RESPONSES TO CEC DATA REQUESTS (#1-78)

APPLICATION FOR CERTIFICATION (07-AFC-8)
Carrizo Energy Solar Farm
Carrizo Energy, LLC

Submitted to:
California Energy Commission

Submitted by:
Carrizo Energy, LLC

With Support from:

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108

February 2008

February 26, 2008

Mr. B.B. Blevins
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Carrizo Energy Solar Farm (07-AFC-8)
Responses to CEC Data Requests
URS Project No. 22239472.018000

Dear Mr. Blevins:

On behalf of Ausra CA II, LLC (dba Carrizo Energy, LLC), URS Corporation Americas (URS) hereby submits the Responses to CEC Data Requests (#1-78).

I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge. I also certify that I am authorized to submit the Responses to CEC Data Requests (#1-78) on behalf of Carrizo Energy, LLC.

Sincerely,

Angela Leiba
Project Manager

AL:ml

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108
Tel: 619.294.9400
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TECHNICAL AREA: AIR QUALITY

Data Request 1: Please provide a description of the facility maintenance activities, including, but not limited to, cleaning the solar mirrors, vegetation suppression, grading, reapplication of dust suppressants, and the number and type of equipment and/or vehicles utilized for such activities.

Response: Power block maintenance routines include fluid reservoir checks, cleaning, lubricating, preserving, and tensioning, as required by equipment providers and normal industrial practices. Similarly, the solar field maintenance will include the above plus removal of undesired vegetation using commercial processes. Small vehicles, tractors, and gas powered vehicles will be used to access the site and assist with these maintenance activities. Reflector surfaces will be dusted and/or cleaned using specially designed equipment similar to a high pressure water nozzle configuration. The other equipment will likely include pick-up trucks, forklifts, manlifts, small cranes, and/or pickers.

While at this early stage it is difficult to propose any numbers and maintenance schedules with certainty, for the purpose of calculating equipment usage, emissions, etc., our most up-to-date estimates are as follows: For mirror cleaning we anticipate using six trucks, each with 1,000 gallon water tank trailers. Each truck should have a towing capacity of at least 10,000 lbs. The equivalent of a Ford F150 5.4L Triton V8 4x2 pick up will suffice.[1]

- Truck specs: Equivalent of Ford F150 5.4L Triton V8 4x2 Regular Cab with >10,000 lbs. towing capacity. The engine performance for this or equivalent is approximately the following:
    - 300 HP.
    - 18 miles per gallon (MPG) highway; estimate 10 MPG efficiency during plant use because of starting, stopping, and slow speeds.
    - Fuel required: regular unleaded gasoline.
- Water tank trailer will not require fuel for operation.
- Each truck will drive approximately 10 miles per day for mirror cleaning operations, requiring one gallon per day of gasoline.
- The water tank and trailers will be maintained every six months for normal wear and tear, and cleaning of tanks. This will be performed offsite.
- Trucks will be maintained per regular auto maintenance schedules, including oil change and tuning approximately every three months, which may vary depending on usage. This will be performed offsite.

[1] Assumes 13 crews of 4 people each working on each line. One truck supports one to two crews with clean water during course of the day.

For plant maintenance, approximately six additional trucks, the equivalent of Ford F150 models, will be used to move equipment and support crews. Each of these trucks will drive an estimated ten miles per day. Ten all terrain vehicles (ATVs) will also be used to support maintenance crews and will drive approximately ten miles per day. All of these vehicles will have a three month maintenance schedule (which is subject to change based on usage) including oil changes and tuning to be performed offsite.

TECHNICAL AREA: AIR QUALITY

Data Request 2: Please provide an estimate of emissions of NOx, VOC, PM2.5 and PM10, including fugitive PM2.5/PM10, caused by the maintenance equipment, vehicles and activities.

Response: An estimate of operational NO_x, VOC, $PM_{2.5}$, and PM_{10} emissions from Project maintenance equipment was calculated based on the approximations provided in response to Data Request 1, above. The maintenance equipment include six Ford F150 5.4L trucks, or equivalent, each pulling a water tank trailer for solar panel cleaning, six additional maintenance trucks of the same size, and ten support ATVs. This equipment will be on the CESF site each day to clean solar mirrors and maintain the facility, potentially employing 13 crews of 4 people each to work on each line of solar panels. All equipment is gasoline fueled. Assumptions for emission calculations are included in the following emissions tables.

Emission factors were obtained from the EMFAC 2007 2.3 model for the San Luis Obispo Air District (see Appendix A). To obtain emission factors for each pollutant, a light heavy duty truck classification with a weight class of 10,000 to 14,000 lbs. was used as a Ford F150 5.4L equivalent. ATV emission factors were calculated from Gas Fired Offroad Equipment Emission Factors from EPA "Exhaust Emission Factors for Nonroad Engine Modeling: Spark-Ignition." All pieces of equipment are estimated to travel 10 miles per day, and assumed to operate 8 hours a day, 7 days a week.

CESF Maintenance Equipment Emissions

Short Term Combustion Exhaust Emissions

Gasoline Fired Offroad Equipment

				Emission factors (g/mile)					Emission factors (g/hp-hr)	Hourly Emissions (lb/hr)						Daily Emissions (lb/day)						Annual Emissions (tons/year)					
Equipment	**No. Of Units**	**Max Daily Distance per Vehicle (mile/day)**	**Max Daily VMT (all units)**	**PM10**	**PM2.5**	**CO**	**ROC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**
Additional ATV's for maintenance	10	10	100	1.08	1.002	51.3	28.15	0.28	0.20	0.030	0.028	1.414	0.776	0.008	0.004	0.24	0.22	11.31	6.21	0.06	0.035	0.043	0.040	2.064	1.133	0.011	0.006

Gas Fired Offroad Equipment Emission Factors from EPA "Exhaust Emission Factors for Nonroad Engine Modeling:Spark-Ignition". Assumed half ATVs are 2-stroke and the rest are 4-stroke.
Assumes for gasoline emissions 92.8% of all PM10 is PM2.5

Combustion Exhaust from Travel on Unpaved Roads

				Emission factor (lb/mile)						Hourly Emissions (lb/hr)						Daily Emissions (lb/day)						Annual Emissions (tons/year)					
Vehicle Type	**No. Of Units**	**Max Daily Distance per Vehicle (mile/day)**	**Max Daily VMT (all units)**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**
Trucks pulling water trailers	6	10	60	0.00009	0.00008	0.03136	0.00321	0.00135	0.00005	0.001	0.001	0.235	0.024	0.010	0.000	0.005400	0.005011	1.881600	0.192600	0.081000	0.003000	0.001	0.001	0.343	0.035	0.015	0.001
Maintenance trucks	6	10	60	0.00009	0.00008	0.03136	0.00321	0.00135	0.00005	0.001	0.001	0.235	0.024	0.010	0.000	0.005400	0.005011	1.881600	0.192600	0.081000	0.003000	0.001	0.001	0.343	0.035	0.015	0.001
Worker vehicles	41.6	0.2	8.32	0.00009	0.00008	0.00969	0.00099	0.00101	0.00004	0.000	0.000	0.010	0.001	0.001	0.000	0.000716	0.000664	0.080584	0.008257	0.008363	0.000334	0.000	0.000	0.015	0.002	0.002	0.000

Maintenance and water trucks are Ford F150 pickup trucks, Emission factor vehicle type = LHDT2, T5
Worker vehicles, Emission factor vehicle type = passenger

Short term Fugitive Dust Emissions

Travel on unpaved road

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4 G = Surface silt loading (%) (value for gravel road)
5 H = Mean vehicle speed (mph)
value listed in table I = Mean number of wheels on vehicle
value listed in table J = Mean vehicle weight (ton)
46 K = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Paso Robles COOP Station)

							Watering Control Efficiency		PM10 Emissions (lb/hr)		PM10 Emissions (lb/day)		PM10 Emissions (tons/year)		PM2.5 Emissions (lb/hr)		PM2.5 Emissions (lb/day)		PM2.5 Emissions (tons/year)	
Vehicle Type	**No. Of Unit**	**Max Daily Distance per Vehicle (mile/day)**	**Max Daily VMT (all units)**	**Mean Vehicle Weight (tons)**	**Number of Wheels on Vehicle**	**PM10 EF (lbs/VMT)**	**Unmitigated**	**Mitigated[7]**	**Unmitigated**	**Mitigated[7]**	**Unmitigated**	**Mitigated[7]**	**Unmitigated**	**Mitigated[7]**	**Unmitigated**	**Mitigated[7]**	**Unmitigated**	**Mitigated[7]**	**Unmitigated**	**Mitigated[7]**
Trucks pulling water trailers	6	10	60.0	9	8	0.31	0%	90%	2.33	0.23	18.67	1.87	3.41	0.34	0.49	0.05	3.96	0.40	0.72	**0.07**
Maintenance trucks	6	10	60.0	5	4	0.15	0%	90%	1.09	0.11	8.75	0.87	1.60	0.16	0.23	0.02	1.85	0.19	0.34	**0.03**
ATV	10	10	100.0	0.25	4	0.02	0%	90%	0.22	0.02	1.79	0.18	0.33	0.03	0.05	0.00	0.38	0.04	0.07	**0.01**
worker personal vehicles	41.6	0.2	8.3	0.5	4	0.03	0%	90%	0.03	0.00	0.24	0.02	0.04	0.00	0.01	0.00	0.05	0.01	0.01	**0.00**
								TOTAL Fugitive emissions	**3.68**	**0.37**	**29.45**	**2.94**	**5.37**	**0.54**	**0.78**	**0.08**	**6.24**	**0.62**	**1.14**	**0.11**

Notes:
Emission Factors are from Emfac 2007 (version 2.3),
Scenario Year: 2010, All vehicle model years in the range 1966 to 2010
Equipment list, quantity, and horsepower from client.
Equipment weight from SCAQMD Table A9-9-D-3 and various websites
PM2.5 emission factors from CEIDARS List with PM2.5 fractions in SCAQMD CEQA Handbook. (http://www.aqmd.gov/CEQA/handbook/PM2_5/PM2_5.html)
Assumes for fugitive dust 21.2% of all PM10 is PM2.5

Assumptions
1. Maximum number of operation work hours per day = 8 hours (9 am to 5 pm).
2. The average travel speed is 5 mph
3. The average ambient temperature for the project site is 70 Fahrenheit and the relative humidity is 50%
4. Assume 25% workers carpool
5. Assume the operational maintenance will occur 365 days per year (7 days per week)
6. Assume 10 hp for ATVs
7. Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

Total Operational Emissions for Maintenance Equipment

	Hourly Emissions (lb/hr)						Daily Emissions (lb/day)						Annual Emissions (tons/year)					
	PM10	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO**	**VOC**	**NOx**	**SOx**
Unmitigated (no watering)	3.712	0.809	1.894	0.825	0.029	0.005	29.698	6.475	15.154	6.599	0.232	0.041	5.420	1.182	2.766	1.204	0.042	0.007
Mitigated (with watering)	0.399	0.107	1.894	0.825	0.029	0.005	3.194	0.856	15.154	6.599	0.232	0.041	0.583	0.156	2.766	1.204	0.042	0.007

Appendix A

EMFAC2007 V2.3 Emission Factor output

Title : test
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/02/11 14:49:04
Scen Year: 2010 -- All model years in the range 1966 to 2010 selected
Season : Annual
Area : San Luis Obispo
****
Year: 2010 -- Model Years 1966 to 2010 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Luis Obispo County Average

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Total Organi Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	19.05	0.587	0.535	0.778	19.09	0.944	0.238	1.241	19.01	0.672	0.352	0.796	23.27	0.689	0.23	0.806	19.24	0.559	0.471	0.571	19.24	1.455	0.625	1.098	28.85	3.831	0.665	1.356	78.23	20.48	11.34	11.91	28.85	3.089	0.601	1.878	0	5.446	2.005	3.306	5.901	4.318	0	5.281	28.85	4.489	0.902	2.138	28.85	2.367	0.329	3.018	13.83	0.75	3.155	1.128
10	13.57	0.393	0.42	0.53	13.6	0.646	0.187	0.861	13.54	0.453	0.276	0.542	16.57	0.461	0.18	0.545	12.61	0.367	0.37	0.394	12.61	0.954	0.49	0.762	18.91	2.512	0.522	0.961	51.26	13.43	6.322	6.767	18.91	2.027	0.472	1.274	0	3.569	1.455	2.254	4.663	3.211	0	4.094	18.91	2.944	0.708	1.493	18.91	1.552	0.258	1.984	10.01	0.506	1.846	0.756
15	10.11	0.277	0.337	0.38	10.13	0.464	0.15	0.626	10.09	0.322	0.222	0.388	12.35	0.325	0.145	0.387	8.615	0.251	0.297	0.283	8.615	0.652	0.393	0.551	12.92	1.718	0.419	0.709	35.02	9.173	3.036	3.418	12.92	1.387	0.379	0.901	0	2.438	1.093	1.602	3.855	2.516	0	3.331	12.92	2.014	0.569	1.087	12.92	1.062	0.207	1.36	7.591	0.359	0.982	0.525

Pollutant Name: Carbon Mon Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	153.4	5.396	2.895	6.924	153.6	10.94	2.196	13.05	153.7	6.786	2.557	7.775	273.8	5.964	2.156	7.355	326.3	5.124	2.972	5.135	326.3	14.22	3.267	9.818	489.4	43.02	7.269	16.17	1830	181.7	16.08	26.69	489.4	35.75	6.566	22.23	0	26.3	10.51	16.48	40.04	16.68	0	30.89	489.4	53.19	9.943	27.48	489.4	47.59	3.77	57.34	116.5	7.452	7.091	9.362
10	111.8	4.745	1.996	5.847	111.9	9.277	1.514	10.69	112.1	5.91	1.763	6.62	199.6	5.22	1.486	6.223	217.1	3.409	2.049	3.439	217.1	9.463	2.253	6.572	325.6	28.62	5.012	10.9	1217	120.9	11.76	18.76	325.6	23.79	4.528	14.88	0	17.5	6.612	10.73	32.84	14.53	0	25.67	325.6	35.39	6.856	18.47	325.6	31.66	2.6	38.16	85.72	6.301	5.045	7.633
15	85.81	4.226	1.44	5.063	85.93	8.039	1.093	9.041	86.01	5.225	1.272	5.762	153.2	4.636	1.073	5.398	152.6	2.396	1.479	2.429	152.6	6.652	1.626	4.641	228.9	20.12	3.617	7.743	855.6	84.97	8.498	13.4	228.9	16.72	3.267	10.5	0	12.3	4.419	7.399	28.36	13.01	0	22.35	228.9	24.87	4.948	13.08	228.9	22.26	1.876	26.83	66.64	5.46	3.639	6.434

Pollutant Name: Oxides of Ni Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	3.134	0.484	2.026	0.518	3.059	0.951	2.055	1.067	3.069	0.894	2.003	0.914	4.797	0.899	2.064	0.926	1.601	0.254	6.443	2.173	1.601	0.613	7.573	4.181	2.402	1.975	12.69	10.92	14.04	8.956	36.13	34.47	2.402	2.432	11.55	7.294	0	1.554	29.58	18.98	0.949	1.134	0	1.021	2.402	2.691	18.7	15.19	2.402	1.213	13.22	2.619	2.219	0.722	14.47	1.582
10	3.295	0.417	1.681	0.452	3.216	0.807	1.705	0.915	3.227	0.764	1.662	0.785	5.044	0.77	1.712	0.798	1.682	0.267	5.345	1.842	1.682	0.644	6.283	3.535	2.523	2.075	10.53	9.134	14.75	9.41	24.91	23.97	2.523	2.555	9.583	6.302	0	1.633	22.62	14.69	0.995	1.069	0	1.024	2.523	2.828	15.51	12.73	2.523	1.274	10.97	2.419	2.332	0.624	10.74	1.268
15	3.46	0.367	1.445	0.403	3.377	0.703	1.466	0.807	3.389	0.668	1.429	0.69	5.297	0.674	1.472	0.703	1.763	0.28	4.595	1.619	1.763	0.675	5.401	3.099	2.645	2.175	9.048	7.917	15.46	9.864	18.01	17.51	2.645	2.679	8.238	5.643	0	1.711	18.19	11.96	1.041	1.022	0	1.034	2.645	2.964	13.33	11.06	2.645	1.336	9.431	2.3	2.447	0.553	8.384	1.062

Pollutant Name: Carbon Diox Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	1322	977	359.2	978.266	1321	1206	346.7	1148	1321	1209	351	1207	1578	1655	346.8	1646	2514	2514	520.1	1897	2514	2514	529.7	1498	2514	2514	1505	1671	2514	2514	3845	3764	2514	2514	1505	1976	0	2514	2541	2531	226.6	270.1	0	243.6	2514	2514	1505	1725	2514	2514	1505	2399	896.7	1191	1537	1206.9
10	997.9	736.9	359.2	738.164	997.7	909.4	346.7	872.1	997.9	912.2	351	910.6	1192	1248	346.8	1242	1672	1672	520.1	1316	1672	1672	529.7	1087	1672	1672	1505	1533	1672	1672	3165	3074	1672	1672	1505	1583	0	1672	2541	2212	193.8	224.2	0	205.7	1672	1672	1505	1542	1672	1672	1505	1653	681.2	890.1	1371	915.53
15	782.6	577.4	359.2	578.691	782.5	712.6	346.7	688.6	782.6	714.7	351	713.8	934.6	977.8	346.8	973.9	1175	1175	520.1	972.7	1175	1175	529.7	844.8	1175	1175	1505	1451	1175	1175	2596	2509	1175	1175	1505	1351	0	1175	2541	2025	168.4	192.3	0	177.8	1175	1175	1505	1433	1175	1175	1505	1213	537.8	692.4	1231	722.37

Pollutant Name: Sulfur Dioxid Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	0.016	0.009	0.003	0.01	0.016	0.012	0.003	0.011	0.016	0.012	0.003	0.012	0.02	0.016	0.003	0.016	0.03	0.024	0.005	0.018	0.03	0.024	0.005	0.015	0.032	0.025	0.014	0.016	0.054	0.027	0.037	0.036	0.032	0.025	0.014	0.019	0	0.025	0.024	0.024	0.003	0.003	0	0.003	0.032	0.025	0.014	0.017	0.032	0.025	0.014	0.024	0.011	0.012	0.015	0.012
10	0.012	0.007	0.003	0.007	0.012	0.009	0.003	0.009	0.012	0.009	0.003	0.009	0.015	0.012	0.003	0.012	0.02	0.016	0.005	0.013	0.02	0.016	0.005	0.011	0.022	0.017	0.014	0.015	0.036	0.018	0.03	0.029	0.022	0.016	0.014	0.015	0	0.016	0.024	0.021	0.002	0.002	0	0.002	0.022	0.017	0.014	0.015	0.022	0.017	0.014	0.016	0.008	0.009	0.013	0.009
15	0.009	0.006	0.003	0.006	0.009	0.007	0.003	0.007	0.009	0.007	0.003	0.007	0.012	0.009	0.003	0.009	0.014	0.011	0.005	0.009	0.014	0.011	0.005	0.008	0.015	0.012	0.014	0.014	0.025	0.013	0.025	0.024	0.015	0.012	0.014	0.013	0	0.012	0.024	0.019	0.002	0.002	0	0.002	0.015	0.012	0.014	0.014	0.015	0.012	0.014	0.012	0.006	0.007	0.012	0.007

Pollutant Name: PM10 Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	0.104	0.055	0.351	0.057	0.102	0.068	0.136	0.074	0.105	0.118	0.218	0.118	0.106	0.113	0.131	0.113	0.101	0.027	0.107	0.052	0.101	0.04	0.131	0.087	0.101	0.053	0.724	0.614	0.101	0.105	2.254	2.123	0.101	0.055	0.652	0.374	0	0.081	0.78	0.516	0.08	0.005	0	0.051	0.101	0.058	1.137	0.902	0.101	0.017	0.513	0.077	0.093	0.076	0.8	0.121
10	0.074	0.036	0.275	0.038	0.072	0.045	0.107	0.05	0.075	0.077	0.171	0.077	0.075	0.074	0.103	0.074	0.066	0.018	0.084	0.038	0.066	0.026	0.103	0.066	0.066	0.035	0.569	0.481	0.066	0.069	1.531	1.442	0.066	0.036	0.512	0.29	0	0.053	0.566	0.372	0.063	0.004	0	0.04	0.066	0.038	0.892	0.706	0.066	0.011	0.402	0.058	0.069	0.05	0.569	0.082
15	0.055	0.025	0.221	0.026	0.054	0.032	0.086	0.036	0.056	0.053	0.137	0.054	0.056	0.051	0.083	0.051	0.045	0.012	0.067	0.029	0.045	0.018	0.083	0.051	0.045	0.024	0.456	0.385	0.045	0.047	1.003	0.945	0.045	0.025	0.411	0.231	0	0.036	0.425	0.278	0.052	0.003	0	0.033	0.045	0.026	0.716	0.566	0.045	0.008	0.323	0.045	0.054	0.035	0.401	0.057

Pollutant Name: PM10 - Tire Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.036	0.035	0.012	0.012	0.012	0.012	0	0.012	0.008	0.01	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.017	0.009
10	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.036	0.035	0.012	0.012	0.012	0.012	0	0.012	0.008	0.01	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.017	0.009
15	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.036	0.035	0.012	0.012	0.012	0.012	0	0.012	0.008	0.01	0.004	0.004	0	0.004	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.006	0.008	0.017	0.009

Pollutant Name: PM10 - Brea Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.01	0.013	0.016	0.013
10	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.01	0.013	0.016	0.013
15	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.028	0.028	0.028	0.028	0.013	0.013	0.013	0.013	0	0.013	0.013	0.013	0.006	0.006	0	0.006	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.01	0.013	0.016	0.013

Pollutant Name: Gasoline - m Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	5.47	8.976	0	8.939	5.472	7.231	0	7.195	5.471	7.252	0	7.239	4.265	5.319	0	5.313	2.873	3.512	0	3.51	2.873	3.488	0	3.484	2.63	3.418	0	3.386	1.576	3.098	0	3.09	2.63	3.436	0	3.428	0	3.446	0	3.446	28.85	28.66	0	28.78	2.63	3.394	0	3.33	2.63	3.414	0	3.385	15.2	7.806	0	7.945
10	7.298	11.89	0	11.838	7.297	9.571	0	9.524	7.296	9.603	0	9.587	5.699	7.047	0	7.04	4.32	5.279	0	5.276	4.32	5.243	0	5.236	3.955	5.138	0	5.09	2.37	4.658	0	4.646	3.955	5.165	0	5.153	0	5.181	0	5.181	34.17	34.53	0	34.31	3.955	5.103	0	5.005	3.955	5.132	0	5.088	18.48	10.34	0	10.496
15	9.35	15.15	0	15.091	9.349	12.2	0	12.14	9.348	12.24	0	12.22	7.31	8.987	0	8.978	6.149	7.51	0	7.505	6.149	7.46	0	7.449	5.63	7.31	0	7.242	3.376	6.63	0	6.614	5.63	7.348	0	7.332	0	7.372	0	7.372	39.47	40.24	0	39.77	5.63	7.26	0	7.122	5.63	7.302	0	7.239	21.88	13.19	0	13.356

Pollutant Name: Diesel - mi/g Temperature: 70F Relative Humidity: 50%

Speed MPH	LDA NCAT	LDA CAT	LDA DSL	LDA ALL	LDT1 NCAT	LDT1 CAT	LDT1 DSL	LDT1 ALL	LDT2 NCAT	LDT2 CAT	LDT2 DSL	LDT2 ALL	MDV NCAT	MDV CAT	MDV DSL	MDV ALL	LHD1 NCAT	LHD1 CAT	LHD1 DSL	LHD1 ALL	LHD2 NCAT	LHD2 CAT	LHD2 DSL	LHD2 ALL	MHD NCAT	MHD CAT	MHD DSL	MHD ALL	HHD NCAT	HHD CAT	HHD DSL	HHD ALL	OBUS NCAT	OBUS CAT	OBUS DSL	OBUS ALL	UBUS NCAT	UBUS CAT	UBUS DSL	UBUS ALL	MCY NCAT	MCY CAT	MCY DSL	MCY ALL	SBUS NCAT	SBUS CAT	SBUS DSL	SBUS ALL	MH NCAT	MH CAT	MH DSL	MH ALL	ALL NCAT	ALL CAT	ALL DSL	ALL ALL
5	0	0	28.06	28.064	0	0	29.07	29.07	0	0	28.72	28.72	0	0	29.07	29.07	0	0	19.38	19.38	0	0	19.03	19.03	0	0	6.698	6.698	0	0	2.621	2.621	0	0	6.698	6.698	0	0	3.967	3.967	0	0	0	0	0	0	6.698	6.698	0	0	6.698	6.698	0	0	14.69	14.694
10	0	0	28.06	28.064	0	0	29.07	29.07	0	0	28.72	28.72	0	0	29.07	29.07	0	0	19.38	19.38	0	0	19.03	19.03	0	0	6.698	6.698	0	0	3.184	3.184	0	0	6.698	6.698	0	0	3.967	3.967	0	0	0	0	0	0	6.698	6.698	0	0	6.698	6.698	0	0	14.83	14.832
15	0	0	28.06	28.064	0	0	29.07	29.07	0	0	28.72	28.72	0	0	29.07	29.07	0	0	19.38	19.38	0	0	19.03	19.03	0	0	6.698	6.698	0	0	3.883	3.883	0	0	6.698	6.698	0	0	3.967	3.967	0	0	0	0	0	0	6.698	6.698	0	0	6.698	6.698	0	0	15	15.003

TECHNICAL AREA: ALTERNATIVES

Data Request 3: Please explain why available access to transmission was restricted.

Response: While physical access to transmission is not necessarily restricted, the Applicant's analysis of the CAISO queue showed almost 12,000 MW of solar ahead of the Applicant, with all of that being in Kern, San Bernardino, Riverside and Imperial counties. There was an additional 25,000 MW of other generation ahead of the Applicant from locations in Southern California. The Applicant and its customer (PG&E) deemed access to transmission capacity via the CAISO queue a significant detriment to this site.

TECHNICAL AREA: ALTERNATIVES

Data Request 4: Additionally, please provide infrastructure data as well as sensitive receptor information specific to the Daggett-Soppeland Alternative Site.

a. Please identify the length of new transmission line and water pipeline, if any, that would be required.
b. Please discuss whether a switchyard would need to be constructed.
c. Please identify and describe the closest sensitive receptors and state where they are located.

Response:

a. New transmission interconnection facilities would have been less than 5 miles to the existing 230 kV or 500 kV lines near the Daggett-Soppeland alternative, subject to the approval of CAISO and the transmission owner as part of the LGIP.

b. At this alternative, it is likely that a switchyard would need to be constructed, similar to the one at the proposed facility. The ultimate facilities would be determined by the LGIP with CAISO and the transmission owner.

c. The nearest sensitive receptors would likely be the towns of Harvard and/or Toomey or the Calico Early Man Archaeological Site.

TECHNICAL AREA: ALTERNATIVES

Data Request 5: Please explain why the Harper Lake Alternative Site is cost and time prohibitive.

Response: Ausra, Inc., the owner of Carrizo Energy, LLC, has signed a Non-Disclosure Agreement with Harper Lake, LLC. Under those terms, the Applicant is not allowed to disclose any details of the discussion. The site was cost and time prohibitive, meaning Applicant could not pay the requested amount.

TECHNICAL AREA: ALTERNATIVES

Data Request 6: Please provide infrastructure data as well as sensitive receptor information specific to the Harper Lake Alternative Site.

a. Please identify if new infrastructure would be necessary, and the length of new transmission line and water pipeline that would be required.
b. Please discuss whether a switchyard would need to be constructed.
c. Please identify and describe the closest sensitive receptors and state where they are located.

Response:

a. While the Harper Lake site appears to have adequate transmission infrastructure to connect to the CAISO, the Harper Lake site is subject to the same CAISO queue backlog as the Daggett-Soppeland alternative. Network upgrades would only be determined as part of the LGIP. The owners of the Harper Lake site represented that adequate water for cooling and auxiliary uses could be available to purchasers of the site. Ausra did not get to the detailed due diligence phase on this site.

b. At this alternative, it is likely that a switchyard would need to be constructed, similar to the one at the proposed facility.

c. Potential sensitive receptors include residences along Harper Lake Road to the south of the alternative site

TECHNICAL AREA: ALTERNATIVES

Data Request 7: Please provide infrastructure data as well as sensitive receptor information specific to the Kern County Alternative Site.

a. Please identify the length of new water pipeline, if any, that would be required.
b. Please discuss whether a switchyard would need to be constructed.
c. Please identify and describe the closest sensitive receptors and state where they are located.

Response:

a. Applicant identified an area for consideration but did not get far enough in due diligence with any particular site or landowner to determine whether a water pipeline would be required. Applicant was able to secure site control of the Carrizo Energy Solar Farm site during this regional investigation.

b. At this alternative, it is likely that a switchyard would need to be constructed, similar to the one at the proposed facility.

c. The Kern County alternative site is a region encompassing several dozen square miles. As no individual site was identified for due diligence, it would be speculative to designate the closest sensitive receptors.

TECHNICAL AREA: ALTERNATIVES

Data Request 8: Please provide infrastructure data as well as sensitive receptor information specific to the Old Mine Alternative Site.

a. Please identify what key factors were met and were not met, the length of new transmission line and water pipeline, if any, that would be required.
b. Please discuss whether a switchyard would need to be constructed.
c. Please identify and describe the closest sensitive receptors and state where they are located.

Response:

a. The key factors met by the Old Mine Alternative were its generally flat terrain and good solar resource near transmission lines. However, similar to the Daggett-Soppeland alternative, the Old Mine alternative was deemed to be a very poor electrical interconnection option due to the CAISO queue. Ausra did not get to the point of discussing water availability with the landowner prior to gaining control of the Carrizo Energy Solar Farm site.

b. At this alternative, it is likely that a switchyard would need to be constructed, similar to the one at the proposed facility. The ultimate facilities would be determined by the LGIP with CAISO and the transmission owner.

c. The nearest potentially sensitive receptor would be the Calico Ghost Town Theme Park.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 9:

a. Please describe the lighting plan measures that will be implemented to ensure that light is directed where necessary while minimizing offsite illumination and glare.

b. Please describe the fixtures and design features that will be used to safely light the site while avoiding lighting impacts to biological resources.

Response:

a. There are several areas within the facility that need to be illuminated for nighttime operations, maintenance, and security purposes. Each of these will be configured to minimize offsite illumination and glare while striving to provide a safe work area for the operations and maintenance staff.

b. Perimeter lighting will be shielded as necessary to prevent spillage, installed at a low level, with low intensity, and diffuse suitable for illuminating roads and general area purposes. The majority of this light may be operable with motion sensors such that only areas which have activity in them are illuminated.

The field lighting will be low level area lighting, likely consisting of sodium vapor or mercury halide. In general, field lighting will be area lighting, with more intense area task lighting only in a few necessary locations where equipment is operated or maintained. This area task lighting may be on structures above ground level, in which case it will be operable with motion sensors and only illuminated when the area is occupied. This configuration minimizes light pollution while achieving a safe working environment.

The power block area lighting will be low intensity, with localized general task lighting operable with motion sensors, as needed to foster a safe working environment. Appropriate consideration will be given concerning the hazards associated with equipment that is energized, rotating, hot, or otherwise requiring caution for operation and maintenance purposes. The power block area stairs and elevated platforms will have specialized lighting configurations, such as motion sensors, localized switching, etc., to keep them safe and easily accessible. The lighting plan will take careful consideration to provide adequate yet unobtrusive lighting in this area.

Specific task lighting will be necessary in some localized areas, such as the water chemistry area, and will be more intense than the general area or area task lighting. These areas may be operable with motion sensors and otherwise fully illuminated only when personnel are involved in the task.

See response to Data Request 9a, above. The fixtures will evolve from the lighting design, and will be a result of careful development of the lighting plan. Although it is not good design practice to specify a fixture before the design evolution process is complete, with that said; the design features will include consideration for color, intensity, spillage, glare, direction, and controllability. Achieving the desired effect will be accomplished by

selecting fixtures, lamps, lens covers, shields and mounting heights as appropriate in various configurations.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 10: Please provide a status update on the anticipated schedule for the USACE determination of wetland status and preparation of the BA.

Response: The Applicant's consultant anticipates submitting the USACE Jurisdictional Determination request package to the Corps by February/March, 2008. Once the San Francisco Division of the Corps has the information, the Applicant's consultant expects a two to three week turnaround time for them to submit their decision to Headquarters. Headquarters can then take 15 to 60 days to return a final decision. Based on this timeframe, a final decision is anticipated in May or June, 2008.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 11: Please provide a discussion of the status of proposed off-site habitat compensation lands, including communications with the USFWS, California Department of Fish and Game (CDFG), and the county regarding the appropriate mitigation ratios and location of mitigation land.

Response: Offsite habitat compensation lands are being researched at this time. Ausra is working with The Wildlands, Inc. and the Nature Conservancy, as well as CDFG and USFWS to find a mitigation option within the Carrizo Plain that would be approved by the FWS. Mitigation for loss of San Joaquin kit fox habitat will be proportional to the impact as required by CEQA.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 12: Please provide a description of proposed perimeter fencing and solar receivers, including a discussion of potential bird perching sites and measures that may be taken to reduce perching opportunities.

Response: The facility will be fenced with an approximate 3 meter (10-foot) high chain link fence with three strands of barbwire on top and with privacy lattice around the perimeter. Entrance to the facility will be via one 7.3 meter (24-foot wide) motorized gate equipped with a security monitoring system, including a camera and intercom system, remotely controlled from the control room. Additionally, each line in the solar field focuses on an elevated receiver structure approximately 17 m (56 feet) tall.

The fence will provide perching sites for birds, including raptors such as northern shrike, American kestrel, and red-tailed hawk that forage for rodents and lizards. Similarly, the receivers may also provide perching sites; however, because each line provides approximately 82 percent ground coverage, receivers located in the interior portion of the solar field may be utilized as perches less than receivers located along the perimeter of the solar field due to lack of ground visibility associated with foraging opportunities.

An increased number of perching sites creates a potential increase in foraging opportunities for birds of prey as well as insectivorous songbirds. No adverse effects on birds or their prey are anticipated as a result of the increased number of potential perching sites. The increased perching sites may allow for an increased potential in successful capture of common insect, rodent, and lizard species by predatory birds; no special-status insects, rodents or lizards were detected or are expected to be present on the Project site, and relative density of the existing potential prey populations onsite is low; therefore, no adverse effects are anticipated on special status species as a result of the perimeter fence or solar receivers.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 13: Please describe the likely components of a closure plan (e.g., decommissioning methods, timing of any proposed restoration, restoration performance criteria) and discuss each relative to biological resources and specifically species of concern such as San Joaquin kit fox.

Response: Decommissioning of the facility will involve removal of all improvements and restoration to a condition that resembles the “as found” condition, i.e., a plowed field.

All surface improvements will be removed such that nothing remains on the surface of the ground and all underground elements will be removed to the extent that they could be impediments to using the surface for agricultural purposes. Underground storage tanks, if any, will be removed and remediated. All ground level penetrations will be removed and any subsurface elements will be filled or capped to prevent biological resources such as the San Joaquin Kit Fox, a species of concern, from gaining access and otherwise becoming trapped.

All of the Project site and surrounding landscape has been chronically disturbed by extensive dry-land agricultural practices, including seasonal plowing and disking. San Joaquin kit fox, horned lark, golden eagle, prairie falcon, and burrowing owl (including active burrows) were observed in the Project vicinity; these species most likely use the study area and overall vicinity for foraging. Decommissioning of the Project and restoration to the “pre-project" condition would be somewhat beneficial to wildlife by returning the site to agricultural production and providing wildlife additional area for foraging that may be displaced by the proposed Project equipment and buildings.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 14: Please describe the potential funding (e.g., a bond or sinking fund) and/or legal mechanisms for decommissioning and restoration of the project site that could be used:

a. at the end of operations; and
b. in the event of bankruptcy or the untimely closure of the facility for financial reasons.

Response: a. The Applicant has not yet selected a specific legal mechanism for the form of securing decommissioning and restoration of the Project site, and the specific mechanism would depend upon the amount required and market conditions at the time.

b. Please see the response to Data Request 14a.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 15: Please provide a discussion of facility closure requirements of the County of San Luis Obispo.

Response: The following is an excerpt from an email from John D. McKenzie, Environmental & Resource Management Division of the Planning & Building Department, San Luis Obispo County to Seth Hopkins, URS Environmental Specialist, on February 21, 2008:

"The county does not have specific regulations on the decomissioning or closure of a solar power plant. That would have been established through a conditional use permit. Other long-term, larger projects that will eventually need to be closed, include some form of financial assurance mechanism (e.g., establish surety bond favorable to the County, etc.) that would cover the costs to remove all equipment on site and restore to "natural conditions". As is done with our SMARA program for larger mines, an outside expert is retained to provide a detailed cost assessment of plant closure costs, which would need to be completed prior to permit issuance. The bond with the county would also be established at this time. Labor and equipment costs should be based on State Labor Department information and, as applicable, the latest Caltrans manual for large equipment used for removal/restoration. Additional county fees are added for county administration and monitoring. If long-term monitoring by an expert is needed (e.g., detailed vegetation restoration plan requiring many years of monitoring health/success), this would be an additional cost to include in the bond. This final cost estimate would then need to be adjusted annually, based on some index (probably the CPI), with an occasional need to redo the cost study when certain circumstances change considerably."

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 16: Please describe:

a. All underground structures the applicant expects to encounter on the project site during foundation excavations; and

b. The treatment proposed for these underground structures.

Response: a. Based on site-specific research through primary and secondary sources, it is unlikely that underground structures exist within the Project Area. A review of historic maps and aerial photographs from 1890 through 1970 (included in Appendices D and E of the Confidential Cultural Resources Appendix M in the Project AFC) failed to identify the presence of underground structures within the Project Area. The structures identified within the Project Area are associated with the recorded archaeological sites URS-ACP-1 and URS-2. URS-ACP-1 is located within Section 28 and consists of the former King Property, and URS-2 is located within the northern half of Section 33 and consists of the former Cavanaugh Property. While URS-ACP-1 and URS-2 identified and recorded several former structures (such as Features A, B, C, and D) within URS-ACP-1 and URS-2, none of these structures were considered "underground structures." Primarily, these features consisted of former building foundation materials and concrete pads previously used for ancillary agricultural or irrigation purposes within the last 15 years. The features have been recorded and mapped using the appropriate DPR 523 series forms.

b. In the event that underground structures are encountered prior to or during construction activities (including subsurface excavation), construction activities in the immediate vicinity of the underground structure shall be halted and a qualified archaeologist shall identify the nature and boundary of the finds. Prior to the initiation of the construction activities, a qualified archaeologist will lead a training session for construction crew members that addresses and identifies specific cultural resources that may be encountered during the development of the Project.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 17: For the Morro Bay-Midway 230-kV Line 1:

a. Please have a qualified architectural historian provide a detailed discussion, with supporting evidence, of the eligibility of the transmission line under CRHR criteria 1 and 3.
b. Please have a qualified architectural historian provide a detailed discussion of the integrity of the transmission line, focusing on the design and materials of the towers, conductors, and insulators.
c. Please provide a detailed description of the modifications that would be made to the Morro Bay-Midway 230-kV Line 1 to accommodate the output of the proposed CESF.
d. Please have a qualified architectural historian provide an assessment of the impacts of the modifications to the integrity of the transmission line.

Response: The proposed CESF will require construction of approximately 260 m (850 feet) of 230 kV transmission line to loop into the existing Morro Bay-Midway 230-kV Line 1. The CESF transmission line would extend from the Project site switchyard to the Morro Bay–Midway right-of-way (ROW), continue east along the northern edge of Section 28 for approximately 213 m (700 feet), and then north for 46 m (150 feet) to interconnect with the existing Morro Bay–Midway 230 kV Line 1. Accordingly, the Applicant anticipates the proposed CESF will not materially alter or modify the Morro Bay–Midway 230 kV Line 1, and the transmission line will retain its footprint, form, materials/fabric, and visual appearance and narrative. However, the System Impact Study has not been completed and, at this time, the Applicant does not know if reconductering would be required.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 18: If the Midway Substation is older than 45 years:

a. Please have a qualified architectural historian provide a detailed discussion, with supporting evidence, of the eligibility of the substation under CRHR criteria 1 and 3.
b. Please have a qualified architectural historian provide a detailed discussion of the integrity of the substation, focusing on its design and materials.
c. Please provide a detailed description of the modifications that would be made to the Midway Substation to accommodate the output of the proposed CESF.
d. Please have a qualified architectural historian provide an assessment of the impacts of the modifications to the integrity of the substation

Response: The Midway Substation is located in Kern County, approximately 42-miles east of the Project Area. The Midway Substation was constructed following World War II. Construction of the Midway Substation occurred on a parcel originally owned by the San Joaquin Light and Power Company. The parcel was first developed between 1921 and 1932 (per the 1932 Buttonwillow USGS 15-minute quadrangle map) as a hydroelectric facility, steam plant, or an oil heater (based on the map). Sometime following World War II, the substation was added to the site, and this alteration to the 1921-1932 facility tripled the size of its footprint.

The proposed CESF will interconnect to the Midway Substation by looping into the existing Morro Bay-Midway 230 kV Line 1, located north and adjacent to the CESF site. The generated energy will travel along the existing Morro Bay-Midway 230 kV Line 1 transmission line to the Midway Substation. The Applicant does not propose to modify the Midway substation as part of this Project. Due to its distance from the Project Area, the Applicant anticipates that the proposed CESF will not materially alter or modify the Midway Substation; however, the System Impact Study has not been completed and, at this time, the Applicant does not know if reconductering would be required, although none is anticipated.

TECHNICAL AREA: LAND USE

Data Request 19: If the project would need a MUP and/or CUP, please provide documentation of the County's findings that would be included as part of each permit, and the conditions (if known) that San Luis Obispo County would place on the project.

a. Please provide a timeline as to when these conditions would become available to staff.

Response: The Applicant's consultant is currently communicating with John McKenzie (805/781-5452), Environmental & Resource Management Division of the Planning & Building Department, San Luis Obispo County, to provide information to satisfy this request.

TECHNICAL AREA: LAND USE

Data Request 20: Please state whether you have obtained San Luis Obispo County's position on the proposed project's consistency with its General Plan and Land Use Ordinance. If so, please provide it.

Response: The Applicant's consultant is currently communicating with John McKenzie (805/781-5452), Environmental & Resource Management Division of the Planning & Building Department, San Luis Obispo County, to provide information to satisfy this request.

TECHNICAL AREA: LAND USE

Data Request 21: Please provide documentation of the County's interpretation of this exception (#C.2.c.7) and how it applies to the CESF.

Response: The air cooled condenser and receiver structures will exceed 35 feet in height, but would not be habitable structures. The tallest habitable structure proposed as part of the CESF is the 40 foot tall control and administration building. The height of this proposed structure exceeds the height limit for habitable structures within the Agriculture, Rural Lands land use category (which limits habitable structures to 35 feet in height). However, according to the San Luis Obispo County Planning and Building Department an exception to this height restriction is allowable under Section 22.10.090 of the LUO pursuant to the issuance of a Conditional Use Permit (CUP) based on the findings described below.

The following is an excerpt from an email from John D. McKenzie of the San Luis Obispo County Planning and Building Department, describing the findings necessary under a CUP for the County to approve an exception to the height limits for habitable structures under the LUO Section 22.10.090:

"For habitable structures within the Agriculture and Rural Lands land use categories the height limit is 35 feet. Under the exception provision of the ordinance (LUO 22.10.090.C.2) a modification can be requested if the following findings can be made:

1) the project will not result in substantial detrimental effects on the enjoyment and use of adjoining properties, and
2) that the modified height will not exceed the lifesaving equipment capabilities of the fire protection agency having jurisdiction.

The further from any property line the habitable building can be cited, the easier the argument can be made to meet item #1. If the county were processing this permit, on item #2, we would be asking for a response from Cal Fire on the significance of the proposed height, and if supportable, what specific measures they would need to see to maximize fire protection."

As a follow-up, URS contacted Rick Swan of Cal Fire, and during that discussion the following additional concerns/requirements were determined to be likely if the permit were going through the county:

1) one, possibly two interior, fire-rated stairwell access to the roof;
2) building would be sprinklered;
3) adequate widths and vertical clearances would be needed for fire and life safety vehicles to access to most interior areas;
4) perimeter access around entire site would be necessary;
5) while not a requirement, due to the long distance to any medical facility, a paved area (away from any potential fire sources) should be designated for helicopter landings.

CESF will coordinate with Cal Fire fire safety engineers as part of the project design process.

TECHNICAL AREA: LAND USE

Data Request 22: Please provide documentation of the County's interpretation of this exception (#C.2.c.8) and how it applies to the CESF, and whether the CESF would be subject to issuance of a CUP to allow for development of structures that are greater than 40 feet in height.

Response: The Applicant's consultant is currently communicating with John McKenzie (805/781-5452), Environmental & Resource Management Division of the Planning & Building Department, San Luis Obispo County, to provide information to satisfy this request.

TECHNICAL AREA: LAND USE

Data Request 23: If 072-091-001 is the correct APN number for the CESF site, please verify whether the Exhibit "A" attachment to the option agreement for the properties provided to staff is correct.

Response: The correct parcel number is 072-091-001 and Exhibit "A" to the option agreement is a recorded instrument. The error lies in Exhibit "A", which correctly describes the CESF site, and misrepresents the parcel number only.

TECHNICAL AREA: LAND USE

Data Request 24: If the Exhibit "A" attachment to the option agreement for the CESF parcel is correct, please provide written confirmation on whether the recorded restriction on APN 072-091-001 is still in effect, and the extent to which development is precluded on the parcel.

Response: The recorded exclusion is in effect and relates to the separation of mineral rights from surface rights – a common occurrence in Western states. Mineral rights are limited to what is given in the grant and rights that may be necessary to extract the mineral in question. California case law has been quite strong in protecting the owner of surface rights from unreasonable intrusion by mineral rights owners. Further, these rights have existed for many years and there has been no mineral extraction on the property, nor any indication that we have found that any minerals exist to be extracted. The Applicant has been informed that there has been some testing and borings conducted in the past but no discoveries. Carrizo Energy and its attorneys do not believe the exclusion of mineral rights has any effect on the development of the parcel.

TECHNICAL AREA: LAND USE

Data Request 25: If the recorded restriction on APN 072-091-001 is still in effect, please discuss what process the applicant would be required to undergo to remove the restriction and what would be the duration of this process.

Response: The mineral rights owners have expressed an interest in selling their rights and this option is being pursued; however, Carrizo Energy does not believe the mineral rights exclusion will impact its ability to develop the parcel as proposed for the CESF.

TECHNICAL AREA: NOISE

Data Request 26:

a. Please explain if the applicant has contacted the above residents and the Carrizo Plains School officials to discuss construction noise impacts. If yes, please state the positions of these neighbors in this regard.

b. Please provide the residents' and school officials' contact information.

Response: a. The Applicant has not contacted residents to discuss construction noise impacts. Mark Storm from the URS Acoustics & Noise Control Practice contacted Ms. Kimberly McGrath, Principal of Carrizo Plains School (CPS), at approximately 10:30 am on February 14th, 2008. Anticipated CESF construction noise levels and activity distances from CPS were discussed. Because Ms. McGrath confirmed that windows at CPS are always closed, and there is a working evaporative cooling system, Mr. Storm explained that sound insulation from this "closed" building envelope would help keep classroom interiors from experiencing the predicted outdoor sound levels during Project construction.

b. The Carrizo Plains School principal, Kimberly McGrath, can be contacted at the school: 805-475-2244. The Applicant's consultant was informed that she is available at the school office only on Thursdays.

TECHNICAL AREA: NOISE

Data Request 27: Please discuss whether residents living in the above properties are likely to be present in their residences during the construction hours of 7:00 am to 7:00 pm Monday through Friday.

Response: The residents Carrizo Energy has been in contact with have communicated that most people in the vicinity of the Project work during the day. Because there is little suitable employment in the area, residents commute to neighboring communities (e.g., Paso Robles and Bakersfield). Since working hours typically occur between 9 am and 5 pm, these residents are likely to be away from their homes during typical Project construction hours. Carrizo Energy assumes there are some individuals in the area that do not work outside of the home, are retired, or for other reasons are home during the day.

TECHNICAL AREA: NOISE

Data Request 28: Please identify the hours of the day between 7:00 am and 7:00 pm when the applicant expects the loudest construction activities to occur.

Response: The noise level associated with construction is directly related to the type and number of pieces of motorized construction equipment being used onsite. The Construction Equipment List provided in the Project AFC on Table 3.4-14 shows that for the majority of the construction period, there will be between 80 and 90 pieces of equipment onsite. Since this equipment is used to support construction operations, the noise level is expected to remain reasonably constant throughout the work day.

TECHNICAL AREA: NOISE

Data Request 29: a. Please discuss any landscaping or other features at these receptors that would help to attenuate construction noise.

b. If yes, estimate the degree of attenuation in decibels.

Response: a. Generally, landscaping such as berms can offer some sound path reduction, but the measurable quantity depends on the location of the receiver. Solid fences or walls can also provide some predictable sound attenuation as measured at the receiver, but again the exact receiver/listener position needs to be specified in order to help quantify the expected noise reduction. The building structure can be upgraded with window treatments and other forms of sound insulation improvements, which can result in lower *interior* sound levels. Exterior levels, either at the building facade or at nearby areas of frequent human use, are not effected by such building upgrades. Outdoor foliage between the source and receiver can provide attenuation, but considerable expanses of trees are required for meaningful noise reduction (see response to Data Request 29b).

b. The degree of improvement in decibels depends on the attenuation technique and the location of both the source(s) and the receiver. For instance, 100' depth of trees, with no visual gaps and at least 15' height relative to the line-of-sight elevation, can enable something in the neighborhood of a 5 dBA reduction. For solid barriers, linear occlusion between the source and receiver provides considerably greater sound reduction than a pathway without it.

TECHNICAL AREA: NOISE

Data Request 30: Please identify whether Carrizo Plains School is an elementary school or other level.

Response: The Carrizo Plains School is an elementary school, with students in grades K through 8th.

TECHNICAL AREA: NOISE

Data Request 31:

a. If the school is equipped with a heating, ventilation, and air conditioning (HVAC) system, please explain the working condition of this system.

b. If the school is not equipped with a good working HVAC system, please explain if the school's doors and windows are normally open during class time.

Response: a. Carrizo Plains School is equipped with a working evaporative cooler. Evaporative coolers (also called air, swamp, or desert coolers) are devices which use simple evaporation of water in air.

b. The windows at the Carrizo Plains School do not open.

TECHNICAL AREA: NOISE

Data Request 32: Please identify what type of outdoor facilities (i.e., playground, sports facilities), if any, does the school have, and in what direction(s) they are located relative to the school building(s) and the CESF site.

Response: The school has usable open space, suitable for student activity, on the eastern and southern side of the building. The larger area is on the southern side of the school building; this area is where the playground specific equipment is located. The eastern side of the building is an empty open area with some trees on its perimeter. The northern and western sides of the building are paved and used for driveways or parking. Please note that a typographic error occurred on page 5.12-10, Table 5.12-5 in the Project AFC. The table indicates that LT-1 is located 20,694 feet from the center pf the power block; however, sound levels were predicted using a distance of 9,360 feet between the center of the power block and LT-1, consistent with Figure 5.12-1.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 33: Please provide:

a. a comparison of typical water use per acre of the neighboring land uses with the proposed CESF.

b. a comparison of water use per MW produced relative to other power generating options such as gas-fired combined cycle, gas-fired combustion turbines, and existing solar thermal facilities in California.

Response: The Applicant's consultant has reviewed available information for estimates of typical water use for other property uses that may be applicable to the vicinity of the proposed CESF site. Water use data for other types of power generating facilities are also provided. The table below provides typical water use per acre for other land uses and water use per megawatt of power generation for other types of generating facilities.

Activity/Property Use	Water Use
Single Family Residential[a]	0.52 afy
Commercial/Institutional[a]	1.66 afy
Industrial[a]	6.27 afy
Urban[b]	3.2 af/acre
Agricultural:	
Alfalfa[b,d]	4.7 – 5.5 af/acre
Cotton[b,e]	3.2 - 5.0 af/acre
Barley[b]	1.3 af/acre
Grapes[b]	2.9 af/acre
Tomatoes[b,c]	3.9 af/acre
Corn[b,c]	2.4 af/acre
Deciduous Orchard[b]	3.5 af/acre
Pasture (improved) [b]	4.5 af/acre
Carrots[i]	5.8 af/acre
Lettuce[i]	4 af/acre
Spinach[i]	0.5 – 2.0 af/acre
Dry Beans[i]	1.8 af/acre
Olives (for oil) [i]	2.0 af/acre
Olives (for eating) [i]	2.5 af/acre
Power Generation:	
CESF (projected; 640 acres)	0.03 afy/acre
Solar, Wet Cooling[d]	1.3 afy/acre

CESF (Average Daily)	0.12 afy/MW
Ivanpah	0.25 afy/MW
Victorville 2 Hybrid	5.6 afy/MW
Solar, Dry Cooling[d]	800 -1,000 gal/MWh
Former adjacent ARCO Facility[f]	30.9 afy/MW
Once Through Cooling[g]	300 gal/MWh
Cooling Towers[g]	480 gal/MWh
Conventional Coal-fired[h]	11.2 afy/MW

Notes:
a Integrated Water Resources Plan, MWD, Report No. 1107, March 1996. From Southern California Association of Governments and San Diego Association of Governments.
b California Department of Water Resources, The California Water Plan Update, Bulletin 160-98. Value appearing for San Joaquin Valley unless noted.
c Mean based on information provided for California.
d National Renewable Energy Laboratory, Parabolic Trough FAQs, www.nrel.gov.
e "Power Plants in Arizona--an Emerging Industry, a New Water User", http://ag.arizona.edu.
f Stewardship Council Land Conservation Plan, http://lcpstewardshipcouncil.org

g Freedman, P.L. and J.R. Wolfe, "Thermal Electric Power Plant Water Uses; Improvements Promote Sustainability and Increase Profits", LimnoTech, Canadian-US Water Policy Workshop, October 2, 2007.
h A 880-MW plant reportedly uses an average of 11 million gpd, of which 80% is lost to atmosphere as steam. www.deq.virginia.gov..
I www.vric.ucdavis.edu

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 34: Please discuss:

a. How often the total peak daily water usage of 700,000 gpd will occur.
b. How often the average annual water use will surpass the estimated 22 afy.

Response: a. The total peak daily water usage of 700,000 gallons per day (gpd) will occur very infrequently and only when the air cooled condenser requires cleaning. The Applicant estimates that cleaning may be required one day per year. This frequency of cleaning is believed to be conservative, based on the frequency of cleaning that has occurred in a similar environment and facility operating in Nevada, where the air cooled condenser required cleaning only once in five years.

b. The average annual water use will not surpass the estimated 22 afy as this estimate accounts for all water use activities and water recovered in a year. This volume also accounts for annual washing of the air cooled condenser described in the response to Data Request 34a. The estimated 22 afy is an annualized daily average that includes weekends. This is a conservative estimate, since cleaning and washing is not planned to occur on weekends.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 35: Please discuss whether alternative water sources have been fully evaluated. Agricultural waste water, recycled water or surface water runoff could offer alternative potential water sources.

Response: Alternative water sources have been evaluated as described in the Project AFC. Due to the remote location of the site and sparse population, there is no existing infrastructure (wastewater treatment facilities) that could serve as a source of reclaimed water. Additionally, there are no sources of agricultural wastewater in the site vicinity that could serve the operations at the proposed CESF facility. Precipitation on the Carrizo Plain, reportedly 7 to 9 inches per year (10-inches per year from historic local rainfall gauge data) is sporadic, infrequent, and undependable. Use of surface water runoff as a consistent supply of water for facility operation is not feasible. As an alternative, the facility has been designed with a series of drainage swales and collection areas that will serve to capture stormwater runoff from the facility. Capture of this onsite surface water will be directed to a series of detention/infiltration areas onsite and contribute recharge to the underlying groundwater aquifer. The onsite stormwater detention/infiltration areas have the capacity to capture runoff from a 50-year, 10-hour storm event per San Luis Obispo County standards. On an average annual basis, it is assumed that all of the rainfall falling on the site will be allowed to infiltrate into the ground. Therefore, assuming 7 to 9 inches of annual rainfall, there would be 375 to 480 afy of water available for infiltration over the 640 acres. Some of this accumulated rainfall would be lost to evaporation prior to infiltration. However, based upon this volume of rainfall, it is estimated that infiltration of a portion of the captured stormwater runoff will offset the net makeup water requirement for facility operation (22 afy).

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 36: Please discuss whether surface water runoff has been considered for water supply. The AFC indicates that average annual rainfall in the area is seven to nine inches. Over 640 acres, that equates to 375 to 480 afy falling onsite.

Response: Rainfall and surface water runoff were not considered a reliable source of water to justify designing, constructing, and maintaining a supply and treatment system for this source. Based upon the 7 to 9 inches of annual average rainfall there would be 375 to 480 afy falling onsite; however, that is the total rainfall and does not account for the onsite infiltration. To capture the 375 to 480 afy, the entire site would have to be impervious and able to store and use the volume of rainfall runoff. Instead, the approach is to allow rainfall to infiltrate and provide groundwater basin recharge because the Project will be using groundwater as the water source.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 37: Please confirm the design intent of the perimeter swale: discuss whether its intended use is to convey run-off from upgradient of the site around the site in addition to terrace overflow.

Response: The Project site's perimeter swale is designed to intercept upgradient storm water runoff from adjoining land and convey that stormwater around the site, directing it to the existing natural water course located at the southwest corner of the Project site. The swales are sized to collect and convey up to approximately a 5-year storm event. Excess upgradient flows will sheet flow across the site (excluding the power block) and either infiltrate or sheet flow to the southwest corner as under existing conditions. The perimeter swales are not designed to convey significant runoff from the multiple onsite detention/infiltration areas.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 38: Please quantify (flowrate and volume) of onsite and upgradient runoff and demonstrate that the perimeter swale can convey the anticipated flows.

Response: The proposed site design will create numerous detention/infiltration areas that will capture the generated stormwater runoff. The retention requirement for the County of San Luis Obispo is based on holding the 50-year storm, 10-hour intensity for 10-hour duration. Our analysis has illustrated that the ponding areas will have the provided volume capacity to meet the County's requirement. A separate analysis was conducted to check for the 100-year storm, 1-hour intensity for 10-hour duration. This analysis illustrated that if any overflow from the upper ponding basins is allowed to overflow to the downstream ponds, the volume from the study storm event will be captured as well. The proposed ponding basins have exceeded the County's requirement. Offsite runoff will be conveyed around the perimeter of the site via swales. Ultimately, the offsite runoff and any excess onsite runoff that is not infiltrated will be conveyed into the main drainage channel. The smaller perimeter swales along the northerly section of the site have the capacity to convey approximately the 5 to 10-year storm event flows from the two northerly offsite drainage channels. The larger swales along the westerly and easterly portions of the site have capacity for up to the 100-year storm event. Excess flows along the northerly Project boundary will sheet flow across the site (with the exception of the power production area) and be captured in the onsite detention/infiltration areas. Flows in excess of the detention area capacity will sheet flow to the southwest corner of the site. Soil and Water Resources Table 1 below provides the offsite stormwater runoff flow rates (in cubic feet per second [cfs]) for various return frequency storm events.

Soils and Water Resources Table 1. Offsite Stormwater Runoff Flows

BASIN	DESCRIPTION	Area (Square Mile)	2-Yr Storm (cfs)	5-Yr Storm (cfs)	10-Yr Storm (cfs)	25-Yr Storm (cfs)	50-Yr Storm (cfs)	100-Yr Storm (cfs)
1	Main Carrizo Plain Drainage	38.3	62	308	669	1420	2340	3480
2	Northerly upstream offsite	4.5	8	43	95	206	340	519
3	Northerly upstream offsite	5	9	46	104	226	374	571
Overall	Including Project Vicinity	49.7	79	390	846	1790	2950	4380

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 39: Please quantify the onsite stormwater flows and how runoff will be managed.

Response: The table below provides the onsite proposed condition runoff values calculated using the rational method. The runoff generated onsite will be captured onsite within multiple detention/infiltration areas. These areas will allow the stormwater to infiltrate into the ground and be evaporated.

Soils and Water Resources Table 2. Onsite Stormwater Runoff Flows

STORM EVENT	INTENSITY	Total Existing Onsite Flows	Total Proposed Onsite Flows
(YR)	(IN/HR)	(CFS)	(CFS)
2	0.50	122	128
5	0.70	170	179
10	0.80	195	205
25	1.00	243	256
50	1.10	268	282
100	1.20	292	307

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 40: Please describe the local design standards for runoff management. (San Luis Obispo County Department of Public Works, Regional Water Quality Control Board (RWQCB), or other local entity).

Response: The site is located in an unincorporated area of San Luis Obispo County, therefore, San Luis Obispo County hydrology and hydraulic standards were used for onsite stormwater calculations. SLO County standards require the 100-year design for drainage areas greater than 4 square miles, the 50-year design storm for drainage areas from 1 to 4 square miles, and the 25-year design storm for drainage areas less than 1 square mile. The USGS flowrate regression equations were used to quantify the runoff generated from the offsite upgradient watersheds which are 4 square miles or greater. The regression equations were developed from peak-discharge records of 10 years or longer, available as of 1975, at more than 700 gauging stations throughout the State. The Project site is within the Central Coast Region. The regression equations specific to the Central Coast Region were used to generate the 2 through 500-year flowrates. The results of the analysis are provided in Soils and Water Resources Table 2, in response to Data Request 38, above.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 41: Please confirm whether terraces will be used to store and percolate rainfall runoff or whether drop inlets and stormdrains will be used to convey water off of the terrace and to the perimeter swale.

a. Please describe how much runoff will be infiltrated into the terraces.
b. Please describe how terrace overflows will be managed.

Response: The terraces will be used to store and infiltrate the stormwater runoff. There is no proposed system of drop inlets and storm drain to convey the stormwater to the perimeter swale. Volume calculations were performed to determine that the terrace areas have capacity to store the 50-year design storm per the San Luis Obispo County Hydrology/Drainage Design Standards.

a. For the onsite analyses, the San Luis Obispo County Standard Drawings Manual is referred to for hydrologic and hydraulic calculations. Although the entire site is approximately 1 square mile, the Rational Method was used to determine peak flow rates and volumes for analyzing the multiple terrace area detention/infiltration areas. Please refer to Soils and Water Resources Table 3 for the results.

Soils and Water Resources Table 3. Detention/Infiltration Area Volumes

PROPOSED DETENTION/INIFILTRATION AREA PROVIDED VOLUME					
DEPTH	LENGTH	VOLUME PROVIDED	VOLUME PROVIDED	VOLUME REQUIRED	SURPLUS VOLUME
(FT)	(FT)	(CF)	(AC-FT)	(AC-FT)	(AC-FT)
1	5280	1117934.4	25.7	17.9	7.7
1	5280	2182461.6	50.1	16.1	34.0
1	5280	2165116.8	49.7	16.1	33.7
1	5280	2437934.4	56.0	18.1	37.8
1	5280	2182461.6	50.1	16.3	33.8
1	5280	2165116.8	49.7	16.2	33.5

Note: Volume required is the volume to store the 50-year, 10-hour intensity for a 10-hour duration (San Luis Obispo County retention standard)

b. Based on the 50-year design basis storm event, the capacity of the localized terrace detention/infiltration areas is adequate to contain the quantity of storm water generated onsite. Onsite storm water will not flow out of the detention/infiltration areas into the perimeter swales, but will be allowed to infiltrate and evaporate.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 42: Please describe the detailed stormwater plans to discharge from the perimeter swale at the southwest corner of the site.

Response: The perimeter drainage swales will daylight (graded back to existing elevations) at the southwest corner of the site to match existing surface flow conditions at that location. There is no proposed cross culvert under the road.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 43: Please discuss whether you have considered deepening the perimeter swale along the south edge to allow for additional storage and percolation. If not, explain why.

Response: The depths and widths of the perimeter swale vary from approximately 7 feet deep by 50 feet wide to 3 feet deep by 124 feet wide. Slopes vary from approximately one percent to less than one-tenth of one percent. As designed, the capacity and velocity control provided by the perimeter swales provide the capability of channeling typical annual upgradient storm water around the site as well as allowing that storm water to percolate into the ground.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 44: Please provide calculations demonstrating the amount of water infiltrating and running offsite for existing (no project) conditions and compare the calculations with the amount of water that will infiltrate and runoff the site post-project. Calculations should be on an average annual basis.

Response: Calculations were performed to verify that the multiple onsite detention/infiltration areas have adequate volume to store the stormwater runoff generated from a 50-year storm per San Luis Obispo County standards (See Soils and Water Resources Table 3 in response to Data Request 41, above). Based upon these calculations, all proposed onsite runoff up through the 50-year storm can be stored onsite without generating runoff to the perimeter swales. The amount of surface runoff was also evaluated on an average annual basis. Under existing conditions approximately 203 afy of stormwater would runoff the 640 acre site assuming an average annual rainfall of 10 inches and a runoff coefficient of 0.38. Under proposed conditions, the 640 acre site would generate approximately 213 ac-ft of stormwater runoff annually; however, there would be no surface runoff from the site under normal conditions. The detention/infiltration areas are designed to capture at least the 50-year rainfall event. Rainfall would be captured onsite in the terrace detention/infiltration areas and allowed to infiltrate and evaporate.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 45: Please describe the distance of the fueling station from the top of the drainage channel's bank.

Response: Based upon the layout provided in the Project AFC, the fueling station boundary on the temporary construction laydown area is approximately 50 to 100 feet from the top of the drainage channel bank at the closest location. However, the location of the fueling station for the construction laydown area is not finalized at this time. An alternate configuration for the laydown area might be to relocate the conference rooms/site offices, meal room and restrooms to where the fuel storage area is currently shown, and relocate fuel storage to a site just north of the vehicle marshalling area or shift the marshalling area west and put the fueling station in between the marshaling and parking areas.

Technical Area: Soils and Water Resources

Data Request 46: Please confirm that the fuel storage area is above the 100-year flood level.

Response: Based upon the current layout provided in the Project AFC, portions of the northeast corner of the temporary fueling station boundaries within the construction laydown area are within the Federal Emergency Management Agency (FEMA) delineated 100-year, Zone A floodplain limits based upon a comparison of the fueling station boundaries with the FEMA Flood Insurance Rate Map. However, the majority of the designated area, including the fuel storage tanks, is outside the 100-year floodplain. The FEMA designated 100-year floodplain widths in this area vary from approximately 400 to 600 feet in width. Based upon the 100-year flood flowrates calculated and provided in Soils and Water Resources Table 2, available topography, and Manning's normal depth calculations, the flood depths in this area are approximately 4 to 6 feet deep. The temporary fueling area would be placed above this depth or could be protected by berms along the channel side of the facility. The permanent fueling facility on the power block (along with all other facilities on the power block) will be elevated above the 100-year flood level.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 47: Please discuss whether you have considered moving the fueling station to another portion of the laydown area that is further away from the drainage channel. If not, discuss why.

Response: The fueling area would include appropriate containment and spill prevention measures to minimize risk of spillage into the drainage. However, the laydown area design is preliminary and Carrizo Energy will evaluate changes to the site configuration that could move the fueling area further from the drainage.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 48: Please provide a draft DESCP containing elements A through I below outlining site management activities and erosion/sediment control BMPs to be implemented during site mobilization, excavation/demolition, construction, and post-construction activities. The level of detail in the draft DESCP should be commensurate with the current level of planning for site grading and drainage.

Response: Preparation of a DESCP is in progress and scheduled to be complete in March 2008.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 49: Please provide all conceptual erosion control information for those phases of construction and post-construction that have been developed, or provide a statement when such information will be available.

A. Vicinity Map – A map(s) at a minimum scale 1"=100' indicating the location of all project elements (construction site, laydown area, pipelines, etc.) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. Site Delineation – All areas subject to soil disturbance for the CGS (project site, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction/demolition areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. Watercourses and Critical Areas – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. Indicate the proximity of those features to the CGS construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

D. Drainage Map – The DESCP shall provide a topographic site map(s) at a minimum scale 1"=100' showing all existing, interim and proposed drainage systems and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.

E. Drainage of Project Site Narrative – The DESCP shall include a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative should include the summary pages from the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage measures. The hydraulic analysis should be used to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the CGS construction and laydown areas.

F. Clearing and Grading Plans – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.

G. Clearing and Grading Narrative – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements of the CGS project (project site, lay down area, transmission corridors, and pipeline corridors) whether such

excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. Best Management Practices Plan – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading/demolition, project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to prevent wind and water erosion.

I. Best management practices narrative – the DESCP shall show the location (as identified in H above), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, for all project elements (site, pipelines, etc.) related to excavations and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule should include post-construction maintenance of structural control BMPs, or a statement provided when such information will be available. Be sure to include provisions for wet-season work.

Response: Preparation of a DESCP is in progress and scheduled to be complete in March 2008.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 50: Please furnish a raw water quality report that includes the primary drinking water maximum contaminant levels including inorganics, radionuclides, Volitile Organic Compounds, and Semi-volitile Organic Compounds.

Response: The Applicant's consultant conducted sampling of the proposed water supply well on February 14, 2008. Analyses are being conducted for inorganics, radionuclides, volatile organic compounds, and semivolatile organic compounds. Results are expected in March 2008.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 51: Please provide the design for the evaporation ponds and their maintenance requirements.

Response: The Project does not propose to use specifically designed evaporation ponds for process wastewater. Solar thermal and air cooled condenser washwater will be disposed of by evaporation, but it is not currently anticipated that any proposed detention, infiltration, or evaporation ponds will be used for process wastewater disposal. The reflector washing operation is similar to commercial window washing using wet applicators or pressure nozzles and squeegees, and the solar thermal washdown water (20 lines per day at 2,000 liters/line) will largely evaporate from the reflector surface with only a small fraction falling to the ground surface where it will evaporate.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 52: Please provide a description of the quality (constituent concentrations) of waste water discharged to the evaporation ponds.

Response: The air cooled condenser cells are anticipated to require water washing once per year. The external surfaces of the finned tubes on air-cooled condensers are very prone to fouling from pollen, dust, insects, leaves, plastic bags, etc. Not only is the airflow affected but also the heat transfer coefficient, the deterioration in performance increasing unit operating costs. In severe cases, fouling can also limit the power generation capacity of the turbogenerator. The cells will be washed one at a time while offline with a cleaning system consisting of a nozzle beam, a tracking system, and a control panel. The water contains no additives. The nozzle beam is optimally matched to the tube bundle geometry, with a constant jet angle. Optimizing the geometry of the nozzle beam involves determining the proper nozzle distance to the surface, the jet energy and the selection of the appropriate nozzle design. The process uses approximately 2,500 gallons of water per cell at a pressure that atomizes the water into fine droplets, allowing for effective surface cleaning, while avoiding damage to galvanized surfaces and fins, and permits evaporation of virtually all of the water prior to reaching the ground surface.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 53: Please discuss whether a zero liquid discharge system has been considered to deal with the process wastewater

Response: The Project is reusing as much of the process water as possible based upon the currently proposed operations. This is indicated in the Project AFC in Table 5.5-3 which indicates that the raw average annual water usage rate of 39 gpm is reduced to approximately 11 gpm after water reuse/recycling.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 54: Please discuss whether the CESF has contacted the Regional Water Quality Control Board regarding discharge of wastewater to evaporation ponds.

a. Please provide copies of all correspondence to or from the RWQCB regarding waste water discharge to evaporation ponds.
b. Please provide a copy of the Draft Report of Waste Discharge.

Response: The Project is in the process of contacting the RWQCB concerning the Draft Report of Waste Discharge.

a. No formal correspondence or document submittal has occurred at this point.

b. RWQCB will be contacted to discuss the applicability of issuance of draft WDRs and a likely schedule.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 55: Please discuss whether the CESF has contacted the SLO-DEH regarding review and approval of septic leach fields.

a. Please provide copies of all correspondence with SLO-DEH regarding design and approval of the septic leach field.

Response: The Project has contacted the San Louis Obispo County Department of Planning and Building Department, Mr. Barry Tolle, 805-781-5628. San Luis Obispo (SLO) County requirements for the installation of the septic tank and leaching field are established in SLO County publication "Private Sewage Disposal System." The Project will follow the requirements established in this publication for the installation of the facility's septic system. Septic system, installed in accordance with the SLO requirements, is the method for sewage treatment on the Carrizo Plain. According to SLO, no system failures have occurred.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 56: a. Please discuss whether the CESF will utilize a RO system.
b. If so, address the fate of the reject water.

Response: The Project will not use an RO System. Water treatment for the Project is achieved using a water softener in combination with resin cartridges.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 57: Please confirm that all water from "contact areas" will be directed to the OWS.

Response: All contact water will discharge to the oil water separator (OWS). Rain falling in the power block area will be collected and directed to the surrounding solar field using a system of swales integrated with the site-grading plan. Rainfall from vehicle parking and paved areas in the power block will be collected and directed to an OWS prior to discharge to the raw water tank for recovery. The OWS is rated at 1.4 gpm. Rainwater collected from active areas (i.e., potentially contaminated by oil) is routed to an OWS. Water from the OWS is sent to the wastewater tank and then, following inspection, to the water treatment system for recovery.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 58: Please describe the raw water requirements of the water treatment system.

Response: The raw water requirements for equipment are provided in Table 5.5.-3 of the Project AFC. There is no additional raw water required for treatment. The water treatment facility has a capacity of 27 gpm.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 59: Please describe the system for monitoring OWS discharge water.

Response: Discharge water from the oil water separator (OWS) will typically be monitored after removal of the oil and prior to re-use within the raw water stream, to ensure that the water quality constituents are compatible with the onsite water treatment system.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 60: Please describe the OWS discharge water if it doesn't meet the water treatment system requirements.

Response: If the water discharge from the OWS is not compatible with re-use onsite it will be collected, transported and disposed of offsite using a licensed TSD contractor.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 61: Please provide information related to the frequency of solar collector cleaning, likely concentrations of sodium in the water runoff and plant toxicity levels.

Response: Solar collector system cleaning will be ongoing throughout the life of the Project. Solar thermal washwater will evaporate upon application, therefore, it is not currently anticipated that any proposed detention, infiltration, or evaporation ponds will be used for process wastewater disposal. The reflector washing operation is similar to commercial window washing using wet applicators or pressure nozzles and squeegees, and the solar thermal washdown water (20 lines per day at 2,000 liters/line) will evaporate from the reflector surface upon application with only a small fraction falling to the ground surface where it will evaporate. No washwater will reach the groundwater based on the minimal volume, high evaporation rate, clayey nature of the soil, and its depth (approximately 30 feet). Reflectors will be washed with softened water (i.e., calcium and sodium carbonates removed). Based upon the groundwater quality analysis of the supply groundwater (See Table 5.5-1 in the Project AFC), the average hardness (total) in the supply water is approximately 290 mg/L (17 grains per gallon). After a typical mechanical softening (cation exchange) process, the salinity in the softened water will increase by about 140 mg/L (Source: Air and Water Quality, Inc., http://www.awqinc.com/sodium_softening .html). The original sodium level in the groundwater was measured at 150 mg/L, so the resultant sodium concentration would be approximately 290 mg/L. Although the water softening process will likely increase the sodium concentration in the washwater, the minimal volume that will incidentally fall to the ground surface will not result in a significant accumulation of sodium in the soil that will affect soil salinity and plant toxicity levels.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 62: Please describe the types of solvents or cleaning solutions that may be added to the solar collector (reflector) cleaning solutions and discuss the potential impacts to groundwater quality.

Response: Reflectors will be washed with softened water (i.e., calcium and sodium carbonates removed) with the addition of a highly diluted biodegradable dishwashing liquid. The Project will use approximately 1 cup (8 fl. Oz. or 0.2366 L) per 1,000 L of softened wash water. The reflector washing operation is similar to commercial window washing using wet applicators or pressure nozzles and squeegees, and the solar thermal washdown water (20 lines per day at 2,000 liters/line) will largely evaporate from the reflector surface with only a small fraction falling to the ground surface, where it will evaporate. Any soap residue will bio-degrade. Therefore, there are no potential impacts to groundwater quality.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 63: Please describe what impacts washdown with softened water / cleaning solutions over the life of the CESF would have on the health of the soil and groundwater for future agricultural or residential use of the property.

Response: Washdown or contact water within the power generation area will be directed to OWS systems so there will be no soil or groundwater contact. The solar thermal washdown water (20 lines per day at 2,000 liters/line) will evaporate from the reflector surface with only a small fraction falling to the ground surface, where it will evaporate. Although water softening processes typically increase the sodium concentration in the resultant water, it is not anticipated that there will be significant accumulation of sodium in the soil that will affect soil salinity and plant toxicity levels because the amount of washwater reaching the ground surface during the reflector washing process will be minimal. A highly diluted biodegradable dishwashing type liquid will be added to the softened water for cleaning the reflectors, so it is not anticipated that this bio-degradable soap solution will negatively impact the soil or groundwater.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 64: Please describe the system proposed to discover contaminated soils during grading activities onsite, and how the applicant would deal with any contaminated soils.

Response: The Phase I ESA conducted by URS did not identify any "Recognized Environmental Conditions" (RECs) on the property as defined in ASTM designation E 1527-05. However, it is possible that de minimis soil containing hazardous substances or petroleum products (not considered a REC) could be discovered during grading activities. Based on our knowledge of the site, the areas that would have the greatest potential for de minimis petroleum hydrocarbons or other materials would be those with past historical use. These would include areas around buildings, wells, and along roadways. If potentially hazardous materials are observed in other areas of the property, the handling and disposal of the potentially hazardous materials observed will be conducted as described below.

Prior to construction, the contractor will be informed of the types of materials that could be encountered that may require special handling and disposal. The contractor will also be informed of the areas most likely to contain contaminated soils based upon previous use of the property. In addition, the contractor will be required to provide training to construction workers during excavation and grading on how to recognize contaminated soils such as watching for discoloration and odors. When encountered, the contractor will notify the hazardous materials specialist, who will observe further excavation activities in these areas specific to the proposed construction. The hazmat specialist will monitor the area with appropriate equipment, based on the type of contamination observed. No excavation will be conducted beyond that needed to construct the Project. The excavated soil will be segregated, and placed on plastic sheeting at a designated location where it will be covered. The stockpile will be sampled in accordance with U.S. EPA Guideline SW-846 and analyzed for the chemicals of potential concern. The number of samples analyzed will depend on the volume of soil stockpiled. Other analyses will be conducted as required by the receiving landfill or treatment facility for acceptance of the waste materials. Once characterized, the soil in the stockpile(s) will be placed in end dump trucks that are appropriately tarped. Dust will be controlled by lightly spraying the soil with water before and during loading. The loaded trucks will be observed so that no potentially contaminated soil will be tracked offsite. The soil will be transported to the receiving facility under waste manifest, where it will be treated or disposed in accordance with state and federal regulations.

Technical Area: Soils and Water Resources

Data Request 65: Please discuss in what capacities and for how long will the laydown area be used.

Response: During construction activities, the laydown area will be used to warehouse equipment intended for installation in the facility, and to provide stores for wares which are either used for the construction of the facility or otherwise ultimately installed in the facility itself. A portion of the laydown area will be used for construction personnel parking. The laydown area will be restored shortly after completion of the facility construction activities.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 66: Please discuss how the sites will be stabilized after construction.

Response: Site soil stabilization will occur following construction; however, several alternatives are being considered to determine which solution best achieves the desired effect to: minimize wind erosion, prevent water erosion, minimize weed and undesired vegetation growth, as well as providing a suitable work surface. The soil may be amended to stabilize it, or covered to achieve the desired effect.

The laydown area will be returned to its "as found" condition as practical, by cleaning and clearing all material placed there for the construction effort and then by disking and tilling the surface to restore the top soil to an aerated condition.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 67: Please discuss what ground cover is planned.

Response: Ground cover selection will occur following construction; however, the Applicant intends to select material that is easy to maintain, durable, cost effective to install, and, if necessary, remove, and remains inert throughout its lifecycle.

TECHNICAL AREA: SOILS AND WATER RESOURCES

Data Request 68: Please discuss how much soil will be lost from wind and water erosion. Please quantify the values with and without the proposed BMPs, both during construction and operations.

Response: The calculations required to complete this response are reliant on the preparation of the DESCP (see response to Data Requests 48 and 49) which will identify the construction and post construction phase BMPs. These calculations will be submitted with the DESCP.

TECHNICAL AREA: TRANSMISSION SYSTEM ENGINEERING

Data Request 69: After consulting with the California ISO and PG&E, please provide a Power Flow analysis and a Short Circuit Study for the CESF with and without proposed net output of 177 MW for 2010 Summer Peak /Summer Off peak conditions.

a. Please provide Power Flow analysis for N-0 (normal condition), N-1 (single contingencies) and critical N-2 (double contingencies) systems conditions.

b. Please provide a list of overload criteria violations in one table showing the loadings before and after the new generation and their differences side by side.

c. Please provide power flow diagrams (MVA, percent loading & P. U. voltage) for base cases with and without the project. Power flow diagrams must also be provided for all N-0, N-1 and N-2 studies where overload or voltage criteria violations appear.

d. Please provide a Short Circuit Study report in one table showing fault currents at important buses with and without the new generation, and respective breaker interrupting ratings side by side.

e. Please provide a list mitigation measures considered and those selected for all criteria violations.

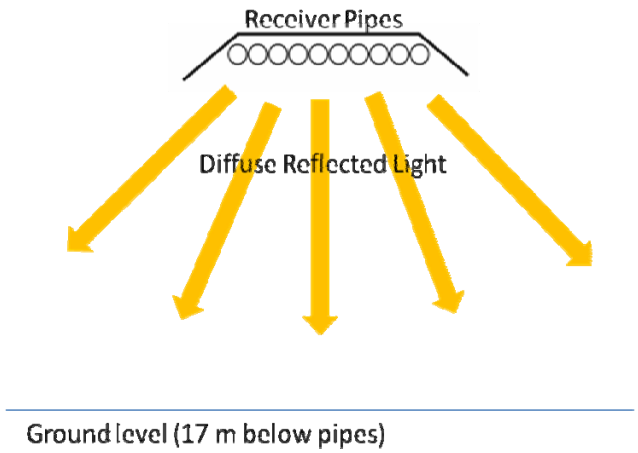
f. For any mitigation selected in “d” above please provide an analysis that meets CEQA requirements for indirect project impacts.

Response: As described in the System Impact Study Agreement provided to the CEC, the requested information will not be available until the System Impact Study is complete. Furthermore, CAISO has chosen 2012 as the appropriate year for power flow studies rather than 2010, so Carrizo Energy’s related studies will be for 2012, as well.

TECHNICAL AREA: VISUAL RESOURCES

Data Request 70: Please provide a "Glint/Glare Study" for the proposed CESF project. The Glint/Glare Study should include an analysis of the project's tracking system to determine if concentrated reflections are directed at occupied structures, recreation areas, or roads (public rights of way), and adequately assess potential glint/glare from project construction and operation

Response: During operation, concentrated light from CESF reflectors will be directed at the absorber pipes in the receiver structure, which is approximately 56' from ground level. Potential glare from light reflecting off of the absorber pipes is minimal, but will be analyzed below.



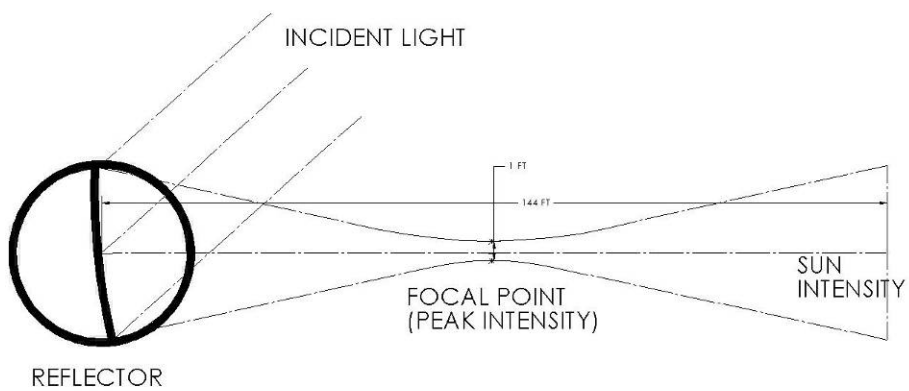
Visual Resources Figure 1: Diffuse reflected light from Receiver pipes spreads out as it travels to ground.

At peak performance, solar intensity on the receiver pipes will approach 30 kW/m2. Pipe absorptivity of the solar spectrum shall be 0.94; thus, the intensity of reflected light from the pipes will be 0.06 * 30 kW/m2 = 1.8 kW/m2. The reflected light will be diffuse rather than specular, meaning that light will come off in random, scattered directions. If one approximates the Lambertian scatter as uniform over the half-cylinder formed beneath the receiver, the ability to estimate the intensity in the eyes of an observer at ground level is gained. The intensity drops off is a function of distance from the pipes. Using 0.6 meters as the width of the 10 absorber pipes and the half circumference defined by a radius of 17 m from the absorber pipes as the width of the area that reflected light spreads into by ground level, the ratio for intensity decrease is 0.6: 53.4, or 0.011. This means that the intensity of reflected light from receiver pipes is 0.011 * 1.8 kW/m2 = 0.02 kW/m2, or roughly 50 times less than the intensity of the sun. This

intensity is more than 200 times less than the intensity of the solar spectrum deemed hazardous to the human retina (4.5 kW/m2)[2].

As reflectors move from a stow position into tracking position with light focused on absorber pipes, there is a possibility of a concentrated beam being directed horizontally to the north or south of the CESF boundary or spilling out to the east or west. The following is meant to clarify the issues of glare and glint off of the reflectors.

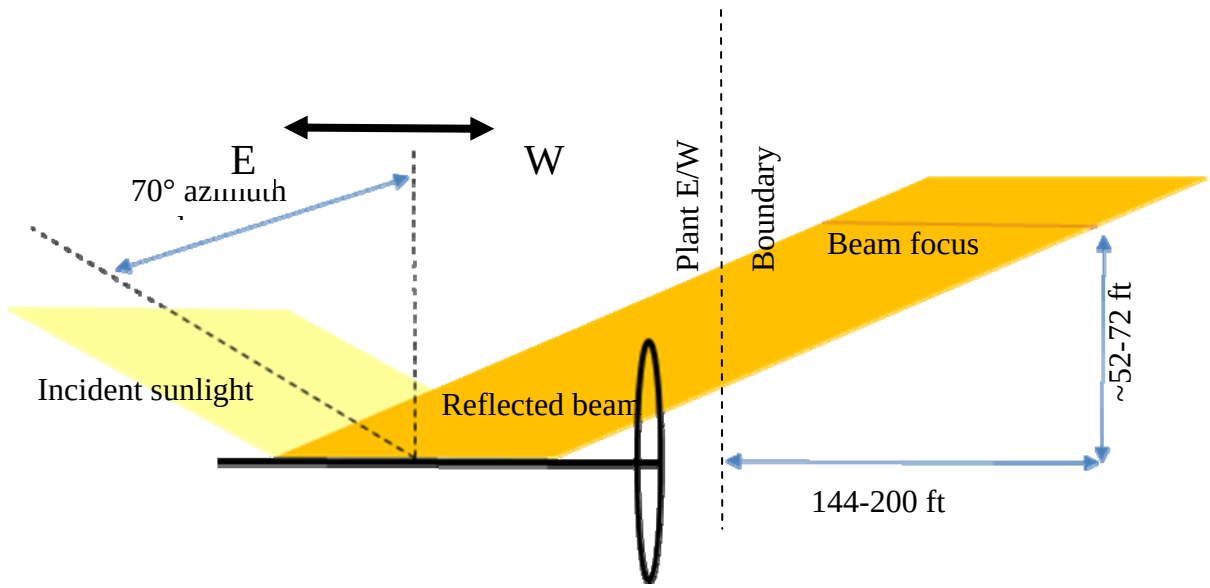
The figure below illustrates the optics from the outside reflectors in each line. The focal length of the outside reflectors is about 77', at which point the beam focuses from 7.4' down to 1.0' wide, giving a maximum intensity of 7.4 kW/m2, assuming a zenith angle near 90° (in most conditions, the intensity at the focal length of the reflector projected horizontally will be significantly less, decreasing by a factor of the sine of the zenith angle). For the sake of this study, the maximum intensity will be used. It becomes apparent by viewing the figure below that beyond the focal length of the reflector, beam intensity decreases and by 144' from the reflector, beam intensity is the equivalent of the incident solar intensity, that is, the beam is no brighter than the sun.



Visual Resources Figure 2: Diagram of convergence and divergence of light beam from outside Reflector.

Beyond 144', beam intensity continues to decrease. For example, at 1,000' from the focal point of the reflector, the beam intensity would be approximately 8 percent that of solar intensity. Reflectors on the interior of each line have shorter and shorter focal lengths, down to approximately 52' for the middle reflectors. Beams from these reflectors are highly unlikely to be cast out horizontally to the north or south, as they would be blocked by reflectors to the outside of them. The beams could, however, spill to the east and west of the plant boundary in early morning or late evening with the sun low in the east or west.

[2] 10 MWe Solar Thermal Central Receiver Pilot Plant: Beam Safety Tests and Analyses, pp. 26-31: SAND83-8035.



Visual Resources Figure 3: Bird's eye view of east/west spilled beam with Reflector near perpendicular to ground. Image could be mirrored to show spillage to east of plant boundary.

The intensity of spillage to the west in the early morning and to the east in the late evening will be much diminished because of the decreased solar radiation at those times of day; however, the possibility does exist for glare on the east and west sides of the CESF. Spilled beam intensity would diverge back out to incident solar intensity at a maximum of 400 ft from the plant boundary, assuming a 70° azimuth angle and 72' focal length (for outside reflector). The range of beam focus locations is shown in the figure above, ranging from a middle reflector to outside reflector.

While horizontal glare to the north and south are possible any time of day and horizontal glare is possible to the east and west during early morning and late evening hours, the tracking system and operational protocols for the CESF are designed to minimize this. During cleaning activities, adjacent reflector rows will be rolled to face each other, with the outside rows facing inward, both to prevent horizontal glare and also to allow cleaning crews to work on two rows at once and increase efficiency. Reflector rows are stowed facing the ground and thus glare will not be a problem during off hours. During tracking, reflectors will be oriented to direct light towards the receiver structure; should the beams just miss the receiver, by the nature of the system's design focal distance, the beams will diverge back to incident solar intensity at 60' above the receiver structure, beyond which they will quickly diverge into much lower level intensities. There are two conditions identified in which horizontal glare could occur:

1) Reflectors are moving from stow position to tracking position. In this situation, outside reflectors (FL of 72') could direct the beam to the north or south of the property and any reflector could cast a spilled beam to the east or west of the property.

2) Tracking system malfunction or failure, where reflector rows go to an incorrect position or freeze up while directing a beam horizontally.

Condition (1) may occur every time the plant starts and finishes operations. It is believed that condition (2) will be a rare occurrence and will be mitigated by full time maintenance crews who will repair stalled motors. For this reason, glare potential and its effect on surrounding roads, public access areas, and structures will be considered from condition (1).

Structures and areas near the CESF plant and their distance from plant boundaries are given below. The reference for these distances is given to the right of the distance.

Item	Distance from plant boundary	Reference
State Hwy 58	>200 ft	Fig. No. 3.2-1, AFC submission
Tracy Lane	>200 ft	Fig. No. 3.2-1, AFC submission
Nearest North residence	~1400 ft	Fig. No. 5.13-13, AFC submission
Nearest West residence	~1150 ft	Fig. No. 5.13-15, AFC submission

Visual Resources Table 1: Distances of structures and public access roadways from plant boundaries

In addition to these structures and locations, there may be pedestrians who venture closer to the property line. The following table shows the calculated beam intensity at a given distance from the plant boundary and also the time it would take the beam to move across 6', the estimated height of a person, at that distance with the motor rotating the reflector at 0.2 RPM. Note that these estimates are assuming 1 kW/m2 sun intensity.

Distance from Plant Boundary (ft)	Beam intensity (kW/m2)	6' travel time (s)	Affected party, location
0	3.67	9.5	-
20	5.44	5.7	-
40	7.22	4.1	-
60	4.00	3.2	-
80	1.89	2.6	-
100	1.24	2.2	-
200	0.46	1.2	Hwy 58, Tracy Lane
1150	0.06	0.2	West Residence
1400	0.05	0.2	North Residence

Visual Resources Table 2: Computed beam intensity and speed at various distances from plant boundary

Glare on drivers on the two roads closest to the plant will be less than half of the glare from the sun. Conservatively estimating the aperture of a driver's eye to be 1", glare from a rotating reflector would move across the eye in less than 1/100 of a second.

It should be noted that pedestrians who are standing within 60' of the outside of the CESF perimeter fence may see a beam intensity as high or higher than what is recommended as a safe level on the human retina (4.5 kW/m2). For this reason, the CESF will install privacy slats in the perimeter fence to ensure that pedestrians are not exposed.

Vertical glare from the reflectors during operation and tracking was addressed earlier. Vertical glare may also be possible during construction, when reflectors are stored with mirror glass facing upward. However, as seen in the table above, the beam intensity at 200' high is less than that of the sun. By 2000', the intensity of a reflected beam would be 27 times less than the sun at high noon. The risk to passing planes is considered to be negligible.

Additional glare may occur off of standard construction equipment such as cranes, trucks, or forklifts, but this would not be expected to exceed the intensity of incident sunlight.

TECHNICAL AREA: VISUAL RESOURCES

Data Request 71: Please discuss the estimated intensity of illumination of the reflected sunlight, and the duration of reflected sunlight on structures and vehicles on public roads.

Response: Please see Response to Data Request 70.

TECHNICAL AREA: VISUAL RESOURCES

Data Request 72: Please discuss if sunlight on airborne dust particles would result in visible light rays, and provide an estimate of the frequency of this event.

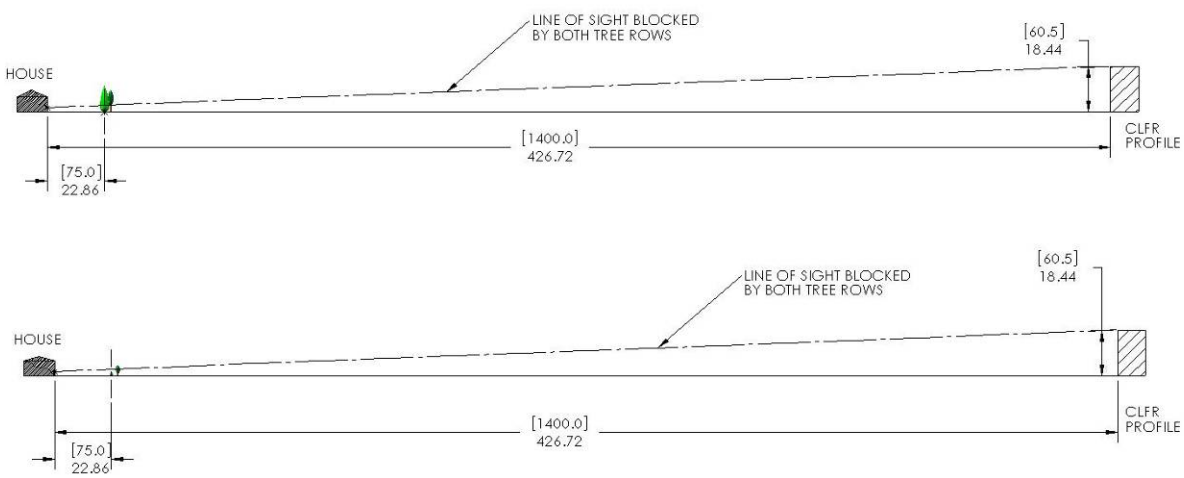
Response: The possibility of dust drifting in between the receiver and reflector array and being illuminated by focused beams coming from the reflectors does exist. But if a dust particle is illuminated, it will reflect light diffusely, in random directions. It is unlikely a specular (mirror-like reflection) light ray bouncing off of such a particle and creating hazards for viewers. If a large amount of dust drifted into the area above the mirrors during operation, it would indeed become illuminated and possibly brighten. However, such a dust cloud would also dim the light reaching the reflectors, and thus the brightened dust would be tempered by the decreased solar input.

The frequency of illuminated dust particles is expected to be rare and will not be a safety risk to either workers onsite or passers by.

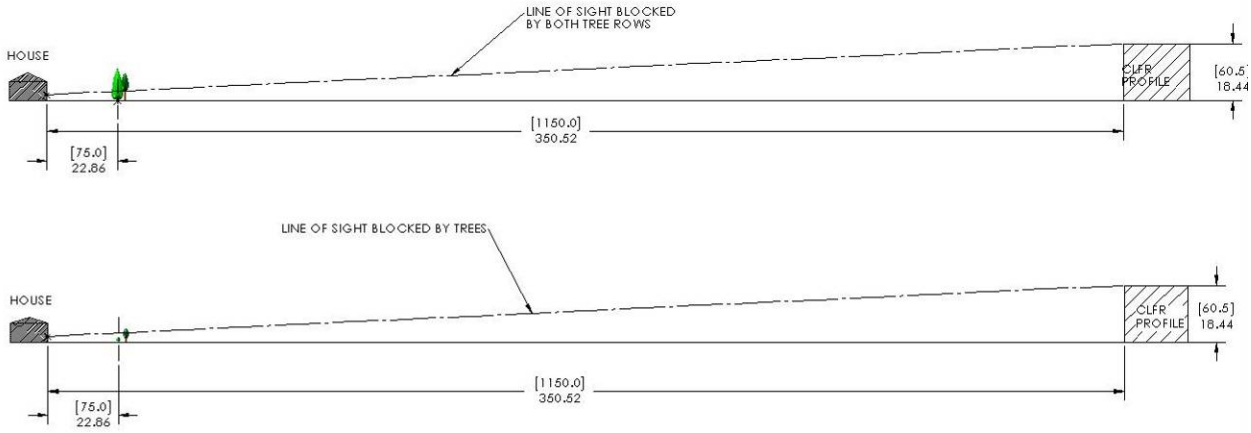
TECHNICAL AREA: VISUAL RESOURCES

Data Request 73: Please provide a line-of-sight diagram(s) or photo simulation(s) that accurately show the conceptual landscape screening's effectiveness from adjacent properties with residential views of the proposed CESF project.

Response: The effectiveness of the conceptual landscape was analyzed by constructing scale drawings showing the line-of-sight for an observer, with their eyes 6' high, standing facing the CESF from both of the closest residences to the plant, shown in Figure No. VISRES-26 in Data Adequacy Request Response VISRES-26. The 5 year growth point and mature heights of the two tree types and the arrangement of the trees and orientation relative to the residence and plant were taken from the same Response. The row of Juniper trees closest to each residence was modeled assuming 75' feet distance between those trees and the residence. The maximum height of the CESF structure used in the diagram was 60.5'. The distance of the residence from the CESF plant boundary was taken from the Project AFC, Section 5.13, figures 5.13-13 and 5.13-15. The residence west of the CESF was analyzed as being approximately 1,150' away from the plant boundary. The residence north of the CESF was approximated at 1,400' from the plant boundary. Note that dimensions in the diagrams are in meters, with feet in brackets [ ].



Visual Resources Figure 4: LOS, North Residence. Top is mature landscaping, bottom is at 5 year growth point.



Visual Resources Figure 5: LOS, West Residence. Top is mature landscaping, bottom is at 5 year growth point.

TECHNICAL AREA: VISUAL RESOURCES

Data Request 74: Please provide the data used to prepare the line-of-sight diagram(s) or photo simulations(s) to allow independent verification of their accuracy.

Response: Data used to prepare the line-of-sight diagrams will be made available to allow independent verification of their accuracy.

TECHNICAL AREA: WASTE MANAGEMENT

Data Request 75: Please quantify the non-hazardous solid waste expected to be generated during operations.

Response: Non hazardous solid waste expected during normal operation of the facility would be approximately 10 cubic yards per week, although the majority of this will be office waste and is difficult to estimate. Of the 10 cubic yards, approximately 5 cubic yards would be recycled (paper, cardboard, plastic glass and aluminum). The remaining waste would be disposed of at a Class III Landfill.

TECHNICAL AREA: WASTE MANAGEMENT

Data Request 76: Please clarify whether structures on Sections 27 and 33 will be demolished.

Response: The abandoned farm structures located on Section 27 and 33 will be demolished prior to change of ownership and are not part of the CESF Project.

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TECHNICAL AREA: WASTE MANAGEMENT

Data Request 77: Please clarify the entity responsible for the demolition of existing structures, and whether demolition is considered part of the CESF project.

Response: The abandoned farm structures located on Section 27 and 33 will be demolished by the current landowners prior to change of ownership, and are not part of the CESF Project.

Technical Area: Waste Management

Data Request 78: Please describe and quantify (in tons and cubic yards) the waste stream generated from the demolition of existing structures.

Response: Not applicable as described in responses to Data Requests 76 and 77.