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February 15, 2002

Ms. Kristy Chew
Siting Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

RE: Data Responses, Set 1D
Cosumnes Power Plant (01-AFC-19)

On behalf of the Sacramento Municipal Utility District, please find attached 12 copies and one original of the Data Responses, Set 1D, in response to Staff's Data Requests dated December 10, 2001. We will be including our Cultural Resources Survey of the laydown areas under a request for confidentiality.

Please call me if you have any questions.

Sincerely,

CH2M HILL

John L. Carrier, J.D.
Principal Project Manager

c: Colin Taylor/SMUD
Kevin Hudson/SMUD
Steve Cohn/SMUD

COSUMNES POWER PLANT
(01-AFC-19)

DATA RESPONSE, SET 1D

(Responses to Data Requests: 41, 42, 60, 109, and 148)

Submitted by

SACRAMENTO MUNICIPAL UTILITY DISTRICT (SMUD)

February 15, 2002

CH2MHILL

2485 Natomas Park Drive, Suite 600
Sacramento, California 95833-2937

Technical Area: Cultural Resources
CEC Author: Judy McKeehan
CPP Author: Jim Bard and Jim Sharpe

BACKGROUND

AFC Sections 2.2.15, 8.2.4, and figure 2.2.3-3 refer to a potential parking and laydown area south of Clay Road and the project site. No cultural resource survey information is provided for this area.

It is possible that temporary staging and laydown areas and workforce parking for the gas pipeline construction could be placed in areas leased or rented from property owners adjacent to the pipeline easement. Staff needs additional information to determine whether there is the potential for impacts to cultural resources.

DATA REQUEST

41. Please survey and provide survey information for the parking and laydown area south of Clay Road and the project site.

    Response: The cultural resources survey report is being provided under request for confidentiality as Confidential Attachment CR-41.

42. Identify the location of any areas that will be used as pipe or equipment staging and laydown areas or for parking, water supply, fire protection waterline, or other purposes. Please provide the results of a cultural resources survey for these areas.

    Response: As stated in Data Response Set 1C, equipment staging and laydown areas for the gas pipeline will occur within the 75-foot-wide construction corridor with the exception of the gas line emergency shut-off valves. The areas where the shut-off valves will be located and the proposed construction laydown area for the plant site was surveyed January 23-25, 2002. The cultural resource report is being provided as Confidential Attachment CR-41.

Technical Area: Land Use
CEC Author: James Adams
CPP Author: Katy Carrasco

BACKGROUND

The proposed site is designated Agriculture, with minimal parcel size of 80 acres (AG-80). The California Department of Conservation, Office of Land Conservation has prepared a rating system for land resources called the California Agricultural Land Evaluation and Site Assessment (LESA). The use of LESA criteria provides a methodology for assessing the potential environmental impact of state and local projects on agricultural lands and its conversion. LESA provides an approach for rating the relative quality of land resources based upon specific measurable features. The California LESA is composed of six different factors. Two Land Evaluation factors area based upon measures of soil resource quality. Four Site Assessment factors provide measures of a given project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands.

DATA REQUEST

60. Please complete the California LESA application prepared by the California Department of Conservation, Office of Land Conservation, and provide the application and it's supporting documentation (i.e. maps, soil information, cropping patterns, etc.) to the Energy Commission. The application can be found at http://www.consrv.ca.gov/dlrp/LESA/LESA.htm.

    Response: Based upon our discussion at the January 24, 2002 workshop, the Applicant has prepared a LESA form for the plant site and gas line. It is included as Attachment LU-60.

Attachment LU-60

LESA Form

Attachment LU-60

Affected Area Evaluation - Soil Map Units

A. Linear Feature Evaluation

125	198	158	157	174	247	137	221	126	121	238	213	217	214	216	215	176	152	114	172	151	120	118	117	111	115	218
										Pipeline																
1.4	1.9	0.6	1.6	0.6	0.9	0.4	1.6	0.4	0.7	0.2	0.7	1.8	0.5	1.5	0.9	0.6	0.4	0.4	1.4	0.5	0.8	0.1	0.4	0.7	0.2	0.5
0.8	2.0			0.9		0.6	0.7	0.3	1.0	0.2	0.5	1.4	0.2				1.0	0.3	0.5	0.1	2.1	0.1	0.3	0.7	0.7	0.4
0.3	0.9			0.3						0.1	0.6	0.3	0.3				0.3	0.3		0.8	0.6					3.7
3.0	1.6										0.3	0.3	0.3				0.4			0.1						1.7
1.8	0.3										4.9	4.0	1.7							0.6						2.8
	1.3										0.2	1.3	0.5							0.6						
											0.3	1.0								0.9						
											2.1	2.3								0.9						
											1.0									0.6						
											1.9									0.4						
											2.4									1.0						
											1.6									1.0						
											0.6									0.1						
											0.9									0.7						
											0.6															
											1.6															
											0.9															
											3.0															
											1.0															
											0.9															
											1.0															
											0.8															
											0.1															
											0.4															
											1.2															
											0.9															
											0.9															
											0.8															
										Area (ac)																
15.7	**17.2**	**1.3**	**3.4**	**3.9**	**1.9**	**2.2**	**5.0**	**1.5**	**3.7**	**1.1**	**69.1**	**26.7**	**7.5**	**3.2**	**1.9**	**1.3**	**4.5**	**2.2**	**4.1**	**17.9**	**7.5**	**0.4**	**1.5**	**3.0**	**1.9**	**19.6**
										Site																
										Area (ac)																
9.8	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
										Total																
										Area (ac)																
25.5	**42.4**	**1.3**	**3.4**	**3.9**	**1.9**	**2.2**	**5.0**	**1.5**	**3.7**	**1.1**	**69.1**	**26.7**	**7.5**	**3.2**	**1.9**	**1.3**	**4.5**	**2.2**	**4.1**	**17.9**	**7.5**	**0.4**	**1.5**	**3.0**	**1.9**	**19.58506**

B. Site Evaluation

125	198
Area (Ac)	
9.8	25.2

Notes:

[1] Pipeline construction easement: 75 ft

[2] Map Scale, 1 cm equals: 1250 ft

TABLE 1A.
Land Evaluation Worksheet

A	D	D	B	C	E	F	G	H
Soil Map Unit	LCC	Overall LCC	Project Acres	Proportion of Project Area	LCC Rating	LCC Score	Storie Index	Storie Index Score
125	IIIe	III	25.5	0.10	70	6.8	36	3.5
198	IVe	IV	42.4	0.16	50	8.1	16	2.6
158	IIIs	III	1.3	0.00	60	0.3	61	0.3
157	IIIs	III	3.4	0.01	60	0.8	30	0.4
174	IVs	IV	3.9	0.01	40	0.6	20	0.3
137	IVs	IV	2.2	0.01	40	0.3	12	0.1
221	IIIs	III	5.0	0.02	60	1.1	31	0.6
126	VI	VI	1.5	0.01	20	0.1	22	0.1
121	IIIw	III	3.7	0.01	60	0.8	65	0.9
238	IIIs	III	1.1	0.00	60	0.2	36	0.1
213	IIIs	III	69.1	0.26	60	15.8	28	7.4
217	IIIs	III	26.7	0.10	60	6.1	23	2.3
214	IIIs	III	7.5	0.03	60	1.7	28	0.8
216	IVs	IV	3.2	0.01	40	0.5	21	0.3
215	IIIe	III	1.9	0.01	70	0.5	26	0.2
176	IVs	IV	1.3	0.00	40	0.2	18	0.1
152	IIIs	III	4.5	0.02	60	1.0	14	0.2
114	IVw	IV	2.2	0.01	40	0.3	22	0.2
172	IIIw	III	4.1	0.02	60	0.9	64	1.0
151	IIIs	III	17.9	0.07	60	4.1	15	1.0
120	IIIs	III	7.5	0.03	60	1.7	77	2.2
118	IIIw	III	0.4	0.00	60	0.1	72	0.1
117	IIIs	III	1.5	0.01	60	0.3	86	0.5
111	IIIe	III	3.0	0.01	70	0.8	68	0.8
115	IIIs	III	1.9	0.01	60	0.4	25	0.2
218	IIIs	III	19.6	0.07	60	4.5	22	1.6
TOTALS			**262.3**	**1.0**		**58.3**		**27.9**

TABLE 1B.
Site Assessment WorkSheet 1.
Project Size Score

LCC Class								
I	II	III	IV	V	VI	VII	VIII	Sum
0	0.0	205.7	55.1	0.0	1.5	0.0	0.0	**262.3**

LCC Class		
I-II	III	IV-VIII
0	205.7	56.6
Project Size Scores		
0	100.0	20.0

Project Size
100

Attachment LU-60

TABLE 4.
Site Assessment Worksheet 2. Water Resources Availability

A	B	C	D1	D2	E
Project Portion	Water Source	Proportion of Project Area	Option (from Table 5)	Water Availability Score	Weighted Availability Score
1	Groundwater	1	7	65	65
2					
3					
4					
5					
6					
TOTALS					65

TABLE 5.
Water Resource Availability Scoring

Option	Non-Drought Years			Non-Drought Years			WATER RESOURCE
	RESTRICTIONS			RESTRICTIONS			
	Irrigated Production Feasible	Physical Restrictions	Economic Restrictions	Irrigation Production Feasible	Physical Restrictions	Economic Restrictions	SCORE
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	--	--	50
9	YES	NO	YES	NO	--	--	45
10	YES	YES	NO	NO	--	--	35
11	YES	YES	YES	NO	--	--	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought an dnon-drought years						25
13	Irrigated product not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years)						20
14	Neither irrigated nor dryland production is feasible						0

TABLE 6.
Site Assessment - The Surrounding Agricultural Land Rating

Segment Length on Map (cm)	Land Use	Zone of Influence Area (ac)	Proportion Area (ac)
Pipeline			
4.3	Agricultural	163	0.04
2.3	Rural Residential	87	0.02
47.2	Agricultural	1788	0.42
2.2	Preserve	83	0.02
39.5	Agricultural	1496	0.35
11.0	Suburban	417	0.10
Site			
Area (ac)	**Land Use**	**Zone of Influence Area (ac)**	**Proportion Area (ac)**
246	Agricultural	246	0.06
Total	--	**4280**	**1**

Notes:
[1] Zone of Influence: 1320 ft lateral distance from pipeline

Summary

Percent of Project Zone of Influence in Agricultural Use	Surrounding Agricultural Land Score
86.28	90

Table 7.
Surrounding Protected Resource Rating

Segment Length Existing Protected Resource (cm)	Protected Resource	Percent of Projects Zone of Influence Defined As Protected	Surrounding Protect Resource Land Score
6.36	Consumnes River Preserve	5.63	0

Notes:
[1] Zone of Influence: 1320 ft lateral distance from pipeline

Table 8.
Final LESA Scoresheet

A	B		C		D
Factor Name	Rating Factor (0-100 points)	X	Factor Weighting (Total = 1.00)	=	Weighted Factor Rating
Land Evaluation					
1. Land Capability Classification	58.3	X	0.25	=	14.6
2. Storie Index Rating	27.9	X	0.25	=	7.0
Site Assessment					
1. Project Size	100	X	0.15	=	15.0
2. Water Resource Availability	65	X	0.15	=	9.8
3. Surrounding Agricultural Lands	90	X	0.15	=	13.5
4. Protected Resource Lands	0	X	0.05	=	0.0
Total				=	**59.8**

Technical Area: Visual Resources and Plumes
CEC Authors: Michael Clayton and William Walters
CPP Author: Sierra Research

BACKGROUND

AFC Section 8.11.5.3.3, pp. 8.11-12,13, states that the plume frequency of the project would be minimal. However, no further information is given to substantiate that claim. Staff requires cooling tower and HRSG operating data to model the plume frequency and plume dimensions to determine the potential significance of the project's visible water vapor plumes.

109. For staff to conduct CSVP modeling of the plume abated HRSG exhaust, please provide, at a minimum, HRSG exhaust parameter data to complete the following table *(a similar set of ambient conditions may be substituted for the values specified as long as they represent the range of ambient conditions expected at the site)*. The values must correspond to full turbine load operating conditions at the specified ambient conditions.

Table 3

Ambient Condition	Moisture Content (% by weight)	Exhaust Flow Rate (lbs/hr)	Exhaust Temperature (°F)
Full Turbine Load, including Inlet Air Fogging for appropriate ambient temperatures			
20°F, 90% RH			
20°F, 60% RH			
20°F, 30% RH			
50°F, 90% RH			
50°F, 60% RH			
50°F, 30% RH			
80°F, 90% RH			
80°F, 60% RH			
80°F, 30% RH			

50% Turbine Load, including Inlet Air Fogging for appropriate ambient temperatures			
20°F, 90% RH			
20°F, 60% RH			
20°F, 30% RH			
50°F, 90% RH			
50°F, 60% RH			
50°F, 30% RH			
80°F, 90% RH			
80°F, 60% RH			
80°F, 30% RH			

Response: The information requested with regard to the above table was previously submitted as Table VR-109 (Data Response, Set 1A). In addition to that information, we have included Attachment VR-109, which provides the Applicant's plume modeling analysis.

Attachment VR-109

Cosumnes Power Plant
Visible Water Vapor Plume Analysis

The following is a description of the visible plume modeling performed for the Cosumnes Power Project. As discussed below, the visible plume modeling was performed for the new equipment (i.e., gas turbines/HRSGs and main cooling tower).

Overview – Visible Plume Analysis

The basic principle used to analyze the visible water droplet plumes for the Cosumnes power Project involves modeling the dilution of a water vapor plume as a function of wind speed, distance, and stability class from the release point, similar to the Gaussian approach for modeling gaseous pollutants. As the plume is diluted, the temperature of the plume approaches ambient temperature, and the moisture content of the plume approaches the moisture content of the surrounding ambient air. At any given point along the plume, one can use the dilution factors to determine the plume temperature and moisture content, given knowledge of the temperature and moisture content of the plume at the time it leaves the release point, and of the temperature and moisture content of the ambient air. Knowing the temperature and moisture content of the plume at that point enables one to determine whether the moisture will condense at that point to form a visible water plume. By performing these calculations along a series of points, one can determine whether a visible plume will form and, if so, the length of the visible plume for each hour evaluated.

The modeling system includes the following two components:

- A modified version of the Industrial Source Complex Short Term Model Version 3 (ISCST3, v. 98356) is used to determine plume dilution through the evaluation of water vapor concentrations determined along a series of receptors placed along the plume centerline. These calculations are performed for each hour of the year using a standard modeling meteorological data set.

- A program called MISTVUE, which determines the amount of dilution of the plume that is required for the visible plume to evaporate, determines the distance (along the plume centerline) that the plume is visible, and summarizes the statistics and prints a report.

Each of these two components is discussed in more detail below.

Modified ISCST3

ISCST3 was modified to provide for the determination of pollutant concentrations along the centerline of a plume. The centerline of the plume is represented by flagpole receptors along a single radial from the stack. The model produces an output file, which includes concentrations for each receptor along the radial for each hour of the year. Relative to the concentration present in the stack, the concentrations reported at each receptor represent the degree of dilution of the plume with ambient air at that point. The modified version of ISCST3 has the following features:

- Calculations can be performed for up to 100 receptors placed along the centerline of the plume.
- Default ISCST3 features have been disabled that would otherwise prevent calculations of pollutant concentrations at locations close to the emission source.
- To avoid ignoring meteorological conditions where visible plumes are likely to be formed, wind speeds of less than 1.0 m/s are set to a wind speed of 1.0 m/s, to avoid implementing the calms processing feature of ISCST3.
- Concentrations are calculated regardless of whether the plume height lies above or below the mixing height.
- Calculations are performed for only simple terrain.
- Calculations are performed for only a single source.

MISTVUE

MISTVUE uses a linear interpolation of water vapor pressure, between the stack exit and ambient conditions, together with the Goff-Gratch formulation of the Clausius-Clapeyron equation for water vapor pressure, to determine the amount of dilution required for the visible plume to not be visible. These calculations are performed for each hour of the year, using the same meteorological data set used for the ISCST3 dispersion modeling analysis. MISTVUE can perform calculations for various types of sources:

- Sources with a fixed exit temperature, exit velocity, and water vapor content
- Sources with diurnal cycles of temperature, exit velocity, or water content that vary by hour
- Sources with exit temperatures at a constant increment above ambient temperatures
- Sources where exit temperature, stack velocity, or moisture content is a function of ambient temperature, with two interpolation regimes available per day (e.g., on-peak and off-peak)
- Sources with moisture content fixed at a specified relative humidity (e.g. 100% for cooling towers), given any ambient temperature.

In this regard, the modeling system is more versatile than other models typically used to evaluate visible water vapor plumes, such as SACTIP (Seasonal/Annual Cooling Tower Impact Program), since combustion sources, as well as cooling towers, can be treated.

After performing these calculations, MISTVUE reads an output file to determine the distance along the centerline of the plume where sufficient dilution has occurred such that the plume is no longer visible.

MISTVUE then proceeds to summarize and print statistics regarding plume visibility. Available statistical outputs include the number and frequency of hours in which a plume is visible, separately for daytime and nighttime conditions, as well as a frequency distribution of visible plume lengths. Calculation is done for all hours, and (provided sufficient meteorological data are available), for just hours with no fog or precipitation. Calculation of typical plume parameters of the 90th-percentile maximum plume height plume, for all hours, and for just daylight no-fog no-precipitation hours is also done. Statistics are reconciled internally in the program, for quality assurance purposes.

Meteorological Data

Meteorological data from the monitoring station located at Sacramento Executive Airport for the 1990-92 calendar years were used for the plume visibility analysis. These data were selected, instead of the meteorological data used for the air quality dispersion modeling analysis, because data necessary to determine whether there is rain or fog is not included in the met data set used for the air quality analysis.

Modeling Assumptions

Table 1 presents the plume-related parameters for the main cooling tower.

Table 1
Cosumnes Power Project
Visible Water Vapor Plume Modeling
Main Cooling Tower Parameters

	Case 1	Case 2	Case 3
Ambient Temp	104°F	61°F	34°F
Ambient RH	17%	59%	90%
Turbine Load	100%	100%	100%
Duct Burners	N/A	N/A	N/A
Inlet Fogging	On	Off	Off
PAG Steam Injection	N/A	N/A	N/A
Cells in Operation	8	8	8
Mass Flow lbs/min/cell	106,550	114,417	120,416
Volume Flow acfm/cell	1,506,617	1,573,344	1,615,992
Exhaust Gas Temp	91°F	79°F	68°F
Exhaust Gas RH	100%	100%	100%

Table 2 presents the plume-related parameters for the heat recovery steam generators.

Table 2
Cosumnes Power Project
Visible Water Vapor Plume Modeling
HRSG Parameters

	Case 1	Case 2	Case 3
Ambient Temp	104°F	61°F	34°F
Ambient RH	17%	59%	90%
Turbine Load	100%	100%	100%
Duct Burners	N/A	N/A	N/A
Inlet Fogging	On	Off	Off
PAG Steam Injection	N/A	N/A	N/A
Exhaust H_2O wt%	6.26%	5.29%	5.01%
Exhaust H_2O vol%	9.77%	8.30%	7.88%
Exhaust Flow lbs/hr	3,469,410	3,604,224	3,750,308
Exhaust MW lbs/lb-mol	28.12	28.29	28.33
Exhaust Flow acfm	989,359	1,015,562	1,050,049
Exhaust Gas Temp	189°F	185°F	182°F

Interpretation of Results

The water droplet plume visibility analysis is an approximation technique, which should not be used to establish limiting conditions for the operation of a facility or a particular piece of equipment. The following caveats should be observed in interpreting the model results:

- The model is least reliable at predicting plume visibility under calm nighttime conditions, since both temperature and relative humidity vary strongly with height under those conditions. What is measured at the meteorological station (at a height of 10 meters) may vary considerably from actual conditions at plume height. In general, under cold, nighttime conditions (with shallow radiation inversions), temperatures are likely to be colder, and relative humidity higher, at the height of the meteorological monitor than at plume height, thus resulting in an overstatement of plume visibility during these conditions.

- Latent heat release and absorption are not treated in the modeling system. These effects are likely to be of secondary importance for combustion plumes traveling for relatively short distances, but may play a more important role for cooling tower plumes. Condensation of water droplets in the plume will cause the plume to increase in temperature, while evaporation of those droplets will subsequently cool the plume by a similar amount. These effects are likely to be negligible in the case of combustion sources, where the plume temperature is already 100 degrees F (or more) warmer than the surrounding ambient air. The effect of ignoring latent heat release and absorption is to slightly underestimate initial plume rise, and slightly underestimate plume length.

- The model results are extremely sensitive to assumptions regarding ambient and stack gas moisture content and relative humidity (as is actual plume visibility). Furthermore, it is not clear that the accuracy of the relative humidity monitors is suitable for the use to which the data are being applied.

Modeling Results

The following table summarizes the hour-by-hour modeling results. Copies of the modeling input and output files used for this analysis are being provided under separate cover.

Main Cooling Tower

Table 3 presents the plume frequencies predicted for the main cooling tower.

Table 3 Cosumnes Power Project Visible Water Vapor Plume Modeling Main Cooling Tower Plume Frequencies				
1990 SAC Met Data				
Length	Total	Day	Night	Day/ Non-Rain/Non-Fog
<10 m	505	166	339	158
<60 m	2272	700	1572	616
<100 m	3043	937	2106	778
<400 m	3791	1151	2640	868
All	4214	1238	2976	882
Reference Period	Year	4380 hrs	4380 hrs	4380 hrs
Percent of Period	48.1%	28.3%	68.0%	20.1%
1991 SAC Met Data				
Length	Total	Day	Night	Day/ Non-Rain/Non-Fog
<10 m	376	134	242	119
<60 m	2116	672	1444	544
<100 m	3021	968	2053	749
<400 m	3977	1232	2745	892
All	4471	1348	3123	914
Reference Period	Year	4380 hrs	4380 hrs	4380 hrs
Percent of Period	51.0%	30.8%	71.3%	20.9%
1992 SAC Met Data				
Length	Total	Day	Night	Day/ Non-Rain/Non-Fog
<10 m	286	102	184	94
<60 m	1724	589	1135	511
<100 m	2613	913	1700	738
<400 m	3884	1283	2601	900
All	4561	1428	3133	921
Reference Period	Year	4380 hrs	4380 hrs	4380 hrs
Percent of Period	52.1%	32.6%	71.5%	21.0%

Table 4 presents plume dimensions predicted for the main cooling tower.

Table 4
Cosumnes Power Project
Visible Water Vapor Plume Modeling
Main Cooling Tower Plume Dimensions

1990 SAC Met Data				
	Total	Day	Night	Day/ Non-Rain/Non-Fog
Maximum Plume Height	216 m			175 m
Average Plume Height	59 m	52 m	62 m	55 m
Maximum Plume Diameter	157 m			149 m
Average Plume Diameter	37 m	31 m	39 m	32 m
Average Plume Length	136 m	87 m	157 m	91 m
	Total			Day/ Non-Rain/Non-Fog
Dimensions for Plume of 90th Percentile Height				
Mean Height	107 m			72 m
Mean Length	234 m			31 m
Mean Diam.	72 m			43 m
1991 SAC Met Data				
	Total	Day	Night	Day/ Non-Rain/Non-Fog
Maximum Plume Height	185 m			185 m
Average Plume Height	56 m	50 m	58 m	53 m
Maximum Plume Diameter	149 m			139 m
Average Plume Diameter	35 m	31 m	37 m	31 m
Average Plume Length	116 m	81 m	130 m	90 m
	Total			Day/ Non-Rain/Non-Fog
Dimensions for Plume of 90th Percentile Height				
Mean Height	101 m			69 m
Mean Length	153 m			81 m
Mean Diam.	66 m			44 m
1992 SAC Met Data				
	Total	Day	Night	Day/ Non-Rain/Non-Fog
Maximum Plume Height	213 m			182 m
Average Plume Height	55 m	51 m	57 m	52 m
Maximum Plume Diameter	146 m			139 m
Average Plume Diameter	35 m	32 m	37 m	31 m
Average Plume Length	125 m	91 m	141 m	106
	Total			Day/ Non-Rain/Non-Fog
Dimensions for Plume of 90th Percentile Height				
Mean Height	100 m			65 m
Mean Length	200 m			79 m
Mean Diam.	65 m			39 m

Gas Turbines/HRSGs

Table 5 presents the plume frequencies predicted for the gas turbines/HRSGs.

Table 5 Cosumnes Power Project Visible Water Vapor Plume Modeling Gas Turbine/HRSG Plume Frequencies				
1990 SAC Met Data				
Length	Total	Day	Night	Day/ Non-Rain/Non-Fog
<10 m	0	0	0	0
<60 m	22	8	14	5
<100 m	127	32	95	20
<400 m	487	91	396	46
All	861	181	680	64
Reference Period	Year	4380 hrs	4380 hrs	4380 hrs
Percent of Period	9.8%	4.1%	15.5%	1.5%
1991 SAC Met Data				
Length	Total	Day	Night	Day/ Non-Rain/Non-Fog
<10 m	0	0	0	0
<60 m	15	3	12	0
<100 m	106	26	80	7
<400 m	486	107	379	43
All	919	206	713	51
Reference Period	Year	4380 hrs	4380 hrs	4380 hrs
Percent of Period	10.5%	4.7%	16.3%	1.2%
1992 SAC Met Data				
Length	Total	Day	Night	Day/ Non-Rain/Non-Fog
<10 m	0	0	0	0
<60 m	7	5	2	2
<100 m	69	33	36	5
<400 m	480	150	330	26
All	1050	284	766	42
Reference Period	Year	4380 hrs	4380 hrs	4380 hrs
Percent of Period	12.0%	6.5%	17.5%	1.0%

Table 6 presents plume dimensions predicted for the gas turbines/HRSGs.

Table 6
Cosumnes Power Project
Visible Water Vapor Plume Modeling
Gas Turbine/HRSG Plume Dimensions

1990 SAC Met Data				
	Total	Day	Night	Day/ Non-Rain/Non-Fog
Maximum Plume Height	396 m			240 m
Average Plume Height	127 m	126 m	127 m	132 m
Maximum Plume Diameter	247 m			211 m
Average Plume Diameter	76 m	84 m	74 m	69 m
Average Plume Length	469 m	357 m	493 m	382 m
	Total			Day/ Non-Rain/Non-Fog
Dimensions for Plume of 90th Percentile Height				
Mean Height	177 m			219 m
Mean Length	1078 m			1032 m
Mean Diam.	110 m			153 m
1991 SAC Met Data				
	Total	Day	Night	Day/ Non-Rain/Non-Fog
Maximum Plume Height	287 m			287 m
Average Plume Height	119 m	118 m	119 m	130 m
Maximum Plume Diameter	183 m			182 m
Average Plume Diameter	76 m	83 m	74 m	68 m
Average Plume Length	380 m	288 m	403 m	339 m
	Total			Day/ Non-Rain/Non-Fog
Dimensions for Plume of 90th Percentile Height				
Mean Height	176 m			187 m
Mean Length	1015 m			116 m
Mean Diam.	109 m			100 m
1992 SAC Met Data				
	Total	Day	Night	Day/ Non-Rain/Non-Fog
Maximum Plume Height	394 m			263 m
Average Plume Height	115 m	121 m	113 m	119 m
Maximum Plume Diameter	247 m			170 m
Average Plume Diameter	85 m	89 m	83 m	75 m
Average Plume Length	394 m	261 m	445 m	528 m
	Total			Day/ Non-Rain/Non-Fog
Dimensions for Plume of 90th Percentile Height				
Mean Height	181 m			198 m
Mean Length	787 m			1721 m
Mean Diam.	110 m			170 m

Technical Area: Water and Soil Resources
CEC Authors: Philip Lowe, P.E., Greg Peterson, P.E., & Richard Latteri
CPP Author: EJ Koford

BACKGROUND

Section 8.14.5.1 of the AFC describes impacts to three tributaries to Clay Creek and states that these drainageways are probably jurisdictional under Section 404 of the Clean Water Act. The AFC states that a 404 Permit will be required (as well as 401 Water Quality Certification) and that an environmental assessment will be performed and mitigation measures developed as a condition of obtaining these permits. The AFC describes how the proposed gas pipeline will cross a number of streams which are probably jurisdictional.

DATA REQUEST

148. Please provide evidence of consultation with the USCOE, RWQCB, and CDFG regarding the proposed riparian disturbance. Evidence of consultation should include applications for a 404 Permit, 401 Water Quality Certification, and a California Fish and Game Code 1601 Streambed Alteration Agreement.

Response: SMUD initiated informal consultations with the agencies prior to submitting the AFC and continues to contact them by phone to identify solutions to project issues. In December 2001, CPP requested a pre-consultation meeting with the agencies to include the USCOE, CDFG, USFWS, and NMFS. That meeting was held on Feb 7, 2002, and was attended by two staff members from the CEC. At that meeting the USCOE stated they would advise if one 404 permit or multiple NWP 12s were appropriate for the project, and would review and application. The USFWS indicated that consultation on Section 7 issues associated with the USCOE would be necessary, or the project may want to use EPA or USBR as lead federal agencies. SMUD was advised to send a letter to these agencies to determine lead agency status.

CDFG did not attend the meeting but from telephone conversations (the most recent was February 14, 2002) indicated that a Streambed Alteration Agreement would be required for crossing the Cosumnes River and Laguna Creek, and that tiger salamander surveys should be implemented in vernal pools crossed by the gas pipeline south of the Cosumnes River.

NMFS did not attend the preconsultation meeting, but had previously indicated by letter its concern for anadromous fishes in the Cosumnes Drainage.

A wetland delineation of the gas pipeline portion of the project is currently underway in preparation for submittal as part of the Section 404 Permit. The

401 water quality certification (or waiver) follows approval of the Section 404 permit.

Early consultation regarding cultural resources revealed a potential limit on the location of the HDD pad. This affects information required for the Streambed Alteration Agreement. As soon as design drawings for crossing the Cosumnes River are available, the Streambed Alteration Agreement Application will be prepared.