundwater production of approximately 1,410 afy, it is within the normal range of agricultural irrigation usage for a 640 acre parcel in the area. As a point of comparison, almond trees would require between 1-4 acre feet of water (irrigation and/or rainfall) in a year. If almonds were planted on the entire 640 acres, a farmer would need to apply between 640 afy of water just to keep the trees alive, and up to 2,560 afy of water to support a large crop of almonds on mature trees. These comparisons indicate that the proposed groundwater water use of approximately 1,050 afy (with recycled water supply from the future City WWTP) would be approximately 26% lower than the current agricultural irrigation usage of water from the existing onsite well; and that the maximum water use of approximately 2,057 afy (no recycled water supply from the future City WWTP) would be approximately 20% lower than the maximum annual agricultural water use per year for a typical crop (i.e., almonds) at the project site.

Data Request 102: Please discuss how water will be supplied to the proposed project, in compliance with all LORS and without substantially impacting other groundwater users, if recycled water is not available.

Response: The City of Coalinga intends to construct the proposed WWTP to replace the existing WWTP. The Applicant has obtained a Letter of Intent from the City of Coalinga indicating that up to 1 million gallons per day (mgd) of recycled water will be supplied to the project on an uninterrupted basis except in extraordinary circumstances. Additionally, the Letter of Intent gives the Applicant first right of refusal for additional recycled wastewater beyond the 1 mgd when available. If for some unforeseen reason, recycled water is not available from the City WWTP, groundwater would be utilized for project water requirements utilizing one or more onsite wells. The total project water demand is approximately 2,057 afy or 1,262 gpm (average annual). As indicated in Data Request 98 response, this amount of usage is generally consistent with typical agricultural application rates in the area.

Expected groundwater response to project pumping is provided in a URS, Technical Memorandum regarding the aquifer test analysis, dated February 19, 2009, posted to CEC website March 20, 2009, and URS Memorandum regarding anticipated well performance, dated January 23, 2009 and posted to the CEC website as Attachment 14 for the Supplemental Project Information. The estimated drawdown due to pumping from a single well at the same location as the current onsite well was analyzed for two pumping rates over 1, 10, and 20 year periods: the anticipated rate with recycled water (680 gpm); and, the estimated maximum daily pumping rate (1,750 gpm). Assuming no recycled water the average annual pumping rate would be about 1,262 gpm. Pumping at 680 gpm for 20 years would result in about 10 ft of decrease in head in the aquifer within about 2,000 feet of the existing onsite well and will not significantly impact any existing nearby wells. Pumping at high rate of 1,750 gpm for 20 years would result in about 26 feet of decrease in head in the aquifer within about 2,000 feet of the existing onsite well. Although not specifically analyzed in the model, pumping at an average annual rate of 1,262 gpm would likely result in a reduction in head between 10 and 26 feet within 2,000 feet of the existing onsite well after 20 years. Using results from the drawdown analysis, the anticipated decrease in head at 1 mile from the current onsite well after 20 years would be between about 8 and 22 feet.

Data Request 103: Please provide a map and plans showing the location of the future WWTP and how the anticipated volume of recycled water would be delivered to the project.

Response: See Figure Number DR-58 for location of the future WWTP and proposed water supply pipe alignment. Additional maps and figures can be found in the City of Coalinga WWTP EIR documents.

Data Request 104: Please identify whether there are current or future customers that can or will request delivery of recycled water and identify the volume of water that will or would be required by those customers.

Response: The only active uses of wastewater from the existing WWTP are at HCM farms which use the water for irrigation of non-human consumption crops and percolation. With closure of the existing WWTP, effluent for irrigation will no longer be available to these properties. The existing farm will be required to acquire irrigation from a different water source following decommissioning of the existing wastewater treatment plant. There are no other known users of existing WWTP wastewater. The WWTP EIR does states the following:

- "The City's infrastructure and circulation policies (found on pages 31 and 32 of the 1994 General Plan) applicable to the proposed WWTP are to ...utilize reclaimed wastewater for irrigating public and private lands (Policy 3), allowing College School Farm first right of refusal to any of the reclaimed water from the WWTP (Policy 5)...The proposed WWTP is consistent with the desire to utilize reclaimed wastewater for irrigating public and private lands...*However, the College School Farm project needs have changed, and the College School Farm has been relocated; therefore, the inconsistency with Policy 5 may not be relevant*."

Furthermore, the Letter of Intent from the City for use of the recycled water provided the applicant agreement for delivery of 1 million gallons per day with first right of refusal for additional supply as it becomes available.

There are no identified future users/customers. However, Pleasant Valley Water District indicated that they approached the City regarding percolation of the treated effluent to recharge the groundwater basin.

Data Request 105: Please provide the projected total volume of recycled water that would be produced by the City of Coalinga's WWTP during the first 10 years of the proposed power plant's operation and provide a copy of the source of that information.

Response: According to the City of Coalinga Wastewater Treatment Plant Final Program EIR, dated April 2006, the existing City WWTP was operating at an average daily flow of 0.93 million gallons per day (mgd) in 2005. The proposed WWTP is not currently constructed. Conservatively assuming the 2005 average daily flow rate of 0.93 mgd applies for the first 10 years of the proposed SJS 1&2 project's operation, this would result in a total volume of 3.4 billion gallons (0.93 mgd x 365 days/year x 10 years = 3394.5 million gallons), or about 10,400 acre-feet. It is likely that the total volume of recycled water produced by the WWTP over the first 10 year of operation of SJS 1&2 will exceed this amount assuming population growth will increase the WWTPs effluent.

The City of Coalinga 2005 Sewer System Master Plan provides information on current and projected wastewater flows from the City of Coalinga's WWTP. Information from the 2005 Sewer System Master Plan is provided in the City of Coalinga Wastewater Treatment Plant Final Program EIR in Table III-1, and is provided below.

City of Coalinga Estimated Population and Sewer Flows

Year	Estimated Population	Projected Wastewater Flow (mgd) @ 90 gallons per day per capita (gpcpd)
2005	14,057	1.27
2010	16,855	1.52
2015	19,540	1.76
2020	22,652	2.04
2025	22,260	2.36

Using the average of projected flows provided in the table above for the years 2010 through 2020 (approximately 1.75 mgd), the total estimated volume of recycled water that could be provided to SJS 1&2 would be approximately 6.4 billion gallons (1.75 mgd x 365 days/year x 10 years = 6387.5 mgd), or about 19,600 acre-feet.

Data Request 106: Please discuss the reliability of the recycled water supply and the expected duration of the interruptions in production or delivery of recycled water and quantify, on an annual basis over the life of the project, how much water would not be available due to each interruption.

Response: The Letter of Intent provided by the City of Coalinga indicates that recycled water will be supplied to the project on an uninterrupted basis except in extraordinary circumstances. Therefore, there are no planned interruptions in production or delivery of the recycled water or quantified reductions in delivery over the life of the project. In the case of extraordinary circumstances, required water supply will be obtained from the onsite well and/or from water stored on site.

Data Request 107: Please quantify the potential water use by all existing and reasonably foreseeable projects within the PVGS and provide the rationale for why particular projects may not be included in this listing.

Response: The Applicant contacted the Pleasant Valley Groundwater District (PVGD) (Rod Stiefvater, President PVGD, 559-673-9587) regarding water use within the district as well as foreseeable projects. The majority of the water used in PVGD is for agricultural uses. Future uses likely include increased agricultural uses for existing and proposed pistachio trees. According to PVGD, about 15 years ago, most farming in PVGD was relatively low value row crops. In the past 10 years, about 5,000 acres of pistachios have been planted in PVGD. Most of the pistachio trees in the area are young, so they do not use as much water as they will when they mature. Other potential future agricultural uses in the PVGD include carrot production.

Currently, the most readily available regional data on groundwater use in Pleasant Valley is that from DWR Bulletin 118 provided in AFC Section 5.5.1.6 from the AFC. The Pleasant Valley Groundwater Subbasin (PVGS) is approximately 146,000 acres (228 square miles) so identification of all existing and reasonably foreseeable projects within the PVGS is beyond the realm of this analysis. According to PVGD, Pleasant Valley is a separate aquifer from the main valley due to an anticline at Polvadero Gap.

AFC Section 5.18, Cumulative Impacts provides a list of 19 projects identified to have permits or permit applications filed with Fresno County within a 5-mile radius of the Project area. Of these, several are within the PVGS, however, it is not anticipated that these types of commercial projects will require substantial amounts of groundwater. The County of Fresno indicates that no major residential or commercial projects (filed through the County) have been constructed, or are in the process of being constructed, in the nearby vicinity of the Project site. However, recently constructed projects consist of the State Prison and State Hospital located adjacent to the project site, both of which are on the City of Coalinga water supply.

References:

Coalinga, City of. 2009. Final Master Environmental Impact Report for the City of Coalinga Master 2025 General Plan Update, April 2009, prepared by Morro Group, a division of SWCA

Data Request 108: Please discuss the potential incremental and cumulative impact to the PVGS water quality and water supply by the projects within the listing.

Response: It is not anticipated that the recently constructed projects within the area along with the existing and proposed agricultural uses will result in a significant cumulative impact to the PVGS water quality and water supply. There are no identified projects that will utilize substantially higher amounts of water than is currently being used for agricultural purposes.

Data Request 109: Please provide a copy of the draft Report of Waste Discharge for the proposed evaporation pond and a copy of comments from the CVRWQCB.

Response: The draft Report of Waste Discharge is currently being prepared and will be submitted to the RWQCB for comment. Comments from the CVRWQCB will be provided to the CEC when available.

Data Request 110: Please describe any other reporting requirements the CVRWQCB has for the proposed project and provide copies of the draft reports with a copy of comments from the CVRWQCB.

Response: Other reporting requirements required by the CVRWQCB will be provided when obtained from CVRWQCB (after submittal of the draft Report of Waste Discharge).

Data Request 111: Please discuss the economic feasibility and environmental pros and cons of using a zero liquid discharge system as an alternative to an evaporation pond.

Response: The degree of water reuse in the cooling towers is limited by dissolved solids in the water, primarily calcium hardness and silica. Most of the wastewater produced by power plants is cooling tower blowdown. Silica concentrations frequently limit the cycles of concentration in the cooling tower circulating water (Fritz, 2002). Additionally, regulations often control the level of TDS in the cooling tower drift.

Zero-discharge water management systems for steam electricity-generating stations have historically been applied in areas that are deficient in water supply, remote from suitable receiving streams for wastewater discharge. With zero-discharge plants, an attempt is made to minimize wastewater production, reuse as much wastewater as possible within the plant, and employ evaporation to eliminate the remainder of the wastewater produced. If there is sufficient space on site and if local meteorological conditions are favorable for evaporation, the most cost-effective method of achieving zero-liquid discharge is to dispose of all the wastewater to solar evaporation ponds (Imperial-Mexicali, 2004).

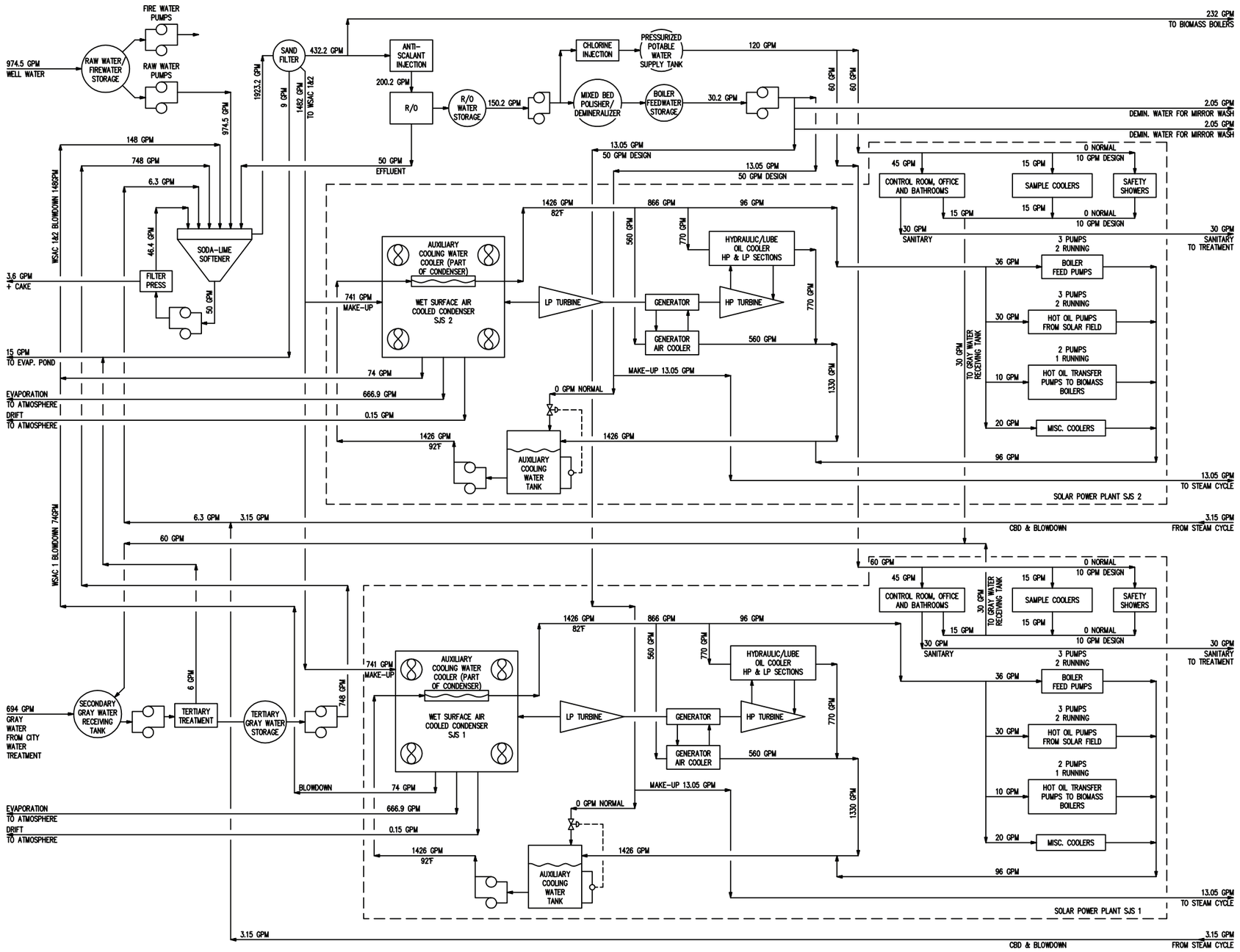
The water treatment and cycle system was recently updated and results in significant reduction in the amount of wastewater discharged to the evaporation pond. Currently it is anticipated that approximately 15 gpm (24 afy) will be discharged to the pond (See Revised Figure 5.5-3, Revised Water Diagram, attached). The updated treatment processes consist of:

Soda Lime – Reactor / Clarifier
Well water at the rate of 1000 gpm will be pumped to a Soda-lime reactor clarifier where hydrated lime and soda ash are added to remove alkalinity and hardness. The treated water will be pumped to a sand filter to remove suspended solids and any carry over from the clarifier. Sand filter discharge is slightly alkaline, and sulfuric acid is added to adjust pH before feeding the RO system. Sandfilters are backwashed 2-3 times a day for 5-10 minutes. The backwash water will be collected in a 10,000 gallon tank and discharged to the pond at the rate of 15 gpm through an automatic screen. The water quality to the pond is estimated to be as follows:

TDS ~ 1850 ppm as CaCo3
pH – 8 – 8.5
Suspended. Solids < 10 ppm

Slurry Treatments
The bottoms of the soda lime reactor clarifier are pumped through a shriver plate and frame filter press with polypropylene plates to the feed stream to the press will be about 8 %. Solids and discharged cake will be about 40 % solids. The liquid from the filter press is recycled back to soda lime reactor. It is estimated that cake volume from filter press is 1200 cubic feet per day or approximately 72,000 pounds per day.

Recycled Water Tertiary Treatment
Recycled (Grey) water is pumped through multimedia filters to remove suspended solids, then through carbon filters to remove carbon and any



SOURCE:
Ford, Davis and Bacon (drawing 2009)

REVISED - WATER BALANCE
SAN JOAQUIN SOLAR 1 & 2

URS	NO SCALE	CREATED BY: CM	DATE: 07-07-09	FIG. NO: 5.5-3
		PM: AR	PROJ. NO: 27658031	

bio-material. Filters are backwashed once a day and backwash water is sent to Lime soda reactor clarifier to remove any hardness in water. TDS from testing treatment will be around 500 ppm, which will help reduce over all hardness of the systems.

The current water use process re-uses onsite water to the maximum extent practicable considering influent water quality constituent concentrations. Due to the relatively high influent TDS from the groundwater (including high silica and gypsum), the water can only by cycled through the system a limited number of times. Currently the evaporation pond is considered the most economical way to dispose of process wastewater that can no longer be cycled through the system.

References:

Fritz, Charles H. and Tiwari, C.K.. 2002. An Economical New Zero Liquid Discharge Approach for Power Plants.

Imperial-Mexicali Final Environmental Impact Statement for the La Rosita Power Complex and Termoelectrica de Mexicali power plants Appendix K: Analysis of the Use of Zero-Liquid Discharge Technoligies at the Power Plants in Mexico, 2004.

Data Request 112: Please submit a site closure and restoration plan that includes a post-operation storm water and sediment erosion control plan.

Response: Post-operation storm water and sediment erosion control plans will be provided in the DESCP.

Data Request 113: Please describe how the onsite well(s) would be properly destroyed or abandoned.

Response: Onsite wells would be destroyed/abandoned if future property use agreements do not require or preclude use of the onsite well(s). If the onsite well(s) need to be destroyed or abandoned these activities will be in accordance with Department of Water Resources Bulletin 74-90: California Well Standards and Bulletin 74-81: Water Well Standards.

TECHNICAL AREA: TRAFFIC

Data Request 114: Please provide the basis for the fraction of daily trips assumption. Also discuss the affects of daily trips on roadway capacity, flow and Average Daily Trips (ADT).

Response: The daily trips were shown at 100 percent in the project construction (Table 5.11-5) and operations (Table 5.11-6) trip generation tables. During the preparation of the traffic analysis, there was no detailed breakdown provided on peak hour worker commute, in order to evaluate a worst case analysis scenario, it was conservatively assumed that 2/3rds of the workers would commute during the 7-9 AM and 4-6 PM peak hours respectively. Typically workers arrive and leave project sites before the 7-9 AM and 4-6 PM work sites, therefore the assumption used was conservative.

Daily trips will be spread throughout the day and consistent with the findings from the peak hour traffic analysis, there is sufficient roadway capacity to handle daily traffic flow during both project construction and operations.

Data Request 115: Please provide data regarding peak hour LOS for I-5. If data is not available to present peak hour LOS, please provide assumptions and describe methodology for establishing peak hour LOS.

Response: Consistent with the Freeway Segment Analysis Procedure of the Highway Capacity Manual, the Peak Hour LOS was derived from the Caltrans Traffic Count Database peak hour directional volume and peak hour project added traffic. The result of the peak hour analysis shows that the I-5 freeway study segment will operate at LOS D or better on all traffic analysis scenarios described below.

Peak Roadway Segment LOS
Year 2010 No Project Conditions

Roadway	Segment	Cross-Section Classification	Peak Hour Traffic Volume[1]	Peak Hour Level of Service (LOS)[2]
Existing Conditions				
I-5 Freeway	Kings/Fresno County Line to RTE 198 (North of W Jayne Avenue)	4-Lane Freeway	2359 / 2640	C / C
Year 2010 No Project Conditions				
I-5 Freeway	Kings/Fresno County Line to RTE 198 (North of W Jayne Avenue)	4-Lane Freeway	2595 / 2904	C / D
Year 2010 Peak Project Construction Conditions				
I-5 Freeway	Kings/Fresno County Line to RTE 198 (North of W Jayne Avenue)	4-Lane Freeway	2722 / 2906	C / D
Year 2011 No Project Conditions				
I-5 Freeway	Kings/Fresno County Line to RTE 198 (North of W Jayne Avenue)	4-Lane Freeway	2666 / 2983	C / D
Year 2011 Project Operations Conditions				
I-5 Freeway	Kings/Fresno County Line to RTE 198 (North of W Jayne Avenue)	4-Lane Freeway	2697 / 3010	C / D

Note: Highest Peak Project Added Directional Volume was added to Peak Directional Base Traffic (NB I-5, north of Jayne Avenue)

[1]AM / PM Peak Hour Volume

[2]AM / PM Peak Hour LOS

Data Request 116: Please provide school bus routes and schedules and discussion on the potential impacts during construction and operation to school bus transportation.

Response: According to Coalinga-Huron Unified School District Transportation staff, there are no existing pick-up and drop-off points along Jayne Avenue near the vicinity of the project site. The school bus route does pas by the project site during the morning and afternoon transport of students from the community of Huron to Coalinga and vice versa. In the morning, school buses travel from Huron between 7:00-7:30 AM and in the afternoon, the buses travel from Coalinga between 3:15-4:00 PM. The study roadway (Jayne Avenue) and intersections along Jayne Avenue have sufficient capacity to handle project construction and operation traffic, therefore no impacts to the school bus route via Jayne Avenue is anticipated.

Data Request 117: Please provide documentation or correspondence demonstrating coordination with Caltrans for transmission lines crossing I-5. In addition, please indicate whether the transmission line would cross over or under the Caltrans right of way (ROW).

Response: URS has contacted Caltrans staff concerning the transmission line crossing and was directed to develop an encroachment permit application for a freeway aerial crossing (Permit Code UF). The encroachment permit application is being finalized and will be submitted to CalTrans District 6 shortly. Transmission support structures for the aerial crossing will be located on private property, not in the Caltrans ROW.

Data Request 118: Please provide discussion regarding potential of glint/glare and plumes to impact crop dusting activities.

Response: According to the findings of the Glare and Glint Study (AFC Appendix L, Pages 2-3), "beyond the focal length of the SCA (approximately 5 feet), beam intensity decreases and by 10' from the SCA, beam intensity is the equivalent of the incident solar intensity," and "the risk to passing planes is considered to be negligible". Therefore, there is no anticipated impact to crop dusting activities.
The project site is located in an arid environment, ideal for solar energy, so plume formation will be minimal. Additionally, the pieces of equipment likely to occasionally produce a plume (the cooling towers and the biomass facility stack) are located in the center of the project site. They are located approximately ½ mile from the project boundary where no crop dusting planes should be flying low enough to be impacted by plumes.

TECHNICAL AREA: TRANSMISSION

Data Request 119: Power flow analysis for normal (N-0) system conditions with all facilities in service, and for Category B (N-1, L-1 & G-1) and Category C (N-2 or more) contingencies. Provide a mitigation plan for any identified reliability criteria violations in the PG&E grid. Provide a list of contingencies studied and the study results of the analysis in a table format with pre and post-project(s) data. In the report list all major assumptions in the base case including major path flows, major generators including generators in the California ISO queue & hydroelectric generators and loads in the area systems. Also identify the reliability and planning criteria utilized to determine the reliability criteria violations.

Response: The San Joaquin Solar 1 & 2 Hybrid Project (referred to in CAISO records as "Bethel 7 & 8 Solar Hybrid Project") originally filed its Interconnection Request with CAISO on December 12, 2007. An Interconnection Feasibility Study was executed on March 3, 2008 for the request. Before the IFS results were released, CAISO revised their interconnection process to the FERC-approved GIPR guidelines. Under the new GIPR process, the project was placed in the Transition Cluster: Queue # 283. A Large Generation Interconnection Study Agreement was executed on October 24, 2008 for the Phase One Study process of CAISO's Transition Cluster. The Phase One Study commenced officially on December 1, 2008. Per FERC regulations, the study results must be released by July 31, 2009. MRST met with CAISO staff at their headquarters in Folsom on April 22, 2009. While CAISO was unable to provide any results of the Phase One study at that time, CAISO staff did confirm that the Phase One Study is proceeding on schedule to be completed on or before the statutory deadline of July 31, 2009.

An email reply from CAISO regarding the Phase One study is attached. MRST will forward results of the Phase One CAISO study to CEC staff as soon as they are available. The Phase One Study results should provide information to address Data Requests #119-125.

Data Request 120: Provide power flow diagrams (units in MW, percentage loading and per unit voltage) with and without the SJS 1 & 2 and other queue project generations (as applicable) for the base cases. Power flow diagrams should also be provided for all overloads or voltage criteria violations under normal system (N-0) or contingency (N-1 & N-2) conditions.

Response: See Response to Data Request 119.

Elizabeth Ingram
<Elizabeth.Ingram@spinnakerenergy.net>

05/27/2009 11:11 AM

To "Anne_Runnalls@URSCorp.com" <Anne_Runnalls@URSCorp.com>
cc "Kent A. Larsen" <Kent.Larsen@spinnakerenergy.net>, "Greggory L. Wheatland" <glw@eslawfirm.com>, Chris Ellison <ChrisE@eslawfirm.com>
bcc
Subject SJS Data Responses #119-125 (Transmission)

History: This message has been replied to.

Anne,

Attached is the response we just got from CAISO. Please add this to the response I drafted last week for the transmission questions.

Thanks,

Elizabeth Ingram | Business Development | Spinnaker Energy, Inc.
12555 High Bluff Drive Suite 100 San Diego CA 92130 | T 858.427.6536 F 858.513.1205

----- Message from "Fishback, Edward" <EFishback@caiso.com> on Wed, 27 May 2009 11:01:05 -0700 -----

To: Elizabeth Ingram <Elizabeth.Ingram@spinnakerenergy.net>
cc: "Kent A. Larsen" <Kent.Larsen@spinnakerenergy.net>, "Wong, Albert" <ayw1@pge.com>, "Didsayabutra, Paul" <PDidsayabutra@caiso.com>, "Wright, Linda" <LWright@caiso.com>
Subject: RE: Bethel 7&8 - information for CEC

Elizabeth,
Here are the responses for the questions with input from CAISO and PG&E Engineering.

For question #1: The CAISO believes we will provide a public version of the Phase 1 report and a confidential version to each developer. The confidential version should document all of the work that we have done. We will definitely have short circuit analysis, and we should have post-transient voltage

analysis. Stability analysis was only done if the ISO or PG&E expected a stability problem. These reports should be available according to the GIPR timeline.

For question #2: Yes

Ed Fishback
Project Manager
California ISO
151 Blue Ravine Road
Folsom, CA 95630
Phone (916) 608-5836
Cell (916) 802-6401
Fax (916) 351-2264

From: Elizabeth Ingram [mailto:Elizabeth.Ingram@spinnakerenergy.net]
Sent: Monday, May 18, 2009 3:23 PM
To: Fishback, Edward; Wright, Linda
Cc: Kent A. Larsen
Subject: Bethel 7&8 - information for CEC

Linda and Ed,

The San Joaquin Solar project (known to CAISO as "Bethel 7&8") is continuing through the CEC's permitting process. The project was deemed "Data Adequate" by CEC on March 11, 2009. We have received the first set of CEC data requests as part of the Discovery Phase of the permitting process. Some of the requests relate to transmission and anticipate the results of the Transition Cluster's Phase One Study underway at CAISO. The Transmission-related requests are listed in the chart below. There is also more detail in the attached document.

In order to respond to CEC, could you please answer the following questions:

(1) Will the information requested below be included in the Phase One results package released by CAISO in July for the Transition Cluster?

(2) Is the Phase One Study process on schedule to be completed no later than July 31, 2009?

TRANSMISSION REQUESTS:

119	Power flow analysis for normal (N-0) system conditions with all facilities in service, and for Category B (N-1, L-1 & G-1) and Category C (N-2 or more) contingencies. Provide a mitigation plan for any identified reliability criteria violations in the PG&E grid. Provide a list of contingencies studied and the study results of the analysis in a table format with pre and post-project(s) data. In the report list all major assumptions in the base case including major path flows, major generators including generators in the California ISO queue & hydroelectric generators and loads in the area systems. Also identify the reliability and planning criteria utilized to determine the reliability criteria violations.
120	Provide power flow diagrams (units in MW, percentage loading and per unit voltage) with and without the SJS 1 & 2 and other queue project generations (as applicable) for the base cases. Power flow diagrams should also be provided for all overloads or

	voltage criteria violations under normal system (N-0) or contingency (N-1 & N-2) conditions
121	Transient stability analysis for critical Category B (N-1) and Category C (N-2) contingencies of the PG&E bulk power (230 & 500 kV) transmission lines/transformers and for full load rejection of the proposed SJS 1 & 2 and other queue project generators (as applicable) with monitoring of voltages, frequencies and generator rotor angles.
122	Short circuit analysis for three line-to-ground faults. Analysis for single line-to-ground faults should be performed, if necessary data is available.
123	Post-transient voltage analysis with governor power flow for selected single and double contingencies.
124	Reactive power deficiency analysis with reactive MVAR output for selected single and double contingencies.
125	Provide electronic copies of *.sav,*.drw. *.dyd and *.swt GE PSLF files and EPCL contingency files in a CD, if available.

Let me know if you have any questions.

Thank you for your assistance,

Elizabeth Ingram | Business Development | Spinnaker Energy, Inc.
12555 High Bluff Drive Suite 100 San Diego CA 92130 | T 858.427.6536 F 858.513.1205

Data Request 121: Transient stability analysis for critical Category B (N-1) and Category C (N-2) contingencies of the PG&E bulk power (230 & 500 kV) transmission lines/transformers and for full load rejection of the proposed SJS 1 & 2 and other queue project generators (as applicable) with monitoring of voltages, frequencies and generator rotor angles.

Response: See Response to Data Request 119.

Data Request 122: Short circuit analysis for three line-to-ground faults. Analysis for single line-to-ground faults should be performed, if necessary data is available.

Response: See Response to Data Request 119.

Data Request 123: Post-transient voltage analysis with governor power flow for selected single and double contingencies.

Response: See Response to Data Request 119.

Data Request 124: Reactive power deficiency analysis with reactive MVAR output for selected single and double contingencies.

Response: See Response to Data Request 119.

Data Request 125: Provide electronic copies of *.sav,*.drw. *.dyd and *.swt GE PSLF files and EPCL contingency files in a CD, if available.

Response: See Response to Data Request 119.

TECHNICAL AREA: VISUAL

Data Request 126: A. Please prepare a photo simulation of the transmission line crossing of the I-5 vicinity from a Key Observation Point (KOP) located within the Fresno County scenic highway corridor of I-5. The KOP should be located where the transmission line crossing (and any associated structures), would be most visible to I-5 travelers.
B. Given the potential for an underground placement of the I-5 crossing of the transmission line, please provide a photo simulation of the transmission area from above ground to underground.

Response: A. A KOP for travelers along I-5 was not selected with the concurrence of CEC siting staff, due to (1) likely traveler inability to distinguish the presence of an additional transmission line crossing at that location, as well as (2) short viewing durations of the Project's transmission line.

(1) There are numerous existing transmission lines currently crossing I-5 both north and south of the Project's proposed transmission line (see Attachment A, next page) which reduces viewer sensitivity to the presence of additional overhead transmission lines in the area.
(2) Viewer is traveling at a high rate of speed perpendicular to Project transmission line, which provides for short viewing durations, reduces visibility and sensitivity.

KOP#4 was selected to represent worst-case, and/or the most unobscured and longest duration, views to the proposed transmission line route and interconnection for travelers along West Jayne Avenue and in the Project area. For this KOP, the viewer is traveling parallel to the proposed transmission line which provides for longer viewing durations in comparison to a perpendicular traveler. KOP#4 is representative of travelers and how they would view an additional transmission line. For these reasons, and per URS coordination with Mark Hamblin in June and July of last year (06/2008-07/2008), a KOP depicting the Project's transmission line crossing of I-5 is not necessary to assess the visual impacts of this project.

B. As discussed in Section 3.0, Project Description, of the AFC, the two potential transmission line routes that have been identified (see Figure 3.4-7) include overhead lines. The Project's transmission line is proposed to cross over I-5 as proposed in the AFC. The applicant has not amended the AFC Project description to conduct another action.

DRR# 126
ATTACHMENT A

OVERVIEW MAP

San Joaquin Solar 1 & 2

Gates Substation

LEGEND

- San Joaquin Solar 1 & 2
- Gates Substation

Transmission Line

- Northern Route
- Southern Route
- Existing Transmission Lines

SOURCES:
TOPO 24K(various dates);
ESRI (roads).

POTENTIAL TRANSMISSION LINE ROUTES
SAN JOAQUIN SOLAR 1 & 2

URS

1500 0 1500 3000 Feet

SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 07-30-08	FIG. NO: 3.4-7
PM: AR	PROJ. NO: 27658031	

Path: G:\gis\projects\1577\27658031\alternative\map_docs\mxd\proj_desc\potential_line_routes.mxd, 11/13/08, colin_mattison

Data Request 127: Please describe the existing visual condition and analyze the visual effects associated with the new KOP consistent with the analysis of other KOPs in the AFC, including an evaluation of consistency with laws, ordinances, regulations and standards (LORS), and mitigation measures. Please provide a revised Figure 5.13-2 that shows the location of the new KOP and highlight the County scenic highway segment of I-5.

Response: Based on the responses to Data Request #126, no new KOPs have been prepared. According to the Conservation and Open Space Element of the County of Fresno General Plan (*October 2000, page 5-36*), the entire length of I-5 within Fresno County is a Fresno County Designated Scenic Highway. Figure 5.13-2 has been revised to highlight the length of I-5 shown in the figure. See Attachment B, next page.

DRR# 127
ATTACHMENT B

OVERVIEW MAP

I-5 County Designated Scenic Highway

Los Gatos Creek

Phelps Ave

Gates Substation

KOP # 1: View from Closest Residence to the North

KOP # 2: Traveler View from Westbound West Jayne Avenue

KOP # 3: Traveler/Employee/Visitor/Patient view from Eastbound West Jayne Avenue and Coalinga State Hospital

West Jayne Ave.

San Joaquin Solar 1 & 2

KOP # 4: Traveler View of Substation Interconnection from Westbound West Jayne Avenue

Butter Ave

Glenn Ave

Pleasant Valley State Prison

Coalinga State Hospital

Zapato Chino Creek

5

LEGEND

- Key Observation Point Location

Transmission Line

- Northern Route
- Southern Route
- San Joaquin Solar 1 & 2
- Gates Substation

SOURCES:
USDA FSA Aerial Photography Field Office (aerial 2005).

AERIAL OF IMMEDIATE PROJECT VICINITY
SAN JOAQUIN SOLAR 1 & 2

URS

1500 0 1500 3000 Feet

SCALE: 1" = 1 Mile (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 09-05-08	FIG. NO: 5.13-2
PM: AL	PROJ. NO: 27658031	

Path: G:\gis\projects\15772765803\1\alternative\map_docs\mxd\visual\sjs_12_visual.mxd, 11/13/08, paul_moreno

Data Request 128: Please discuss the potential visual effects of the project on residents of the state hospital, and if there is the potential for significant effects, prepare a photo simulation from an east-facing window of the hospital that would be representative of the potential project effects.

Response: Per a telephone conversation with Deborah Ireland, a representative at Coalinga State Hospital on 5/7/2009, the eastern buildings of the Coalinga State Hospital (located adjacent to the western Project boundary), consist of an administration building and warehouse buildings. There are no general public viewers or resident viewers in the eastern buildings of the hospital facility. Further, KOP #3 provided in the AFC, is intended to depict worst-case eastbound West Jayne Avenue traveler views as well as employee, visitor, and resident views from Coalinga State Hospital. Therefore, a photo simulation from an east-facing window of the hospital has not been prepared.

Data Request 129: A similar discussion of the effects of late afternoon glint and glare on locations to the west is needed.

Response: In the afternoon after sunset, the collectors rotate back to the stow position facing east, there is no stow position facing west. Therefore, while potential glint/glare from the mirrors may be visible to adjacent areas to the east in the morning, glint/glare from the mirrors to adjacent areas to the west in the evening is not expected to occur.

Data Request 130: Please discuss the types of activities that could occur within 60 feet of the project fence, and the types of users that could have access to the area within 60 feet of the project fence. Please explain to what degree the privacy slats would block out potentially harmful beams.

Response: A description of the activities that could occur within 60 feet of the project fence, and the types of users that could have access to the area within 60 feet of the project fence is provided below:

60 feet from the northern Project boundary:
West Jayne Avenue is located along the northern Project boundary. There are no pedestrian sidewalks or bicycle lanes along the eastbound or westbound alignments of West Jayne Avenue north of the Project site. Therefore, no pedestrians are anticipated to be within 60 feet of the northern Project boundary.

60 feet from the eastern and southern Project boundaries:
The land uses adjacent to the south and east of the Project site consist of agricultural/farming uses. Immediately outside the Project fence to the south and east are private, dirt agricultural roads and agricultural fields. There are no pedestrian sidewalks outside the eastern or southern Project fenceline. Therefore, no pedestrians are anticipated to be within 60 feet of the eastern or southern Project boundary.

60 feet from the western Project boundary:
The closest building to the west of the Project site is approximately 120 feet from the site fence line. An existing dirt area is found immediately outside the western Project fence, and an approximately 30-foot paved access/maintenance road for the Coalinga State Hospital is located beyond the dirt area. This area does not have public access. No pedestrians are anticipated to be within 60 feet of the western Project boundary.

Data Request 131: Please describe, using text and drawings of the fence, SCAs, and the nearest buildings to the east and west of the project site (such as the hospital, prison and residences) the effectiveness of the fence in blocking potentially harmful beams.

Response: Beyond the focal length of the SCA, beam intensity decreases and by 10' from the SCA, beam intensity is the equivalent of the incident solar intensity. The 10 foot high perimeter fence with privacy slats will block wind and effectively 95% of glare.

Data Request 132: Describe in text, or with drawings, mitigation measures that would be needed to protect the human eye from unsafe levels of beam intensity.

Response: According to the Glint and Glare Study, provided as Appendix L in the AFC, the Project will install privacy slats in the perimeter fence as a mitigation measure to ensure that pedestrians outside of the plant perimeter fence to the east, or west are not exposed to unsafe glint or glare from the Project. However, as discussed in Data Request response #131, there is no public use of the areas immediately to the east or west of the site, and no pedestrians are anticipated to be within 60 feet of the eastern or western Project boundary.

Data Request 133: Please describe the lighting needs for the two work crews that will be cleaning the SCAs at night, and identify the number of 30-foot lights that will be needed for biomass operation.

Response: Portable lighting is attached to the SCA cleaning crew's vehicle. There will be approximately 88 30-foot lights in the biomass block.

Data Request 134: Please explain how exhaust conditions and stack parameters would change corresponding to the composition of production base as shown in Figure 3.7-1 and the Table 5.2-23 in the AFC.

Response: Tables DR-30a, DR-30b, and DR-30c outline the different exhaust conditions and stack parameter that correspond to 50%, 75% and 100% combustor loads. The plant will operate at a combination of loads for each combustor to produce the required power as outlined in Table 5.2-23 in the AFC.

Data Request 135: Please summarize for the biomass combustor the exhaust conditions to complete the table below, and additional data as necessary, for staff to be able to determine how the biomass combustor operating conditions/exhaust parameters will vary with solar generation.

Response: The exhaust conditions and the stack parameters for the 100% biomass combustor load at different ambient temperatures are shown in the following Table DR-135.

Table DR-135

Parameter	Combustor Exhausts (each)		
Stack Height	30.48 m (100 ft)		
Stack Diameter	2.083 m (6.83 ft)		
Stack Separation	16.4 m (53.8 ft) within each set of two,		
	70.0 m (229.5 ft) between each set of two		
Ambient Temperature	30 °F	60 °F	90 °F
Ambient Relative Humidity	90%	60%	20%
Production base	100 % Biomass Combustor Load		
Exhaust Temperature (°F)	230	230	230
Exhaust Flow Rate (1000 lbs/hr)	416.37	405.90	398.47
Exhaust Moisture Content (Wt %)	13.4	18.6	18.0

Data Request 136: Please explain how the heat rejection and resulting exhaust conditions (including the number of cooling tower cells in operation) would change corresponding to the composition of production base as shown in Figure 3.7-1 and the Table 5.2-23 in AFC, and as ambient conditions vary.

Response: The SJS1 Solar Boiler for the power plant operates at full capacity to generate 60 MW (gross) during the time shown in yellow on Fig. No. 3.7.1 for daylight operation (0% biomass operation). During this time, the heat rejection from the condenser will be 355.8 MM BTU/Hr. All four fans on each wet surface air cooled (WSAC) condenser will operate at this time. (SJS2 will duplicate these operating conditions).

The SJS1 biomass boiler will operate at full capacity to generate 49.24 MW (gross) during the time shown in green on Fig. No. 3.7.1 for night time operation (0% solar operation). During this time the heat rejection from the condenser will be 292.5 MM BTU/HR. All four fans on each WSAC condenser will operate at this time at approximately 80% of capacity using the variable speed fans. (SJS2 will duplicate these operating conditions.)

Both the SJS1 solar Boiler and SJS1 biomass boiler will operate together to generate 60.4 MW (gross) during the time shown in orange on Fig No. 3.7.1 for daylight operation (but with reduced sunlight conditions). The heat rejection from the condenser will be 355.8 MM BTU/Hr. All four fans on each WSAC condenser will operate at this time. (SJS2 will duplicate these operating conditions.)

Data Request 137: Please summarize for the cooling tower the conditions that affect vapor plume formation including cooling tower heat rejection, exhaust temperature, and exhaust mass flow rate. Please provide values to complete the table, and additional data as necessary for staff to be able to determine how the heat rejection load varies with ambient conditions and also determine at what operating and ambient conditions cooling tower cells may be shut down.

Response: Table DR-137 presents the exhaust data for the WSAC units at SJS 1. SJS2 will duplicate these operating conditions.

Table DR-137

Parameter	WSAC Tower Exhausts for SJS 1*		
Number of Cells	4 cells (two 2-cell WSAC)		
Cell Height	10.97m (36 ft)		
Cell Diameter	7.93m (26 ft)		
Tower Housing Length	48.8m (160 ft)		
Tower Housing Width	22.26 meters (73 feet) total two cells		
Ambient Temperature	30 °F	60 °F	90 °F
Ambient Relative Humidity	90%	60%	20%
Production base	100 % Biomass Combustor Load (0% Solar)		
Number of Cells in Operation	4	4	4
Heat Rejection (MM Btu/hr)	355.8	355.8	355.8
Exhaust Temperature (°F)	80.1	81.2	84.8
Exhaust Flow Rate (lb/hr)	14,649,518	15,542,233	17,471,053
Production base	50 % Biomass Combustor Load (50% Solar)		
Number of Cells in Operation	4	4	4
Heat Rejection (MM Btu/hr)	355.8	355.8	355.8
Exhaust Temperature (°F)	80.1	81.2	84.8
Exhaust Flow Rate (lb/hr)	14,649,518	15,542,233	17,471,053
Production base	0 % Biomass Combustor Load (100% Solar)		
Number of Cells in Operation	4	4	4
Heat Rejection (MM Btu/hr)	273.9	284.5	282.6
Exhaust Temperature (°F)	72.9	77.1	94.2
Exhaust Flow Rate (lb/hr)	15,765,140	15,252,110	8,860,113

Note:
* Exhausts for WSAC units at SJS 2 are equal. WSAC diagram is presented as Figure DR-140

Data Request 138: Please provide the cooling tower manufacturer and model number information and a fogging frequency curve from the cooling tower vendor, if available.

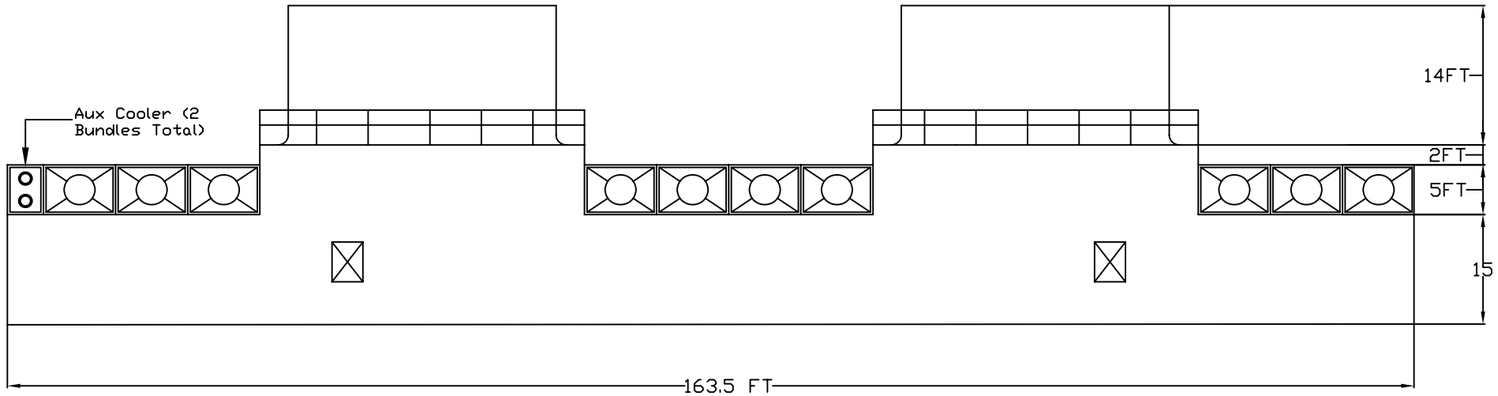
Response: WSAC Unit is a 2 cell Niagara unit, model No. RVC 89833-2F26. Each steam turbine requires one 2 cell WSAC unit, each cell has two fans. A fogging frequency curve is not available.

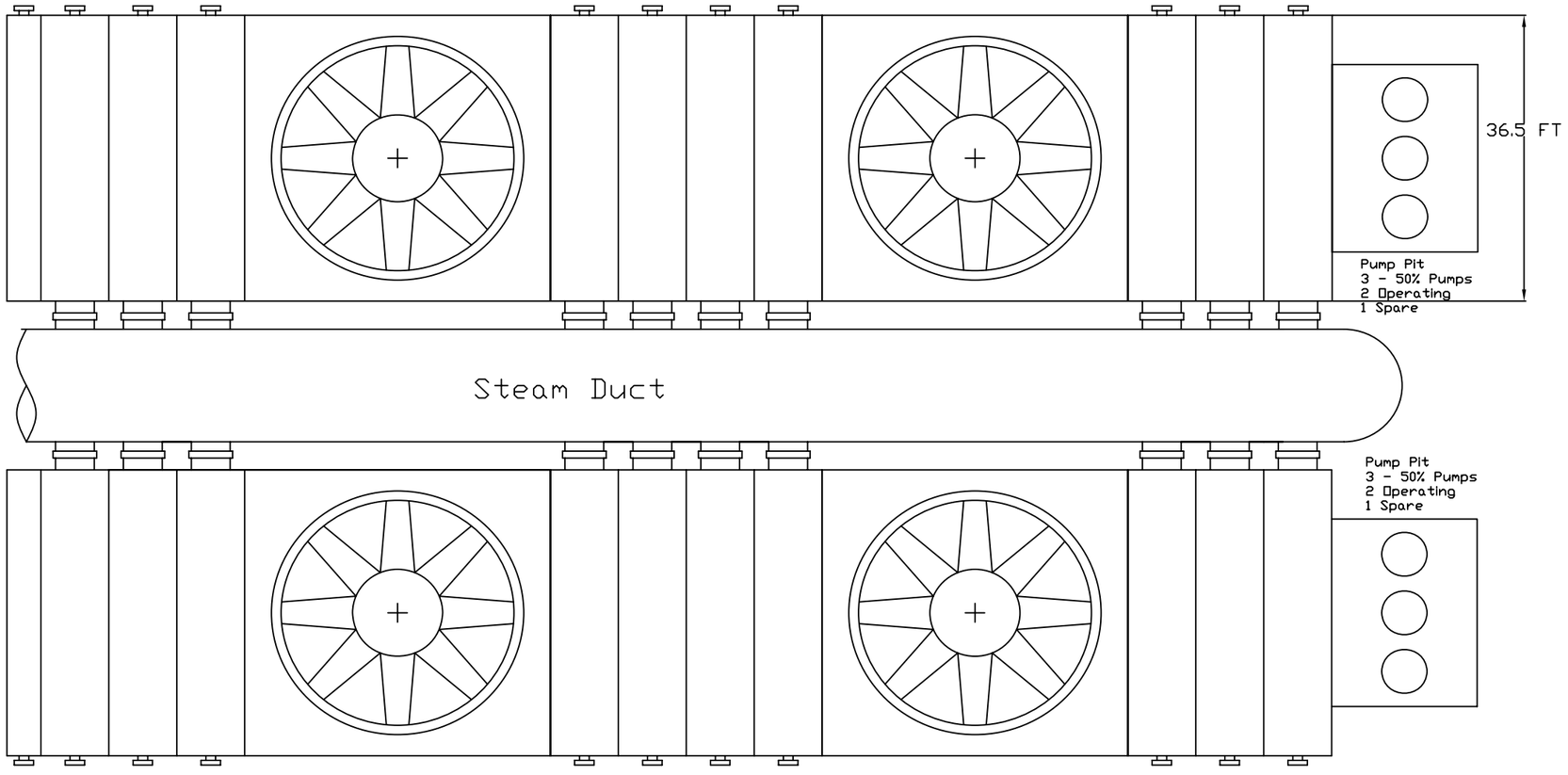
Data Request 139: Please confirm that the cooling tower fan motors will not have dual speed or variable speed/flow controllers. If the cooling tower will have a dual speed or variable speed option, then the exhaust flow rate data given for the cooling tower to complete the exhaust condition table data request should both reflect this assumption and note the specific fan speed(s) assumed.

Response: The WSAC units will have variable speed fans. Exhaust conditions presented in Table DR-137 reflect expected operating conditions.

Data Request 140: Please describe why the cooling towers, as depicted in the project description with very small exhaust diameters compared to their width and length, do not have the appearance of typical power plant cooling towers.

Response: Process cooling at SJS 1&2 will be achieved using a wet surface air cooler (WSAC) condenser. A WSAC combines a conventional cooling tower and turbine condenser in one unit (cell). Two cells will be required for each steam turbine in San Joaquin I & II. Attached is a layout diagram supplied by the WSAC manufacturer, Niagra Blower Company.





SOURCES:
Niagra Blower Company; May 2009.

WSAC LAYOUT DIAGRAM
SAN JOAQUIN SOLAR 1 & 2

URS

Not to Scale

CREATED BY: JS	DATE: 5-29-09	FIG. NO:
PM: AR	PROJ. NO: 27658033.00200	**DR-140**

G:\gis\projects\1577\27658031\support\Data_Requests_0509\AI\FigDR-140_WSAC_Layout.ai

TECHNICAL AREA: WASTE MANAGEMENT

Data Request 141: Please indicate whether the county of Fresno operates a Construction and Demolition Waste Diversion Program.

Response: The Fresno Integrated Waste Management Authority (IWMA) has passed a construction and demolition (C&D) Ordinance. The Ordinance is based on the California Waste Management Act of 1989, Assembly Bill 939, requiring each local jurisdiction in the state to divert fifty percent (50%) of discarded materials from landfill disposal. The C&D ordinance bans the disposal of C&D debris at the American Avenue and Coalinga Landfills except for the following: individual loads consisting of three cubic yards or less; mixed loads where C&D debris represents less than 20 percent of the load; loads containing disaster debris resulting from a locally or federally declared disaster; loads containing more than 50% of C&D debris for which there is no adequate local market infrastructure (as determined by the department of public works and planning); loads that have been pre-processed at a C&D debris processing facility; and loads containing non-friable asbestos that meet county guidelines. (Fresno County Integrated Waste Management Authority website http://www.ciwmb.ca.gov and Title 8, Section 8.25 of the Fresno County Ordinance Code).

Data Request 142: Please provide information on how the San Joaquin Solar Project will meet each of the requirements of the program cited in the previous data request.

Response: During construction, wastes will be separated between recyclable and non-recyclable wastes. Recycling of construction wastes will be done when possible. The management methods are further described in Section 5.14.2.1 Construction, of the project AFC. The project will follow the requirements of diversion from the C&D ordinance with respect to disposal at the American Avenue and Coalinga Landfills.

Data Request 143: Please provide a Phase I ESA for the 6-mile 230 kV transmission line interconnection route that has been prepared in accordance with ASTM Standard E 1527-05 guidelines.

Response: A review was conducted of readily available information related to the proposed transmission alignments in regulatory agency databases to identify conditions indicative of releases or threatened releases of hazardous substances, pollutants and contaminants, petroleum or petroleum products, and controlled substances that could be considered Recognized Environmental Conditions (RECs) in accordance with American Society of Testing and Materials (ASTM) 1527-05. The CEC, URS and MRST agreed during a teleconference on June 12, 2009 that these tasks would be adequate to address Data Request #143 and #144 in lieu of completing a Phase I Environmental Site Assessment in accordance with ASTM 1527-05 and All Appropriate Inquiry (AAI). The report summarizing the findings of this review is attached.

Data Request 144: Where the alignment traverses properties where there has been agricultural land use, the Phase I ESA shall identify the type of crops grown over as long a period as records indicate, the historical use and identity of pesticides (including organic and inorganic pesticides as well as herbicides), and a statement of the likelihood of finding levels of pesticides along the pipeline/transmission route that might present a risk to pipeline workers and/or the public.

Response: See response to Data Request 143.

June 30, 2009

Mr. Kent Larsen
Martifer Renewables Solar Thermal LLC
12555 High Bluff Drive, Suite 100
San Diego, CA 92130

Subject: Environmental Database,
and Aerial and Existing Photograph Review
Data Request #143 & 144, Data Set #1
San Joaquin Solar Hybrid Power Plant 1&2
Proposed Transmission Alignments
West Jayne Avenue
Coalinga, California 93210
URS Project No. 27658033.00200

Dear Mr. Larsen:

URS Corporation Americas (URS) is pleased to submit the following report to Martifer Renewables Thermal Solar LLC (Martifer) that summarizes the results of an agency file and photograph review for the above-referenced site. The review was conducted to address data request #143 and #144, Data Set #1 for the proposed transmission alignments associated with the proposed project. We appreciate the opportunity to provide environmental services to Martifer. Please contact us at 619-294-9400 if you have any questions or require further assistance.

Sincerely,

URS CORPORATION

Robert K. Scott, P.G., C.Hg.
Vice President

Lowell Woodbury, REA
Project Geologist

TABLE OF CONTENTS

Tables

SECTION 1 INTRODUCTION

This report prepared by URS Corporation Americas (URS for Martifer Renewables Solar Thermal LLC (Martifer) presents the results of the agency file review of the proposed transmission alignment associated with the proposed San Joaquin Solar Hybrid Power Plant 1&2 that will be located near Coalinga, Fresno County, California (subject property or site). This assessment was accomplished by, and limited to and review of agency databases regarding the generation, use, storage and/or disposal of hazardous substances at the site and was conducted to address Data Request #143 and #144 of San Joaquin Solar 1 & 2 Hybrid Project (08-Afc-12) Data Request Set 1 (#s 1-148) dated April 30, 2009. The scope of services was performed in accordance with the proposal to Martifer from URS dated June 17, 2009.

1.1 PURPOSE

The purpose of the services described herein was to review readily available information related to the proposed transmission alignments in regulatory agency databases to identify conditions indicative of releases or threatened releases of hazardous substances, pollutants and contaminants, petroleum or petroleum products, and controlled substances that could be considered Recognized Environmental Conditions (RECs) in accordance with American Society of Testing and Materials (ASTM) 1527-05. The CEC, URS and Martifer agreed during a teleconference on June 12, 2009 that these tasks would be adequate to address Data Request #143 and #144 in lieu of completing a Phase I Environmental Site Assessment in accordance with ASTM 1527-05 and All Appropriate Inquiry (AAI). It should be noted that the alignments are proposed and cross over 50 parcels belonging to private landowners.

1.2 SCOPE OF SERVICES

The format and content of this review of the proposed transmission alignments were conducted in general accordance with appropriate sections of the USEPA's standards for AAI and ASTM Standard Practice for Environmental Site Assessments: Phase I Site Assessment Process (ASTM 1527-05).

This agency database review was accomplished by, and limited to review of pertinent documentation available through URS' standard resources regarding past and current land use for indications of the manufacture, generation, use, storage, and/or disposal of hazardous substances along the proposed transmission corridors. To meet the objective of this Phase I ESA, URS completed the following tasks:

- Reviewed the federal, state, and local database list search provided by Environmental Data Resources, Inc., (EDR) of Milford, Connecticut of known or potential hazardous waste sites or landfills, and sites currently under investigation for environmental violations. The agency lists and area study results (EDR Report) are attached.
- Review of existing photographs of the alignments taken during recent biological surveys by URS personnel for evidence of potential sources of hazardous materials use or storage.
- Review of the most recent, readily available aerial photograph for the alignment to observe for conditions that may be considered RECs.

- Prepared this letter report describing the research performed and presenting URS' findings and professional opinions regarding the potential for adverse environmental impacts to the subject property.

1.3 USER RELIANCE

This report has been prepared for use by Martifer and shall not be relied upon by, or transferred to, any other party, or used for any other purpose, without the express written authorization of URS.

1.4 LIMITATIONS AND EXCEPTIONS

This report and associated work have been provided in accordance with the terms and conditions of the proposal to Martifer from URS dated June 17, 2009. Based on the scope of services outlined in the proposal, the review specifically did not include testing for asbestos, radon gas, lead-based paint, or lead in drinking water; sampling or testing of groundwater; or evaluation of wetlands or cultural resources. The services provided should not be considered a Phase I ESA in accordance with ASTM guidelines and AAI.

1.5 LOCATION

The proposed alignment consists of an approximately 12-mile corridor between the Martifer site to the west and the Gates Substation to the east. Ten miles of the corridor are located along the northern (West Jayne Avenue) and southern boundaries of Sections 1 and 2 Township 21 South Range 16 East and Sections 4, 5 and 6 Township 21 South Range 17 East. Two miles of the corridor are located along the eastern (Modoc Avenue) and western boundaries of Section 4 near the City of Coalinga, Fresno County, California. The site vicinity consists primarily of agricultural land. A site vicinity map and site plan are included as Figures 1 and 2, respectively.

SECTION 2 GOVERNMENT AGENCY INFORMATION

URS reviewed readily available records regarding past and current site use, regarding potential environmental concerns at the site, and reviewed the agency database list search for potential environmental concerns at surrounding properties. The information obtained during the records review is provided in the following sections.

2.1 DATABASE LIST SEARCH

URS contracted an environmental database firm, Environmental Data Resources, Inc. (EDR) of Milford, Connecticut, to conduct a search for facilities listed by regulatory agencies as potentially having environmental concerns. The search was limited to a 500-foot zone adjacent to either side of the proposed transmission alignment alternatives to assess whether activities on or near them have the potential to be RECs. The complete list of databases reviewed is provided in the EDR Area Study, attached and summarized in Table 1. It should be noted that the information is reported as URS received it from EDR, which in turn reports information as it is listed in various government databases. It is not possible for either URS or EDR to verify the accuracy or completeness of information contained in these databases. However, the use of and reliance on this information is a generally accepted practice in the conduct of environmental due diligence. The databases searched and the information obtained is summarized in the following sections.

The following table summarizes the number of facilities in the vicinity of the proposed alignment alternatives that were identified in the indicated agency databases within the study area.

Table 1
Agency Database

Agency Database	Number of Sites Identified
United States Environmental Protection Agency (EPA) National Priority List (NPL) for Superfund Sites	0
U.S. Proposed NPL List	0
U.S. National Priority List Deletions (Delisted NPL) List	0
NPL Recovery List (Federal Superfund Liens)	0
U.S. EPA Comprehensive Environmental Response, Compensation and Liability Index System (CERCLIS) List	0
U.S. EPA CERCLIS – No Further Remedial Action Planned (CERCLIS-NFRAP)	0
U.S. EPA Resource Conservation and Recovery Act (RCRA) Corrective Action (CORRACTS) List	0
U.S. EPA RCRA Permitted Treatment, Storage, and Disposal (TSD) Facilities	0

Table 1
Agency Database
(Continued)

Agency Database	Number of Sites Identified
U.S. EPA RCRA Registered Large Generators of Hazardous Waste (RCRIS LQG)	0
U.S. EPA RCRA Registered Small Generators of Hazardous Waste (RCRIS SQG)	1
U.S. EPA Emergency Response Notification System (ERNS) List	1
U.S. Hazardous Materials Incident Reporting System (HMIRS)	1
U.S. Engineering Controls Sites (ENG Controls) List	0
U.S. Facility Index System (FINDS)	2
U.S. Sites with Institutional Controls (INST Controls) List	0
U.S. Record of Decision (ROD) List	0
State Hazardous Waste Sites (Cal-Sites)	0
State Hazardous Material Incidents, Including Accidental Releases and Spills (CHMIRS)	0
State Hazardous Waste and Substances Sites (Cortese)	1
State Proposition 65 Database (Notify 65)	0
State Toxic Pits Cleanup Act Sites (Toxic Pits)	0
State Permitted Solid Waste Landfill, Incinerators or Transfer Stations (SWF/LF) List	0
State Waste Management Unit Database System (WMUDS/SWAT)	1
State Leaking Underground Storage Tank (LUST) List	1
State Bond Expenditure Plan (CA Bond Exp. Plan)	0
State Drycleaners List	0
State Underground Storage Tanks (UST) List	0
State Site Cleanup (SLIC) List	0
State Voluntary Cleanup Program (VCP)	0
State Underground Storage Tanks on Indian Land (Indian UST)	0
State Leaking Underground Storage Tanks on Indian Land (Indian LUST)	0
State Facility Inventory Database of historic active and inactive UST locations (CA FID UST)	0
State Hazardous Substance Storage Container Database of historic UST sites (HIST UST)	0
State SWEEPS UST database	1

Table 1
Agency Database
(Continued)

Agency Database	Number of Sites Identified
State Site Mitigation and Brownfields Reuse Program (ENVIROSTOR) database	0
County of Fresno Certified Unified Program Agency (CUPA)	1
EDR Proprietary Records: Manufactured Gas Plants	0
Other Local, State, and/or Federal Databases including, but not limited to, Brownfield listings, Current and Former Department of Defense Sites, Consent Decrees, Records of Decision, Deed Restrictions, Hazardous Materials or Waste Tracking Systems and Facility Registries, and Enforcement Activities (see EDR report for complete listing of databases and search radii)	3

2.1.1 Subject Property

The proposed alignments were not identified in the EDR Area Summary.

2.1.2 Adjacent Properties

Four facility/incident address/locations were identified in the EDR Area Study near the proposed northern alignment. These locations are shown as three points near West Jane Avenue.

- **BP West Coast Products LLC 572 (Map ID 2)** at 20033 Sommerville Lane is also reported under the names of ARCO AM/PM#5177, ARCO Facility No 05722, 20033 Summerville Lane, ARCP Products Company, and Chase Inc.; and are reported on the LUST, RCRA-SQG, ERNS, FINDS, HIST CORTESE, SWEEPS UST, UST, Fresno CUPA, HAZNET and EMI databases. This address is located less than 500 feet south of the proposed alignment along West Jayne Avenue. The LUST listing reports that unleaded gasoline was released from an underground storage tank (UST) affecting soil. This case (Global ID #T0601900365) is reported as closed as of December 2006. No further information was provided. This facility is reported on the CUPA list as having three USTs. The RCRA-SQG database identified the subject property (EPA ID no. CAR000100420) as having no reported violations. The SWEEPS UST list, an older UST database that is no longer maintained, identified three USTs at the site containing unleaded and premium unleaded gasoline. The HAZNET listing reported the facility as having several hazardous waste generating events involving aqueous solution with 10% or more total organic residues that are disposed at a recycling facility. The ERNS listing reported the spill of approximately 10 ounces of hydrochloric acid affecting soil in February 1992 and was cleaned by the County Health Department.

- **Reclamation Site SW Corner (Map ID 3)** at southwestern corner of Jayne and Sutter Ave is listed on the California WDS database. No further information was provided.
- **Not Reported (Map ID 1)** at Interstate 5 and Jayne Avenue is listed on the CHMIRS database for an incident occurring in March 1989. No injuries or fatalities were reported. No further information was provided.

2.1.3 Site Vicinity

URS reviewed the EDR database report to identify offsite facilities that have suspected or documented environmental concerns or RECs that may negatively impact the subject property. An offsite facility is defined as reported as being located outside the 500-foot zone adjacent to either side of the proposed transmission alignment alternatives. URS' criteria for further evaluating the potential impact of a listed offsite facility are summarized below:

- The listed offsite facility is documented or assumed to be hydrogeologically upgradient and a likely pathway exists for known releases of environmentally mobile contaminants to reach the subject property; or, contaminants from the listed offsite facility can reach the subject through other pathways (i.e., surface runoff); and,
- The offsite facility is listed as an open case on one of the following databases: Federal NPL, Federal CORRACTS, Federal CERCLIS, Federal ERNS, and State-Specific lists including, but not limited to State Hazardous Waste Sites, State SCL, State LUST, State Deed Restrictions, State Toxic Pits, Landfill (excluding transfer stations); or
- The facility is a known or suspected concern based on URS' experience or observations made during the site reconnaissance. (i.e., Dry-cleaning operations that may or may not be listed as RCRA-SQG or a non-adjacent UST site that appears to have a remediation system in place).

URS did not identify facilities that, using the criteria discussed above, appeared to be of potential environmental concern.

2.1.4 Unmapped Facilities

Twelve facilities identified on the EDR Report as "orphan sites" appear to be located close to the proposed alignment along Jayne Avenue based on address information provided. These facilities are presented in the following table. "Orphan sites" are facilities listed in the EDR Report that have not been geocoded since there are no sufficient data regarding their exact location within the general area. A full summary of agency databases can be found in the EDR Area Study attached.

Site Name	Address	Database
MH Whittier Corp	I-5 / Jayne Ave	SWEEPS UST
Garcia & Church Farms, LLC	El Dorado	Fresno CUPA
PG&E Substation	On Jayne Ave 2 Miles West of Lassen	Fresno CUPA
PG&E Substation	18336 W Jayne	Fresno CUPA
Nuevo Energy Co-Pleasant/Provadero	Jayne Ave, 2 Miles W of I-5	Fresno CUPA

Site Name	Address	Database
Dresick Farms Dresick Farms, Inc	19536 Jayne	Fresno CUPA HAZNET, Drycleaners
BHN Research	19536 Jayne	Fresno CUPA
Dresick Cooling	19935 Jayne	Fresno CUPA
Gates Substation	18336 W Jayne Ave	AST
Salyer American Cooling	16980 Jayne	Fresno CUPA
B E Giovannetti & Sons	13644 W Jayne	Fresno CUPA
Level 3 Communications	18364 W Jayne	Fresno CUPA

Based on the analysis criteria presented above, the facilities listed on the UST and AST databases are not expected to have significant potential to impact the proposed alignment. No specific information was provided in the Fresno CUPA database other than to report a local agency listing. Although no release was reported on the DRYCLEANERS and HAZNET databases, waste hydrocarbon solvent was reported to have been generated at the Dresick Farms facility (EPA ID: CAL000112743) at 19536 Jayne Ave.

SECTION 3 PHOTOGRAPH REVIEW

3.1 CURRENT AERIAL PHOTOGRAPH

URS reviewed current aerial photographs of the site available from GoogleEarth dated 2008, and existing photographs of the proposed alignment collected by URS during other phases of work for the San Joaquin Solar Hybrid Power Plant 1&2 project.

Generally, the aerial photographs show the proposed alignment with the Martifer site on the west and the Gates Substation on the east with agriculturally developed land between them. The Guijarral Hills oil field is clearly visible north of the Martifer site, on Section 2 and the northern half of Section 1. The Guijarral Hills oil field was addressed in our previous Phase I report for the proposed San Joaquin Solar Hybrid Power Plant 1&2 site. The remaining sections that the proposed transmission alignments cross appear to be agriculturally developed. There are several structures located on the southeastern corner of Interstate Highway 5 and West Jayne Avenue that appear to be commercial/industrial. There is a group of much smaller buildings located approximately one half mile further east along West Jayne Avenue, adjacent to the northern proposed alignment. Based on the locations of these buildings, it does not appear that any of these businesses have been reported on the EDR Area Study report.

3.2 PROJECT PHOTOGRAPHS

Review of existing photographs taken by URS staff identified irrigation pump stations, aboveground water tanks and water treatment chemical storage associated with the agriculturally developed areas, and several farmhouses near the proposed alignment. Many of the pump stations were powered by electric motors, but internal combustion engines with associated gasoline or diesel-fuel tanks were observed at some of the locations. The pump station locations are shown on Figure 2. Two aboveground tanks with capacities in the thousands of gallons were observed near the proposed alignments (Figure 2). One was labeled as containing sulfuric acid and the second had a warning label to use goggles and gloves. Labeling documenting its contents was not clearly visible. No evidence of spillage or leakage of these materials was observed in the photographs reviewed.

SECTION 4 CONCLUSIONS AND RECOMMENDATIONS

URS conducted an agency database review of the proposed transmission alignments for the San Joaquin Solar Hybrid Power Plant 1&2 project near Coalinga, California. The subject property consists of 12 linear miles of proposed transmission alignments east of the proposed San Joaquin Solar Hybrid Power Plant 1&2 project site and west of the Gates Substation. The transmission lines will be above ground, supported by towers that are several hundred feet apart.

Based on the scope of services performed, there is no evidence of the presence of specific RECs in connection with current operations within a 500-foot corridor adjacent to the proposed alignments that may have affected soil. It is possible that there may be residual concentrations of persistent pesticides on land used for cultivation of crops resulting from standard application methods. However, in the context of the construction associated with the proposed towers for the transmission lines, there is a low likelihood that these chemicals of potential concern are present at levels that would pose an adverse health risk to construction workers. Once a transmission alignment is identified and right-of-access is granted, soil at the locations of the towers for the transmission lines can be addressed through sampling and analyses as needed. If persistent pesticides are found in the soil at a specific tower location, it can be addressed in accordance with a Soil Management Plan that specifies methods for managing excavated soil.

No offsite properties with the potential to be RECs were identified on the EDR Areas Study report although the data presented in the report were not complete. Ten facility listings for property addresses that plot within the alignment corridor were reported as having records on file with the Fresno County CUPA. These data were not included in the EDR Area Study report.

Although several irrigation pump stations that utilize petroleum hydrocarbons for fuel and lubricants were observed near the proposed alignment, it is URS's opinion that any spillage or leakage of petroleum hydrocarbons at these locations would likely be limited to the immediately surrounding area and affect soil only. Groundwater was reported in the Phase I report to be approximately 250 feet below ground surface at the San Joaquin Solar Hybrid Power Plant 1&2 project site. If a pump station were located at the proposed location of a transmission line tower, the location of the proposed tower could be relocated, or soil that required excavation and handling could be managed in accordance with the Soil Management Plan.

Based on the findings of the work completed, URS recommends that records at the Fresno County CUPA be reviewed to identify whether the offsite properties have the potential to be RECs.

SECTION 5 REFERENCES

Environmental Data Resources, Inc., 2009, EDR Radius Map with GeoCheck, Inquiry No. 2475509.2s, April 23.

Google Earth Pro, 2009, site and vicinity photograph print dated 2008, June 30.

Data Request 145: Please provide a summary table of information on proposed businesses that would purchase fly ash from the project. At a minimum, please include the following information for each facility: facility location, distance from project site, capacity, materials accepted, acceptance limits (if any), volume they would purchase or accept, and terms of agreement under which they would purchase or accept fly ash from the project.

Response: The project has not yet obtained site specific information regarding the physical, chemical, and micro-structural properties of the fly ash. The ash is expected to contain several beneficial nutrients (10% P_2O_5, 12% K_2O, 13.5% Ca, and 5% Mg).

Potential uses for fly ash include:

- Cement-based materials including CLSM (Controlled Low Strength Materials), low- and, medium-strength concrete, cast-concrete products, RCCP (Roller Compacted Concrete Pavements), road base-course materials, and blended cements.
- Raw materials for agricultural use as a soil amendment or fertilizer
- Bedding material for livestock pens
- Sanitary landfill cover

Several companies that may potentially use the project fly ash were identified and include:

- Vulcan Materials (Bakersfield, 661-835-4809), potential usage as concrete aggregate in construction materials.
- Granite Construction (Santa Clara, 408-327-7000), potential usage in concrete mix.
- Cemex (Modesto, 209-529-4115), potential usage as aggregate materials.
- California Portland Cement Company (Glendora, 626-852-6200), potential use as aggregate in concrete production.

Additional evaluation is currently being conducted to find potential uses for the fly ash for agricultural use as a soil amendment or fertilizer or as bedding material for livestock pens.

Data Request 146: Please provide results of field sampling and analysis that adequately characterize the presence of harmful chemicals or conditions and whether there will be any risk to construction or plant personnel due to the presence of these chemicals. The project owner should determine if there is any analytical characterization data for the agricultural chemicals that were applied to the land. Samples should be assessed for persistent agricultural chemicals, such as organochlorine pesticides that were applied to the project property.

Response: The attached Report of Phase II Environmental Investigation dated May 28, 2009, addresses this data request.

Data Request 147: Please provide information on when, and how the oil tanks, excess aboveground piping and waste oil was or will be cleaned up and disposed of prior to construction at the project site.

Response: The existing aboveground storage tanks (ASTs) and piping in the southwestern portion of the site will be removed from the site and either recycled or properly disposed at a permitted facility prior to construction. Prior to removal, the contents of the diesel fuel AST will be emptied and the product contained either used or recycled. Each of the tanks will be rinsed and the rinsate will be properly disposed/treated. A composite sample of surface soil collected in this area where soil is visibly stained with hydrocarbons was analyzed as part of the Phase II Environmental Investigation as requested by the CEC. The composite sample contained 23,000 ug/kg TPH quantified as diesel fuel (TPH-d). The concentration of TPH-d detected is not a potential human health risk or concern; however, soil that is visibly stained with petroleum hydrocarbons on the ground surface in this area will be excavated and properly disposed/recycled prior to construction.

Data Request 148: Please provide information showing the abandoned oil wells have been abandoned in accordance with applicable LORS and do not present a safety concern.

Response: It was noted in the Phase I ESA prepared for the AFC that information was available for two of the six wells on the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) website. The Phase I ESA included the DOGGR Map 503 showing that each of the wells have been abandoned. URS has obtained Reports of Well Abandonment for these two wells that indicate that the abandonments were completed in accordance with DOGGR requirements thereby meeting the LORS. Copies of these reports are attached. URS is contacting DOGGR to review available files for the four additional abandoned wells to confirm that the abandonments were completed in accordance with the LORS. Copies of the Reports of WEll Abandonment, if available will be provided.

URS

June 1, 2009

Mr. Kent Larsen
Martifer Renewables Solar Thermal LLC
12555 High Bluff Drive, Suite 100
San Diego, CA 92130

Subject: Report of Phase II Environmental Investigation
Response to Data Request #146, Data Set #1
San Joaquin Solar Hybrid Power Stations 1 & 2 (08-AFC-12)
Coalinga, California
URS Project No. 27658033.00200

Dear Mr. Larsen:

URS Corporation Americas (URS) is pleased to provide Martifer Renewables Solar Thermal LLC (Martifer) this letter report summarizing the results of a Phase II Environmental Investigation at the San Joaquin Solar Hybrid Power Stations 1 & 2, located on West Jayne Avenue, Coalinga, California (the site; see Figures 1 and 2). Our services were performed in accordance with our proposal dated May 1, 2009 that was approved by Martifer on May 22, 2009.

BACKGROUND

URS performed a Phase I Environmental Site Assessment in accordance with ASTM 1597-05 for the above-referenced site as part of Martifer's Application for Certification (AFC) for the project. The results of the Phase I ESA are summarized in a report dated June 16, 2008 and identified no recognized environmental conditions (RECs) on the property. Because some of the site had been used historically for agricultural purposes, the California Energy Commission (CEC) requested additional information (Data Request #146, Data Set 1, dated April 30, 2009) related to the potential presence of chemicals associated with agricultural property use on the site that might pose a health risk and/or hazard to construction workers and/or operations personnel associated with the project. On May 13, 2009, URS provided a brief work plan to the CEC via electronic mail describing our proposed sampling and analysis plan. Ms. Ellie Townsend-Hough of the CEC concurred with the approach and plan on May 15, 2009.

PURPOSE

The purpose of this investigation was to evaluate the potential presence of persistent chemicals such as organochlorine pesticides (OCPs) that may pose a risk to construction workers during construction of the project in order to address Data Request #146, Data Set #1.

SCOPE OF WORK

URS completed the following services:

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

- Mobilized to collect soil samples.
- Collected ten surface soil samples (surface to 1 foot below the ground surface) samples at locations of known historical agricultural use.
- Collected one composite surface soil sample in the vicinity of the site water well where there is an aboveground diesel-fuel tank and several pesticide mixing tanks.
- Analyzed the soil samples for chemicals of concern (COPCs).
- Prepared this letter report summarizing the field procedures and analytical results. The analytical results were compared to screening criteria for human health risk and hazardous waste regulatory criteria, where appropriate.

SAMPLING RATIONALE AND FIELD ACTIVITIES

URS' review of historical aerial photographs of the site appearing in the Phase I ESA indicate that approximately 1/8 of the site (southeast corner) was cultivated during the period that persistent pesticides may have been applied to crops between the 1950s and about 1980 (see Appendix D of Phase I ESA). URS conducted surface soil sampling (from ground surface to 1 foot below the ground surface) for OCPs in this area of the site, since the highest residual concentrations would be expected in the upper portion of the tilled zone. The samples were collected on a systematic random grid in accordance with U.S. EPA Guidance SW-846 from ten cells of approximately equal area on a rectangular grid (approximately representing 8 acres each). Random locations were generated using a random number generator, and the coordinates of the locations were programmed into a hand-held Global Positioning System (GPS) unit. The locations were identified in the field with the GPS unit with approximately 3-meter (10-foot) accuracy. This approach is very similar to that appearing in the California Department of Toxic Substances Control (DTSC) Guidance, titled "Interim Guidance for Sampling Agricultural Fields for School Sites", Second Revision, dated August 26, 2002.

Because the risk associated with the proposed property use (non-residential and construction worker) is significantly less than that associated with exposures to sensitive receptors at school sites, the number of samples collected for analyses was reduced compared to the number of samples suggested in the DTSC guidance. It was assumed based on the historical aerial photographs that the agricultural practices appeared to be consistent on the roughly 80 acres, therefore, it would be expected that there would not be variations in OCP concentrations assuming that the pesticides would have been uniformly applied.

On May 14, 2009, one soil sample was collected by a URS field technician at each location (locations SJS-01 through -10) from the ground surface to approximately 1 foot below the ground surface (bgs). Minimal surface grading is proposed on the approximately 800 acres that have been used historically to cultivate crops. In addition as agreed with the CEC, four soil samples (SJS-11A through -11D) were collected from the ground surface (0 to 1 foot bgs) near a diesel-fuel AST and pesticide mixing ASTs on the southwest corner of the site. The four samples were composited by

the laboratory in accordance with standard methods. The approximate locations of the samples colled and analyzed are shown on Figure 2. The samples were transported under chain-of-custody procedures in an insulated cooler with ice, maintained at 4°C, and delivered to Calscience Environmental Laboratories, Inc. (Calscience), a California Department of Health Services-certified laboratory for analyses.

The samples were collected using a shovel that was decontaminated between uses using a non-phosphate detergent solution followed by rinsing twice with deionized water. Wastewater was placed on the ground surface and allowed to infiltrate the soil following completion of sampling.

LABORATORY METHODS AND ANALYTICAL RESULTS

Each of the soil samples was analyzed for OCPs by EPA Method 8081A. The composite soil sample from the vicinity of the ASTs was additionally analyzed for total petroleum hydrocarbons quantified as diesel fuel (TPH-d). The analytical results are presented in Table 1 and a copy of the laboratory analytical report and chain-of-custody form is provided in Attachment A.

AREA OF HISTORICAL AGRICULTURAL USE

The following OCPs were detected in the surface soil samples collected from the area identified as being used historically for agriculture: dieldrin, 4,4'-DDE, 4, 4'-DDD, 4,4'-DDT and toxaphene. Dieldrin was detected in seven of the ten samples analyzed at concentrations ranging from 5.6 to 13 ug/kg. 4,4'-DDE was detected in each of the ten samples analyzed at concentrations ranging from 18 to 270 ug/kg. 4,4'-DDD was detected in four of the ten samples at concentrations ranging from 5.6 to 12 ug/kg. 4,4'-DDT was detected eight of the ten samples analyzed at concentrations ranging from 14 to 90 ug/kg. Toxaphene was detected in each of the ten samples analyzed at concentrations ranging from 600 to 3,100 ug/kg.

AST AREA

TPH-d were detected in the composite sample at a concentration of 23,000 ug/kg. No OCPs were detected in the composite sample. It should be noted that the AST area was not used for agriculture prior to 1980 when persistent pesticides would have been applied to crops.

SOIL SCREENING

URS conducted screening of the soil sample analytical results that compared the detected COPC concentrations to human health risk and hazardous waste criteria. The analytical data were compared to California Human Health Screening Levels (CHHSLs; Cal EPA 2005) for a commercial/industrial land use scenario. The data were also compared to state and federal hazardous waste criteria. For comparative purposes, the CHHSLs and hazardous waste criteria are listed at the bottom of Table 1.

HUMAN HEALTH SCREENING

The CHHSLs were modeled after the USEPA Region IX Preliminary Remediation Goals (PRGs) and are described in the document prepared by the California EPA titled, "Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties", dated January 2005. The CHHSLs have been developed for 54 chemicals in soil or soil gas based on a threshold of one in a million (1×10^{-6}) lifetime cancer risk and a hazard quotient of 1.0 for non-cancer health effects. The CHHSLs were developed using standard exposure assumptions and chemical toxicity values published by the Cal EPA, where available, and the U.S. EPA, in instances where no Cal EPA-specific toxicity value exists. CHHSLs are not regulatory cleanup standards. Because the site will be industrial and the potential exposures would be to construction workers or operators at the site, the analytical results for the soil samples have been compared to the industrial/commercial CHHSLs for the OCPs detected.

Of the OCPs detected, only toxaphene detected in three samples was present at concentrations above the commercial/industrial CHHSL of 1,800 ug/kg. If the average concentration of toxaphene detected in the samples collected from the area of historical agricultural use is considered (1,432 ug/kg), it is below the commercial/industrial CHHSL for this compound. The concentration of TPH in the composite sample (23,000 ug/kg) is not considered a health concern under any property use scenario.

HAZARDOUS WASTE SCREENING

State (CCR Title 22 Section 66261.3) and Federal hazardous waste regulations (40CFR 261.3) include regulatory limits for certain constituents based on toxicity. In California, the regulatory limits for the toxicity characteristic are identified by comparing the concentrations of a constituent to the Total Threshold Limit Concentration (TTLC) and Soluble Threshold Limit Concentration (STLC). If a constituent concentration is above either of these regulatory limits, the material may be considered a non-Resource Conservation and Recovery Act (RCRA), California hazardous waste. As such, the materials may require disposal at a Class I landfill if these materials were to be removed from the site. To identify whether a material is a Federal or RCRA hazardous waste, the materials are subjected to a leaching procedure and the concentration of that constituent in the extract is compared to the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limit.

Each of the OCPs detected have regulatory limits for waste classification in California based on toxicity. Of these compounds, only toxaphene has a regulatory limit for RCRA waste classification based on toxicity. None of the OCPs detected were present at a concentration above its respective TTLC regulatory limit. The Waste Extraction Test (WET) that is used to obtain the STLC for a constituent has an inherent 10 times dilution factor. For example, a sample with a toxaphene concentration of 5,000 ug/kg cannot have a STLC toxaphene concentration that is greater than the regulatory limit of 500 ug/l. Of the samples analyzed during this investigation, none has the potential to exceed the STLC for the OCPs that were detected. Therefore, none of the samples could be considered a non-RCRA (California) hazardous waste. Similarly, the TCLP has a 20 times dilution factor inherent in the procedure. Therefore, a sample containing less than 10,000 ug/kg

toxaphene could not exceed the TCLP regulatory limit of 500 ug/l. None of the samples contained toxaphene at a concentration above 20 times the TCLP regulatory limit, therefore none of the samples could be considered a RCRA hazardous waste.

CONCLUSIONS

Based on the limited investigation conducted, URS concludes the following:

- The results of sampling confirmed that OCPs were detected in surface soil on the property that had been used historically for the cultivation of crops prior to 1980.
- The concentrations of toxaphene detected in three of the soil samples are above the industrial/commercial CHHSL. The average concentration in the 10 samples analyzed is 1,432 ug/kg, and is less than the commercial/industrial CHHSL.
- The surface soil would not be considered a non-RCRA or RCRA hazardous waste, if it were removed from the site.
- The concentrations of persistent pesticides (OCPs) detected in the soil at the site are not at levels that would be considered hazardous to the health of construction workers or site operators.
- The movement of soil on the site during grading will be sprayed with water to control fugitive dust. This will also serve as an effective measure in managing any potential health risk to construction workers posed by the OCPs in soil during grading.
- The concentration of TPH-d was relatively low in the vicinity of the ASTs where the soil was visibly stained and does not require any further action. However, the soil containing visual indications of the presence of TPH will be removed and properly disposed at a permitted landfill.

LIMITATIONS

The results described herein are intended to provide a limited, but reasonable evaluation of risk. The intent is that we take such steps as we determine are reasonable, under the circumstances to identify potential environmental concerns. Such steps do not eliminate the possibility of a property having some degree of environmental problems. It should be noted that any level of assessment cannot ascertain that a property is completely free of chemical or toxic substances. Therefore, URS cannot certify that a site is "clean."

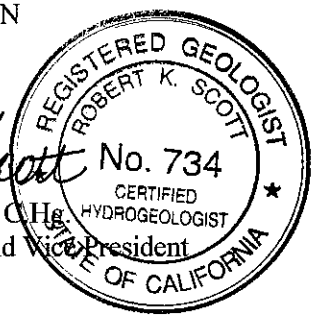
The results and conclusions are based on the information acquired during the assessment. It is possible that variations at the property could exist between and/or beyond points explored during the course of the assessment. Also, changes in conditions found could occur at some time in the future due to variations and factors not apparent at the time of the fieldwork.

All work performed was consistent with the level of care and skill ordinarily exercised by members of our profession, currently practicing under similar conditions in Southern California. *No other warranty is expressed or implied.*

URS appreciates the opportunity to assist Martifer with this project. If you have any questions concerning the results of this investigation, please do not hesitate to call.

Sincerely,

URS CORPORATION



Robert K. Scott, P.G., C.Hg.
Principal Geologist and Vice President

RKS:ml

Attachments: Table 1 - Soil Sample Analytical Results
Figure 1 - Site Location Map
Figure 2 - Site Plan
Figure 3 - Soil Sample Location Map
Attachment A - Laboratory Analytical Report and Chain-of-Custody Form

TABLE

Table 1
SOIL SAMPLE ANALYTICAL RESULTS
SAN JOAQUIN SOLAR 1 & 2

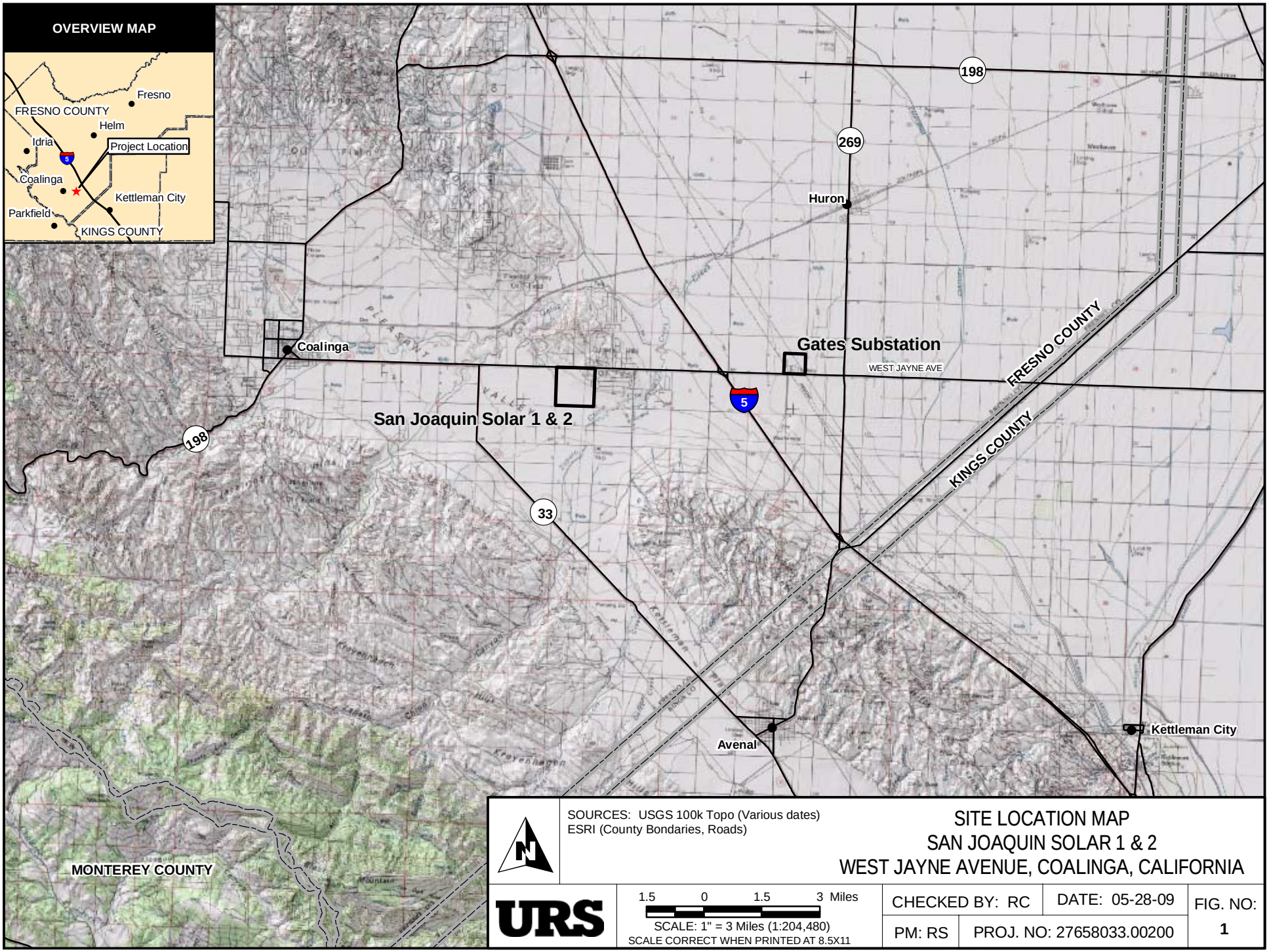
Sample ID	Sample Depth (ft)	OCPs (ug/kg)					TPH-d
		Dieldrin	4,4'-DDE	4,4'-DDD	4,4'-DDT	Toxaphene	
SJS-01	0-1	9.6	61	<5.0	15	770	NA
SJS-02	0-1	6.9	100	<5.0	20	840	NA
SJS-03	0-1	5.6	18	<5.0	<5.0	600	NA
SJS-04	0-1	6.6	55	<5.0	<5.0	960	NA
SJS-05	0-1	9.6	170	<5.0	28	1,000	NA
SJS-06	0-1	13	270	12	63	1,300	NA
SJS-07	0-1	6.9	90	5.6	14	950	NA
SJS-08	0-1	<5.0	230	11	63	2,400	NA
SJS-09	0-1	<5.0	260	<5.0	90	3,100	NA
SJS-10	0-1	<5.0	230	11	68	2,400	NA
SJS-11-A-D (Composite)	0-1	<5.0	<5.0	<5.0	<5.0	<100	23,000
Commerical/Industrial CHHSL		130	6,300	9,000	6,300	1,800	---
TTLC (ug/kg)		8,000	1,000	1,000	1,000	5,000	---
STLC (ug/l)		800	100	100	100	500	---
TCLP (ug/l)		NE	NE	NE	NE	500	---

Notes:

OCPs: Organochlorine pesticides by EPA Method 8081A
NA: Not analyzed
---: Not applicable
CHHSL: California Human Health Screening Level
TTLC: Total Threshold Limit Concentration
STLC: Soluble Threshold Limit Concentration
TCLP: Toxicity Characteristic Leaching Procedure

BOLD indicates concentration detected is above commercial/industrial CHHSL.
None of the detected concentrations is above hazardous waste criteria. See text for discussion.

FIGURES



SOURCES: USGS 100k Topo (Various dates)
ESRI (County Bondaries, Roads)

SITE LOCATION MAP
SAN JOAQUIN SOLAR 1 & 2
WEST JAYNE AVENUE, COALINGA, CALIFORNIA

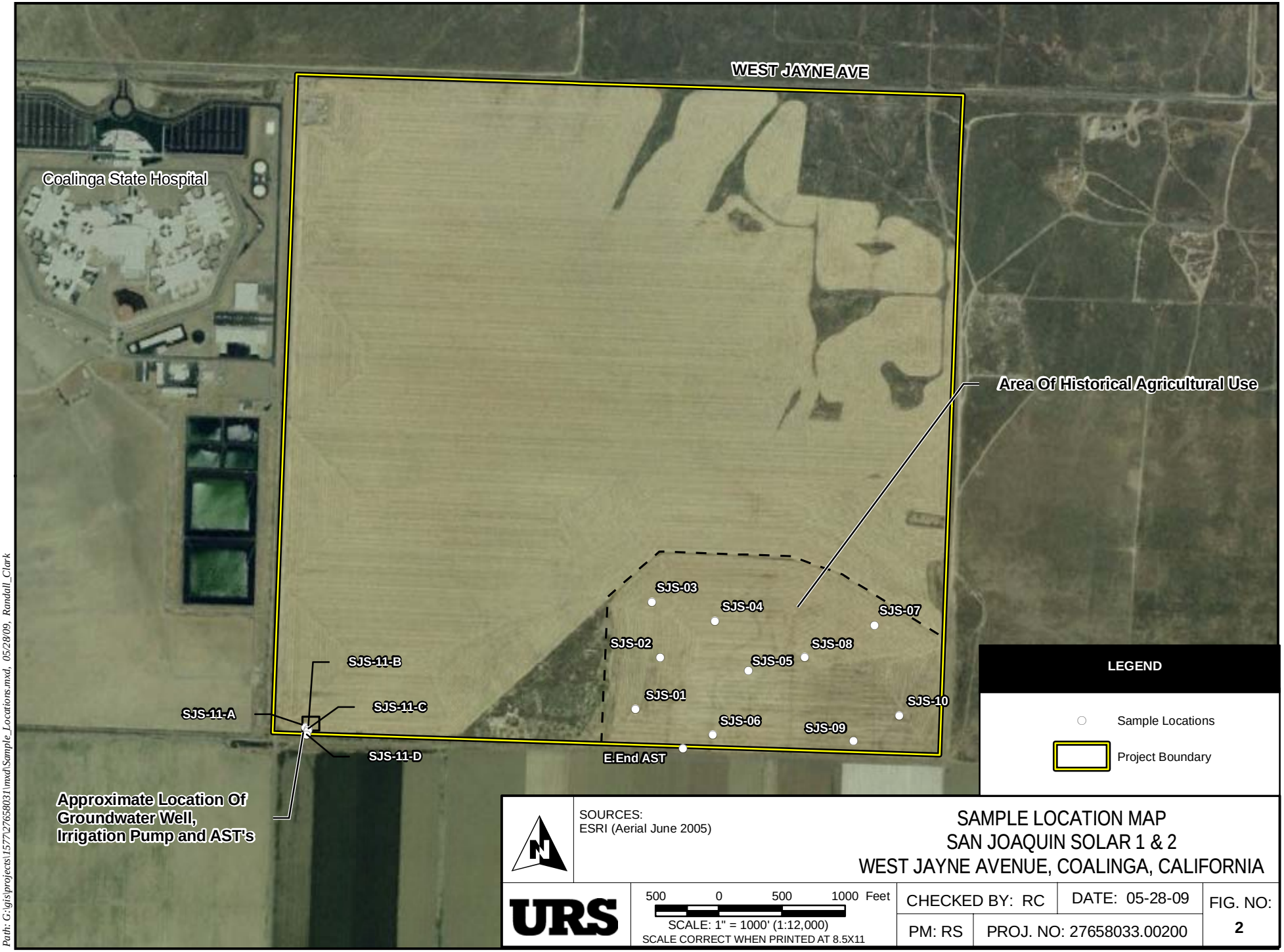
URS

1.5 0 1.5 3 Miles

SCALE: 1" = 3 Miles (1:204,480)
SCALE CORRECT WHEN PRINTED AT 8.5X11

CHECKED BY: RC	DATE: 05-28-09	FIG. NO: 1
PM: RS	PROJ. NO: 27658033.00200	

Path: G:\gis\projects\1577\27658031\mxd\Site_Location.mxd, 05/28/09, Randall_Clark



SOURCES:
ESRI (Aerial June 2005)

SAMPLE LOCATION MAP
SAN JOAQUIN SOLAR 1 & 2
WEST JAYNE AVENUE, COALINGA, CALIFORNIA

URS

500 0 500 1000 Feet

SCALE: 1" = 1000' (1:12,000)

SCALE CORRECT WHEN PRINTED AT 8.5X11

CHECKED BY: RC	DATE: 05-28-09	FIG. NO: 2
PM: RS	PROJ. NO: 27658033.00200	

Path: G:\gis\projects\1577\27658033\mxd\Sample_Locations.mxd, 05/28/09, Randall_Clark

ATTACHMENT A

LABORATORY ANALYTICAL REPORT AND CHAIN-OF-CUSTODY FORM

Calscience Environmental Laboratories, Inc.

May 22, 2009

Robert Scott
URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Subject: **Calscience Work Order No.: 09-05-1394**
Client Reference: SJS 1 & 2 Discovery / 27658033.00200

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 5/15/2009 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Vikas Patel

Calscience Environmental
Laboratories, Inc.
Vikas Patel
Project Manager

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: 05/15/09
Work Order No: 09-05-1394
Preparation: EPA 3550B
Method: EPA 8015B (M)

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-11-A-D (COMPOSITE)	**09-05-1394-15-A**	**05/14/09 00:00**	**Solid**	**GC 47**	**05/18/09**	**05/19/09 13:49**	**090518B05**

Parameter	Result	RL	DF	Qual	Units
TPH as Diesel	23000	100	20		mg/kg

Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	113	61-145	

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
Method Blank	**099-12-275-2,734**	**N/A**	**Solid**	**GC 47**	**05/18/09**	**05/18/09 18:33**	**090518B05**

Parameter	Result	RL	DF	Qual	Units
TPH as Diesel	ND	5.0	1		mg/kg

Surrogates:	REC (%)	Control Limits	Qual
Decachlorobiphenyl	96	61-145	

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	05/15/09
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-01@0-1'	**09-05-1394-1-A**	**05/14/09 16:35**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 01:18**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	15	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	9.6	5.0	1		Toxaphene	770	100	1	
4,4'-DDE	61	10	2		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	78	50-130			2,4,5,6-Tetrachloro-m-Xylene	85	50-130		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-02@0-1'	**09-05-1394-2-A**	**05/14/09 16:45**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 17:23**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	20	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	6.9	5.0	1		Toxaphene	840	100	1	
4,4'-DDE	100	25	5		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	84	50-130			2,4,5,6-Tetrachloro-m-Xylene	76	50-130		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	05/15/09
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-03@0-1'	**09-05-1394-3-A**	**05/14/09 16:55**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 02:13**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	ND	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	5.6	5.0	1		Toxaphene	600	100	1	
4,4'-DDE	18	5.0	1		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	77	50-130			2,4,5,6-Tetrachloro-m-Xylene	83	50-130		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-04@0-1'	**09-05-1394-4-A**	**05/14/09 17:05**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 02:40**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	ND	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	6.6	5.0	1		Toxaphene	960	100	1	
4,4'-DDE	55	10	2		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	83	50-130			2,4,5,6-Tetrachloro-m-Xylene	88	50-130		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	05/15/09
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-05@0-1'	**09-05-1394-5-A**	**05/14/09 17:25**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 03:08**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	28	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	9.6	5.0	1		Toxaphene	1000	100	1	
4,4'-DDE	170	50	10		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	74	50-130			2,4,5,6-Tetrachloro-m-Xylene	81	50-130		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-06@0-1'	**09-05-1394-6-A**	**05/14/09 17:35**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 03:35**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	12	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	63	10	2	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	13	5.0	1		Toxaphene	1300	100	1	
4,4'-DDE	270	50	10		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	76	50-130			2,4,5,6-Tetrachloro-m-Xylene	82	50-130		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	05/15/09
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-07@0-1'	**09-05-1394-7-A**	**05/14/09 17:50**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 04:03**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	5.6	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	14	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	6.9	5.0	1		Toxaphene	950	100	1	
4,4'-DDE	90	25	5		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	73	50-130			2,4,5,6-Tetrachloro-m-Xylene	79	50-130		

SJS-08@0-1'	**09-05-1394-8-A**	**05/14/09 18:00**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 04:17**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	11	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	63	25	5	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	ND	5.0	1		Toxaphene	2400	500	5	
4,4'-DDE	230	100	20		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	76	50-130			2,4,5,6-Tetrachloro-m-Xylene	83	50-130		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	05/15/09
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-09@0-1'	**09-05-1394-9-A**	**05/14/09 18:10**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 04:44**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	90	25	5	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	ND	5.0	1		Toxaphene	3100	500	5	
4,4'-DDE	260	100	20		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	76	50-130			2,4,5,6-Tetrachloro-m-Xylene	81	50-130		

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-10@0-1'	**09-05-1394-10-A**	**05/14/09 18:20**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 05:11**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	11	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	68	25	5	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	ND	5.0	1		Toxaphene	2400	500	5	
4,4'-DDE	230	100	20		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	75	50-130			2,4,5,6-Tetrachloro-m-Xylene	83	50-130		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Analytical Report

URS Corporation		Date Received:	05/15/09
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3545
		Method:	EPA 8081A
		Units:	ug/kg

Project: SJS 1 & 2 Discovery / 27658033.00200

Client Sample Number	Lab Sample Number	Date/Time Collected	Matrix	Instrument	Date Prepared	Date/Time Analyzed	QC Batch ID
SJS-11-A-D (COMPOSITE)	**09-05-1394-15-A**	**05/14/09 00:00**	**Solid**	**GC 44**	**05/18/09**	**05/21/09 05:38**	**090518L07**

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	ND	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	ND	5.0	1		Toxaphene	ND	100	1	
4,4'-DDE	ND	5.0	1		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	82	50-130			2,4,5,6-Tetrachloro-m-Xylene	85	50-130		

Method Blank	099-12-537-651	N/A	Solid	GC 44	05/18/09	05/20/09 19:49	090518L07

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Alpha-BHC	ND	5.0	1		Endrin	ND	5.0	1	
Gamma-BHC	ND	5.0	1		Endrin Aldehyde	ND	5.0	1	
Beta-BHC	ND	5.0	1		4,4'-DDD	ND	5.0	1	
Heptachlor	ND	5.0	1		Endosulfan II	ND	5.0	1	
Delta-BHC	ND	5.0	1		4,4'-DDT	ND	5.0	1	
Aldrin	ND	5.0	1		Endosulfan Sulfate	ND	5.0	1	
Heptachlor Epoxide	ND	5.0	1		Methoxychlor	ND	5.0	1	
Endosulfan I	ND	5.0	1		Chlordane	ND	50	1	
Dieldrin	ND	5.0	1		Toxaphene	ND	100	1	
4,4'-DDE	ND	5.0	1		Endrin Ketone	ND	5.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Decachlorobiphenyl	91	50-130			2,4,5,6-Tetrachloro-m-Xylene	98	50-130		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: 05/15/09
Work Order No: 09-05-1394
Preparation: EPA 3550B
Method: EPA 8015B (M)

Project SJS 1 & 2 Discovery / 27658033.00200

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
09-05-1390-1	**Solid**	**GC 47**	**05/18/09**	**05/18/09**	**090518S05**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	89	102	64-130	13	0-15	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - Spike/Spike Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: 05/15/09
Work Order No: 09-05-1394
Preparation: EPA 3545
Method: EPA 8081A

Project SJS 1 & 2 Discovery / 27658033.00200

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
SJS-01@0-1'	**Solid**	**GC 44**	**05/18/09**	**05/21/09**	**090518S07**

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Gamma-BHC	89	86	50-135	4	0-25	
Heptachlor	87	83	50-135	5	0-25	
Endosulfan I	87	85	50-135	3	0-25	
Dieldrin	93	89	50-135	3	0-25	
Endrin	111	106	50-135	4	0-25	
4,4'-DDT	125	105	50-135	11	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation		Date Received:	N/A
1615 Murray Canyon Road, Suite 1000		Work Order No:	09-05-1394
San Diego, CA 92108-4319		Preparation:	EPA 3550B
		Method:	EPA 8015B (M)

Project: SJS 1 & 2 Discovery / 27658033.00200

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-275-2,734	**Solid**	**GC 47**	**05/18/09**	**05/18/09**	**090518B05**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
TPH as Diesel	89	88	75-123	1	0-12	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Quality Control - LCS/LCS Duplicate

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4319

Date Received: N/A
Work Order No: 09-05-1394
Preparation: EPA 3545
Method: EPA 8081A

Project: SJS 1 & 2 Discovery / 27658033.00200

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-12-537-651	**Solid**	**GC 44**	**05/18/09**	**05/20/09**	**090518L07**

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Gamma-BHC	90	97	50-135	7	0-25	
Heptachlor	91	98	50-135	7	0-25	
Endosulfan I	87	94	50-135	7	0-25	
Dieldrin	87	93	50-135	7	0-25	
Endrin	93	100	50-135	8	0-25	
4,4'-DDT	90	97	50-135	7	0-25	

RPD - Relative Percent Difference , CL - Control Limit

Calscience Environmental Laboratories, Inc.

Glossary of Terms and Qualifiers

Work Order Number: 09-05-1394

Qualifier	Definition
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike (MS) or Matrix Spike Duplicate (MSD) compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
ME	LCS Recovery Percentage is within LCS ME Control Limit range.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.
	Solid - Unless otherwise indicated, solid sample data is reported on a wet weight basis, not corrected for % moisture.

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 1 OF 2

LABORATORY CLIENT: URS Corporation
ADDRESS: 30 River Park Place West, Suite 180
CITY: Fresno, CA 93720
TEL: (559)-256-1444 FAX: (559)-256-1478 E-MAIL:

CLIENT PROJECT NAME / NUMBER:
PROJECT CONTACT: Jason Moore
SAMPLER(S): (SIGNATURE)

P.O. NO.:
QUOTE NO.:
LAB USE ONLY 05-1394

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	OCPs by EPA Method 8081A
1	SJS-01 @0-1'		05/14/09	1635	S	1	X
2	SJS-02 @0-1'		05/14/09	1645	S	1	X
3	SJS-03 @0-1'		05/14/09	1655	S	1	X
4	SJS-04 @0-1'		05/14/09	1705	S	1	X
5	SJS-05 @0-1'		05/14/09	1725	S	1	X
6	SJS-06 @0-1'		05/14/09	1735	S	1	X
7	SJS-07 @0-1'		05/14/09	1750	S	1	X
8	SJS-08 @0-1'		05/14/09	1800	S	1	X
9	SJS-09 @0-1'		05/14/09	1810	S	1	X
10	SJS-10 @0-1'		05/14/09	1820	S	1	X

Relinquished by: (Signature) R.V. NEWMAN	Received by: (Signature) ON-TRAC COURIER	Date: 05-14-09	Time: 2115
Relinquished by: (Signature) ONTRAC D10010211524453	Received by: (Signature) Wcbatn CET	Date: 5/15/09	Time: 0900
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Calscience Environmental Laboratories, Inc.
7440 LINCOLN WAY
GARDEN GROVE, CA 92841-1432
TEL: (714) 895-5494 . FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

DATE:

PAGE: 2 OF 2

LABORATORY CLIENT: URS Corporation
ADDRESS: 30 River Park Place West, Suite 180
CITY: Fresno, CA 93720
TEL: (559)-256-1444 FAX: (559)-256-1478 E-MAIL

CLIENT PROJECT NAME / NUMBER:
PROJECT CONTACT: Jason Moore
SAMPLER(S): (SIGNATURE)
P.O. NO.:
QUOTE NO.:
LAB USE ONLY 05-1394

TURNAROUND TIME
☐ SAME DAY ☐ 24 HR ☐ 48HR ☐ 72 HR ☐ 5 DAYS ☐ 10 DAYS

SPECIAL REQUIREMENTS (ADDITIONAL COSTS MAY APPLY)
☐ RWQCB REPORTING ☐ ARCHIVE SAMPLES UNTIL ____/____/____

SPECIAL INSTRUCTIONS

REQUESTED ANALYSIS

LAB USE ONLY	SAMPLE ID	LOCATION/ DESCRIPTION	SAMPLING DATE	SAMPLING TIME	Matrix	#Cont	Composite by Lab	TPH-D by EPA Method 8015M	OCPs by Method 8081A
11	SJS-11-A		05/14/09	1840	S	1	X		
12	SJS-11-B		05/14/09	1845	S	1	X		
13	SJS-11-C		05/14/09	1855	S	1	X		
14	SJS-11-D		05/14/09	1900	S	1	X		
15	SJS-11-A-D (Composite by Lab)							X	X

Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:
R.V. Newman	ON-TRAK COURIER	05-14-09	2115
Relinquished by: (Signature) ONTRAC D10010211524A53	Received by: (Signature) Wahath CEL	Date: 5/15/09	Time: 0900
Relinquished by: (Signature)	Received by: (Signature)	Date:	Time:

Calscience Environmental Laboratories, Inc.

WORK ORDER #: 09-05-1394

SAMPLE RECEIPT FORM

Cooler 1 of 1

CLIENT: URS Corp

DATE: 5/15/09

TEMPERATURE: (Criteria: 0.0 °C – 6.0 °C, not frozen)

Temperature 3.9 °C - 0.2 °C (CF) = 3.7 °C ☐ Blank ☑ Sample

☐ Sample(s) outside temperature criteria (PM/APM contacted by: _____).

☐ Sample(s) outside temperature criteria but received on ice/chilled on same day of sampling.

☐ **Received at ambient temperature, placed on ice for transport by Courier.**

Ambient Temperature: ☐ Air ☐ Filter ☐ Metals Only ☐ PCBs Only **Initial:** WB

CUSTODY SEALS INTACT:

☐ Cooler ☐_____ ☐ No (Not Intact) ☑ Not Present ☐ N/A **Initial:** WB

☐ Sample ☐_____ ☐ No (Not Intact) ☑ Not Present **Initial:** PS

SAMPLE CONDITION:	Yes	No	N/A
Chain-Of-Custody (COC) document(s) received with samples	☑	☐	☐
COC document(s) received complete	☑	☐	☐
☐ Collection date/time, matrix, and/or # of containers logged in based on sample labels.			
☐ COC not relinquished. ☐ No date relinquished. ☐ No time relinquished.			
Sampler's name indicated on COC	☐	☑	☐
Sample container label(s) consistent with COC	☑	☐	☐
Sample container(s) intact and good condition	☑	☐	☐
Correct containers and volume for analyses requested	☑	☐	☐
Analyses received within holding time	☑	☐	☐
Proper preservation noted on COC or sample container	☐	☐	☑
☐ Unpreserved vials received for Volatiles analysis			
Volatile analysis container(s) free of headspace	☐	☐	☑
Tedlar bag(s) free of condensation	☐	☐	☑

CONTAINER TYPE:

Solid: ☑4ozCGJ ☐8ozCGJ ☐16ozCGJ ☐Sleeve ☐EnCores® ☐TerraCores® ☐_____

Water: ☐VOA ☐VOA**h** ☐VOA**na$_2$** ☐125AGB ☐125AGB**h** ☐125AGB**p** ☐1AGB ☐1AGB**na$_2$** ☐1AGB**s** ☐500AGB ☐500AGJ ☐500AGJ**s** ☐250AGB ☐250CGB ☐250CGB**s** ☐1PB ☐500PB ☐500PB**na** ☐250PB ☐250PB**n** ☐125PB ☐125PB**znna** ☐100PB ☐100PB**na$_2$** ☐_____ ☐_____ ☐_____

Air: ☐Tedlar® ☐Summa® ☐_____ **Other:** ☐_____ **Checked/Labeled by:** PS

Container: **C:** Clear **A:** Amber **P:** Plastic **G:** Glass **J:** Jar (Wide-mouth) **B:** Bottle (Narrow-mouth) **Reviewed by:** WB

Preservative: **h:** HCL **n:** HNO3 **na$_2$:** $Na_2S_2O_3$ **Na:** NaOH **p:** H_3PO_4 **s:** H_2SO_4 **znna:** $ZnAc_2$+NaOH **f:** Field-filtered **Scanned by:** PS