CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833-2937
Tel 916.920.0300
Fax 916.920.8463

CH2MHILL

May 22, 2009

Mr. Rod Jones
Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: CPV Vaca Station (08-AFC-11)
Response to CEC Staff Workshop Queries 1 through 8

Dear Mr. Jones:

Attached please find one original and 12 copies of CPV Vaca Station, LLC's responses to California Energy Commission Staff Workshop Queries 1 through 8 for the Application for Certification for the CPV Vaca Station Project (08-AFC-11).

If you have any questions about this matter, please contact me at (916) 286-0278 or Sarah Madams at (916) 286-0249.

Sincerely,

CH2M HILL

Douglas M. Davy, Ph.D.
AFC Project Manager

Attachment

cc: A. Welch (CPV)
S. Madams

Application for Certification

Response to
Workshop Queries 1 through 8

CPV Vaca Station

Submitted by CPV Vacaville, LLC

Submitted to
California Energy Commission

With Technical Assistance by
CH2MHILL

May 2009

ES122007003SAC

Supplemental Filing

Response to CEC Staff Workshop Queries 1 through 8

In support of the

Application for Certification

for

CPV Vaca Station

Vacaville, California

(08-AFC-11)

Submitted to the:

California Energy Commission

Submitted by:

CPV Vacaville, LLC

CPV Vacaville, LLC

With Technical Assistance by:

CH2MHILL

Sacramento, California

May 2009

Contents

Introduction

Attached are CPV Vacaville, LLC's (CPVV's) responses to California Energy Commission (CEC) Staff workshop queries 1 through 8 for the CPV Vaca Station (CPVVS) project (08-AFC-11). The workshop questions are additional information requests that were discussed during the CEC Data Response and Issue Resolution Staff Workshop that was held on April 22, 2009

Because the workshop queries were not formally provided, but were discussed during the CEC Data Workshop, a brief synopsis of each question has been provided prior to the response. The workshop queries have been given a unique workshop query (WSQ) number. Any future workshop queries will be assigned sequential numbers. New or revised graphics or tables are numbered in reference to the WSQ number. For example, the first table used in response to WSQ 36 would be numbered Table WSQ36-1. The first figure used in response to WSQ42 would be Figure WSQ42-1, and so on.

Additional tables, figures, or documents submitted in response to a data request (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Cultural Resources (1)

Geomorphology of Project Site and Linears

1. *The Applicant's prepared a study of project area geomorphology in response to Data Request #39. Existing and available information, however, did not include detailed stratigraphic studies or data that could be used to provide a comprehensive understanding of site geomorphology. Staff suggests that a program of backhoe trenches would provide the information that the Staff needs to obtain a clearer understanding regarding an appropriate scope of cultural resources construction monitoring. The testing should be only to the maximum depth of construction, mostly between four and seven feet.*

Response: The Applicant provided, in response to Data Request #36, a table indicating the depths of excavation for construction of various elements of CPV Vaca Station and, in response to Data Request #37, elevation drawings illustrating the extent and depths of these excavations. The Applicant proposes to conduct the backhoe trenching program as part of the initial clearing program for project construction, in the locations and to the depths indicated in the table and map provided in response to the data requests, and is willing to accept a Condition of Certification requiring such a program. This would permit buried archaeological deposits, if they are located at the project site, to be discovered and evaluated before damage occurs from construction. The program would be conducted by a qualified geomorphologist/geoarchaeologist.

Air Quality (2-8)

Start-up and Shut-down Technology

2. *Please provide an explanation of how the Project's proposed start-up and shut-down technology achieves a similar level of emission reductions as other proposed combined cycle power plants currently under consideration by the California Energy Commission, including: Lodi Energy Center, Carlsbad Energy Center, Marsh Landing Generating Station, Willow Pass Generating Station, El Segundo Repower, Victorville 2 Solar-Gas Hybrid Power Project, and Palmdale Solar-Gas Hybrid*

Response: CPV Vaca Station is based on the latest advances in F class gas turbine technology and features a highly efficient triple-pressure, reheat steam cycle. The high thermal efficiency of this configuration results in less fuel consumption, reduced emissions and reduced generating cost per unit of power generated compared to less efficient technologies.

In addition to its high thermal efficiency, the CPV Vaca Station project will strive to minimize startup times in order to achieve minimum dispatch loads as quickly and as safely as possible. There is a strong economic incentive to reach dispatch loads in the shortest time possible, and the plant design includes state-of-the art technology for operational flexibility and rapid-start and dispatch capability. Most of these features are part of the Balance of Plant systems and heat recovery steam generators (HRSGs) and include the following:

- An auxiliary boiler will be included to supply steam turbine generator sealing steam when the gas turbines are offline. Electric-powered vacuum pumps will also be used for overnight and weekend shutdowns. This enables the condenser to be held under vacuum overnight, which will allow the steam bypass system to begin operation sooner than would otherwise be possible during starts. By keeping the condenser under vacuum, oxygen entrainment is also minimized because, under these conditions, the condensate is not aerated during the starts. This helps in reaching steam purity specifications more quickly during startup.
- The HRSGs will be provided with a number of features to reduce stresses during startup, including sparging connections to keep the pressure parts warm, and HRSG stack dampers. Closing the stack outlet damper reduces heat losses during short periods of down time and reduces the subsequent start-up time. The HRSGs will be maintained in a "bottled-up" condition during the shutdown to minimize heat loss.
- The steam system will include a full steam bypass to the condenser as well as final stage attemperation for steam temperature control to enable the gas turbines to be loaded independently of the steam turbine generator.
- The steam turbine will include stress monitoring provisions consisting of software in the control system and instrumentation to monitor and predict stresses and determine optimum steam turbine inlet steam temperatures from the HRSG attemperation system to prevent steam turbine load holds due to temperature mismatches.

Table WSQ2-1 presents a comparison of the startup-related features of several combined-cycle projects recently licensed in California.

In summary, CPV Vaca Station is designed to minimize time spent in startup and shutdown. It has design features that are equivalent to those proposed for other projects currently being reviewed for certification. These design features will result in faster startups and fewer emissions than existing turbines. However, each installation has unique features, and there are no existing comparable installations. As a result, it is impossible to predict the emission reductions achievable with these techniques with the confidence necessary to accept enforceable permit conditions. Therefore, although the project's design will reduce startup emissions to a degree comparable to those that will be achieved by similar projects listed in Table WSQ2-1, no credit is being claimed for those reductions.

To assist the YSAQMD and CEC Staff in their analysis, CPV Vaca Station is proposing the following condition associated with startups and shutdowns, consistent with the analyses submitted in the Application for Certification. (For convenience, conditions related to combustor tuning are presented here as well; these conditions are proposed in response to WSQ4.)

Definitions

Combustor Tuning Activities: All testing, adjustment, tuning, and calibration activities recommended by the gas turbine manufacturer or an independent qualified contractor to insure safe and reliable steady state operation of the gas turbines. This includes, but is not limited to, adjusting the amount of fuel distributed between the combustion turbine's staged fuel systems to simultaneously minimize NO_x and CO production while minimizing combustor dynamics and ensuring combustor stability.

Combustor Tuning Period: The period during which gas turbine combustor tuning activities are taking place.

Startup: The period of time between the introduction of fuel into a combustion gas turbine and the beginning of the first two consecutive 15-minute periods where compliance with all continuously monitored emission limitations is demonstrated. A cold startup is any startup occurring after the gas turbine has been shut down for 72 hours or more. A warm startup is any startup that is not a cold startup.

Shutdown: The period of time between the end of the last 15 minute period where compliance with all continuously monitored emission limitations is demonstrated and the cessation of fuel flow to a combustion gas turbine.

Proposed Condition 1. The operator shall minimize the duration of activities and conditions for which the emission limitations specified in conditions xxx, yyy, etc. do not apply. The following time limits apply to each of the following activities. (Basis: BACT)

Activity	Maximum duration
Startup (cold)	6 hours
Startup (warm/hot)	2 hours
Shutdown	60 minutes
Combustor Tuning	6 hours
Excursion	4 consecutive 15-minute periods

TABLE WSQ2-1
Combined-Cycle Projects Recently Licensed in California

Project	Capacity (MW)	Docket	Turbine Configuration	Turbine Mfg	Gas Turbine Rating (per)	Proposed Cold Startup Limits
CPV Vaca Station	660	08-AFC-11	2x1	GE or Siemens		6 hour*
Carlsbad	448	07-AFC-06	1x1	Siemens	150 MW	6 hours/day
Marsh Landing	930	08-AFC-03	FP10x2; simple cycle x2	Siemens	180 MW	no limit
Willow Pass	550	08-AFC-06	FP10	Siemens	150 MW	no limit
El Segundo	560	00-AFC-14 (amendment)	R2C2; Siemens SGT6-500F	Siemens	150 MW	1 hour
Lodi	255	08-AFC-10	GE 7FA “rapid response”	GE	171 MW	6 hour
Victorville	563	07-AFC-1	Solar-gas hybrid; 2x1	GE RSP	154 MW	110 minutes
Palmdale	570	08-AFC-9	Solar-gas hybrid; 2x1	GE RSP	154 MW	No limit
East Altamont	1100	01-AFC-4	3x1	F-class	180 MW	No limit

* Proposed limits.

Status Updates of Emission Offsets

3. *Please provide regular status updates of the ongoing efforts to obtain emission offsets for the Project.*

Response: CPV will provide regular updates on efforts to obtain emission offsets in the monthly status report and will also provide status updates at other times to report significant developments.

Excursions and Tuning

4. *Please provide proposed language for excursions and tuning as well as historical information from other projects which have similar provisions.*

Response: At the April 22, 2009 Public Workshop to discuss data requests and responses for the CPV Vaca Station AFC, CEC staff requested that CPV propose permit language addressing the issue of short NOx emission excursions and combustor tuning at CPV Vaca Station. The combustor tuning issue is addressed in WSQ2, above.

With respect to NOx excursions, CEC staff requested that the proposal include a discussion of recent experience at similar facilities. The purpose of the discussion is to assist staff in determining whether excursions are sufficiently likely and unavoidable as to justify special consideration.

Origin of the NOx Excursion Language

The Applicant's consultants, Sierra Research, first became aware of issues related to NOx emissions under transient operating conditions during commissioning of the Sacramento Power Authority (SPA) cogeneration project located in Sacramento, California. (This facility is also known as the SMUD Campbell Soup project.) This unit is a cogeneration facility based on a Siemens V84.2 gas turbine that was equipped with one of the first production dry low-NOx combustion systems. The unit uses a silo combustor that was sensitive to fuel pressure fluctuations. As a result, the plant control system was designed to immediately change the combustion regime to diffusion mode in the event of measured parameters that could indicate potential combustion instability. This, in turn, resulted in short-term spikes (typically less than 15 minutes in duration) when NOx emissions increased from approximately 3 ppmc to nearly 100 ppmc.

To address these spikes, which were confirmed by the equipment manufacturer to be routine and unavoidable, the project owner sought and received approval for language in the facility permit and CEC license to allow for NOx excursions with one-hour average concentrations of up to 30 ppm, for a limited number of hours during each year.

Similar excursion language has been included in the permits and CEC licenses for a number of combined-cycle plant permits from 1999 through 2006. There are now a number of plants with NOx excursion language, with differing rationales, and with different conditions.

Operating:

- Cosumnes Power Plant (01-AFC-19, COC AQ-26);
- Los Medanos Energy Center (98-AFC-1, COC AQ-22);
- Moss Landing Power Plant (99-AFC-4, COC AQ-18);
- Inland Empire Energy Center (01-AFC-17, COC AQ-22);
- Donald Von Raesfeld Power Plant (02-AFC-3, COC AQ-20);
- Walnut Energy Center Project (02-AFC-4, COC AQ-21).

Not Operating:

- East Altamont Energy Center Power Plant (01-AFC-4, COC AQ-25i);
- Los Esteros 2 Power Plant (03-AFC-2, COC AQ-19g);
- San Joaquin Valley Energy Center (01-AFC-22, COC AQ-34);

Review of CEMS Data for Existing Turbines

In order to prepare a response the CEC's request, Sierra has reviewed the continuous emissions monitoring system (CEMS) data for eight California plants equipped with General Electric 7FA combustion turbines similar to those proposed for use at CPV Vaca Station. In addition, data from four California plants equipped with Siemens 501FD combustion turbines have been reviewed. Together, these 12 plants are all of the F-class combined-cycle turbine plants operating in California at this time (except for the recently commissioned Gateway turbines which have not yet submitted CEMS data to EPA). The CEMS data were obtained from the plants' submissions to USEPA under the federal acid rain program, and are all publicly available documents. A summary of the key information for each plant, as compared with the proposed permit conditions for CPV Vaca Station, is shown in Table 1 (provided in Attachment WSQ4-1).

The CEMS data reported to EPA for these facilities were reviewed to determine the frequency with which they exceeded their applicable NOx permit limits, excluding allowable exceedances during startups and shutdowns. These data are summarized in Table 2 (provided in Attachment WSQ4-1).

The data in Table 2 reflect all exceedances, not just those that might qualify for treatment under an exclusion, or that might be associated with transient operations. The data demonstrate that there is a clear "learning curve" with respect to maintaining low NOx emissions with these units, but that by the second or third year of operation, NOx exceedances are minimal (generally a few per year) for all causes. The data demonstrate, however, that excursions do continue to occur, even after several years of operational experience.

Tables 3, 4, and 5 examine a subset of the data in Table 2 in more detail. Table 3 shows a cumulative total of 996 excursions over a combined operation of 63 turbine-years. Table 4 shows that 107 of those excursions were more than 5 ppmc, and 889 were less than 5 ppmc (89%). Table 5 shows that 46 of the excursions were more than 10 ppmc and 950 were less (95%). Tables 3, 4, and 5 are provided in Attachment WSQ4-1.

From these data, it appears that a 30 ppmc excursion limit would accommodate virtually all of the excursions observed in the data; however, an excursion of this magnitude would also result in noncompliance with the 9 ppmc limit contained in YSAQMD Regulation 2.34 Section 301. The 9 ppmc limit is a 15-minute average, and is normalized to a gas turbine with an efficiency of 25%. The corresponding limit for the proposed Vaca Station turbines is approximately 12 ppmc, due to the high thermal efficiency of the gas turbines.

A 12 ppmc excursion limit would eliminate more than 95% of the observed exceedances of the applicable permit limits that are shown in Table 3.[1] Some of those excursions would still be a violation of the District's 9 ppmc 15-minute average limit. Nevertheless, a 12 ppmc excursion limit would significantly reduce the number of events that would be considered to be exceedances.

Conclusion

Modern turbine emission control systems are capable of continuously meeting a stringent BACT limit of 2 ppmc NOx almost all of the time. However, the margin of compliance is not large, and even small changes in operating conditions can result in temporary excursions above the limits. Operating experience at recently licensed power plants demonstrates that, even with well trained and experienced operators, occasional excursions will occur. The frequency, duration, and magnitude of excursions can be minimized, but not eliminated.

Compliance is extremely important to the operators of these facilities. Permit violations result in significant administrative cost, both to the operator and to the regulatory agency. Because occasional brief excursions are reasonably expected and unavoidable, even by the best of controls and operators; because the extra emissions associated with these excursions are small (well below the emissions associated with startups, for example), and therefore have impacts well below short-term impacts already deemed acceptable; because the extra

[1] Note, however, that the proposed excursion language limits annual excursions to 10 hours per year (40 15-minute periods). As a result, many of the excursions at High Desert would still be violations. If High Desert is excluded from the summary, the proposed excursion language would reduce the number of violations by 75%.

emissions are recorded on the CEMS and therefore counted towards daily and longer-term limits; and because treating these excursions as violations will result in a trivial air quality benefit, a narrowly worded and environmentally insignificant allowance for excursions would be appropriate. Excursions that violate District prohibitory rules will still be considered violations subject to enforcement action.

Proposed Permit Condition Language related to Excursions

Proposed Condition 2. The hourly NO_x emission limitations specified in condition xxx shall not apply during short-term excursions limited to a cumulative total of 10 hours per rolling 12-month period. Short-term excursions are defined as 15-minute periods designated by the owner/operator that are the direct result of transient conditions, not to exceed four consecutive 15-minute periods, when the 15-minute average NO_x concentration exceeds 2.0 ppmv, dry @ 15% O_2. Transient conditions do not include startups, shutdowns, or combustor tuning activities. Examples of transient conditions include, but are not limited to the following:

(1) Initiation/shutdown of combustion turbine inlet air cooling
(2) Rapid combustion turbine load changes (ramp rate > 10 MW/minute)
(3) Initiation/shutdown of HRSG duct burners

The maximum 1-hour average NO_x concentration for periods that include short-term excursions shall not exceed 12 ppmv, dry @ 15% O_2. All emissions during short-term excursions shall be included in all calculations of hourly, daily, and annual mass emission rates as required by this permit. (Basis: BACT; Rule 2.34 Sec. 301)

Cumulative Air Quality Modeling Analysis

5. *Please provide the cumulative air quality modeling analysis, including confirmation of issues raised during the previously submitted modeling.*

Response: The cumulative air quality air modeling analysis is currently underway and will be submitted under separate cover at a later date.

Compliance with YSAQMD Rule 2-34

6. *Please provide an analysis of Project compliance with YSAQMD Rule 2-34.*

Response: At the April 22 workshop, Staff requested information about how the CPV Vaca Station project will comply with Yolo-Solano Air Quality Management District (YSAQMD) Rule 2-34. The key compliance question is whether the Project can meet the requirements of the "Thermal Stabilization Period," which is defined as: "The two hour start-up time necessary to bring the heat recovery steam generator to the proper temperature, not to exceed two (2) hours." (YSAQMD Rule 2-34, § 216 [emphasis added].)

CPV expects all startups, except for cold startups, to take less than two hours. Project start-up times are expected to be less than, or at least comparable to, those of other units currently under Energy Commission review using accelerated startup designs. The Project's design includes an auxiliary boiler that will reduce the amount of time necessary to bring the turbines up to operating conditions during a cold startup. Nonetheless, it is likely that some cold starts will require a thermal stabilization period in excess of two hours. Thus, for the reasons discussed below, the Project will not be able to ensure compliance with the 2-hour limit of the Thermal Stabilization Period in YSAQMD Rule 2-34 § 216 unless flexibility can be incorporated into the rule's definition, similar to the flexibility that has been provided in numerous similar rules throughout California.

The Project's combined-cycle equipment startup duration depends on how fast the high pressure steam drum and the steel walls of the steam turbine can be warmed to operating temperature without generating stress cracks or otherwise damaging the equipment. During a cold startup, in which the CTG/HRSG have been shut down for more than 72 hours, the HRSG and steam turbine parts are at ambient temperature and there is a great deal of thermal mass that must be heated. Once the high-pressure steam drum is heated, steam developed in the HRSG from the heated turbine exhaust is admitted into the steam turbine at a controlled temperature to heat it as rapidly as possible without causing stress cracking. The steam temperature is controlled by limiting the load on the gas turbine. The allowable differential between steam temperature and metal temperature is determined by the steam turbine supplier, and is imposed by the supplier's control system to avoid damage to the steam turbine from thermal stress. The control system limits gas turbine load to control the steam temperature. Any manual override of the gas turbine load limit by the operator (to speed up the startup process) reduces the life expectancy of the steam turbine.

At the lower load points, the gas turbine is tuned for combustion stability and not for emissions performance, so uncontrolled emissions at low loads are much higher than uncontrolled emissions at typical operating loads. The allowable rate of temperature increase at the steam turbine is the limiting factor in determining how quickly the gas turbine can achieve higher loads. This, in turn, limits how quickly the gas turbine combustor can be brought up to its minimum compliant load point, and this latter step is necessary for the unit to be able to comply with the BACT CO and NOx emission limits.

In addition, the time prior to initiation of ammonia flow to the SCR system depends on the temperature of the SCR catalyst and the temperature of the ammonia vaporization system. The catalyst bed is warmed by the exhaust flow from the gas turbine. The total mass of metal and water in the HRSG tubes, piping, and drums upstream of the SCR catalyst removes heat from the gas turbine exhaust as it warms. This extends the time required to heat the SCR catalyst to the minimum temperature at which ammonia may be injected upstream of the catalyst bed to begin reducing NOx to N_2. The steam turbine and SCR catalyst temperatures are all monitored by the plant control system, and the turbine ramp rate and SCR initiation sequence are governed by the equipment/system manufacturers' recommended procedures.

Startup information provided by the turbine and HRSG vendors for CPV Vaca Station indicates that, for a cold startup, a *minimum* of 4 hours is required for the unit to come into compliance with the BACT CO and NOx emission limits. Experience at other combined cycle gas turbine power plants has shown that *up to* 6 hours may be required under some circumstances. Because the Project is proposing to use technology to accelerate the startup process, it is expected that startups of the proposed CTG will be shorter than those experienced for other facilities not using these technologies. The use of the auxiliary boiler will allow faster heating of the HRSG and earlier startup of the steam turbine, reducing startup times. However, because each plant design is unique, no in-use operating data are yet available to allow observation and evaluation of the actual times required for the Project units to come into compliance during a startup. Therefore, the Project is conservatively assuming that the times required for startups will be the same as those for conventional Frame 7-based combined cycle turbine plants.

Maximum allowable project start-up times are expected to be less than, or at least comparable to, other units currently under review using accelerated startup designs with a similar capacity capability, as shown in the Table WSQ6-1.

The duration of and emission rates associated with startups and shutdowns of combined cycle power plants are a function of each plant's unique design, including factors such as the gas turbine model, the heat recovery steam generator manufacturer, the steam turbine manufacturer and model, and the plant distributed control system. These unique factors make it impossible to establish a single set of emission rates as BACT for these transient conditions. However, there are basic principles of operation, or Best Management Practices, that minimize emissions during startups and shutdowns, and some Districts have determined that these Best Management Practices constitute BACT for these activities. These Best Management Practices are as follows:

- During a startup, bring the gas turbine to the minimum load necessary to achieve compliance with the applicable NOx and CO emission limits as quickly as possible, consistent with the equipment manufacturers' recommendations and safe operating practices;
- During a startup, initiate ammonia injection to the SCR system as soon as the SCR catalyst temperature and ammonia vaporization system have reached their minimum operating temperatures;
- During a shutdown, once the turbine reaches a load that is below the minimum load necessary to maintain compliance with the applicable NOx and CO emission limits, reduce the gas turbine load to zero as quickly as possible, consistent with the equipment manufacturers' recommendations and safe operating practices; and
- During a shutdown, maintain ammonia injection to the SCR system as long as the SCR catalyst temperature and ammonia vaporization system remain above their minimum operating temperatures.

In conclusion, CPV Vaca Station will use technologies intended to minimize the time necessary to come into compliance with the requirements of YSAQMD Rule 2-34. However, these technologies will not be sufficient to enable compliance with the provisions of this rule on a consistent basis. Consequently, CPV Vaca Station will seek an amendment to Rule 2-34, consistent with similar amendments to similar rules in other Districts, to ensure that the facility will be in compliance at all times.

The fact that CPV Vaca Station may not obtain this relief until after CEC certification of the project is not unique. Table WSQ6-2 is a list of projects approved by the Commission with maximum allowable startup times in excess of the allowable District rules at the time of Commission approval, along with the dates when those District rules were subsequently amended to increase the startup times:

TABLE WSQ6-1
Projects Approved with Maximum Allowable Startup Times in Excess of Allowable Air District Rules

District/Rule	Rule Approval Date	CEC Project/Approval Date
Bay Area AQMD Reg 9 Rule 9	12/6/06 (revising startup exemption from 3 hours to 6 hours)	Los Medanos Energy Center (98-AFC-1C; amendment approved 9/8/2004; 6 hour limit on startups) Delta Energy Center (98-AFC-3C; amendment approved 10/8/2004; 6 hour limit on startups) Metcalf Energy Center (99-AFC-3C; amendment approved 3/16/2005; 6 hour limit on startups)
Sacramento Metro AQMD Rule 413	3/24/05 (revising startup exemption from 1 hour to 1/3/4 hours depending on hot/warm/cold)	Cosumnes (01-AFC-19; project approved 9/10/2003; 3 hour limit on startups)

TABLE WSQ6-2
Startup NOx Emissions for Combined-Cycle Projects Recently Licensed in California

Project	Capacity (MW)	Docket	Turbine Configuration	Turbine Mfg	Gas Turbine Rating (per)	Proposed Cold Startup Limits	Lb NOx/hr/ turbine	Lb NOx/ event
CPV Vaca Station	660	08-AFC-11	2x1	GE or Siemens		6 hour*	140*	
Carlsbad	448	07-AFC-06	1x1	Siemens	150 MW	6 hours/day	69 (max hour)	no limit
Marsh Landing	930	08-AFC-03	FP10x2; simple cycle x2	Siemens	180 MW	no limit	68.6	no limit
Willow Pass	550	08-AFC-06	FP10	Siemens	150 MW	no limit	68.6	no limit
El Segundo	560	00-AFC-14 (amendment)	R2C2; Siemens SGT6-500F	Siemens	150 MW	1 hour	112	no limit
Lodi	255	08-AFC-10	GE 7FA “rapid response”	GE	171 MW	6 hour	160	no limit
Victorville	563	07-AFC-1	Solar-gas hybrid; 2x1	GE RSP	154 MW	110 minutes	No limit	96
Palmdale	570	08-AFC-9	Solar-gas hybrid; 2x1	GE RSP	154 MW	No limit	No limit	96
East Altamont	1100	01-AFC-4	3x1	F-class	180 MW	No limit	No limit	240

* Proposed limits.

PDOC Extension

7. *Please provide a status on the request for extension of the PDOC.*

Response: On May 5, 2009, CPV requested that the Yolo-Solano Air Quality Management District extend the time it will take to prepare the CPV Vaca Station Preliminary Determination of Compliance for two months, until July 9, 2009 (letter from Marc Campopiano, Latham & Watkins, LLP, to Mat Erhardt, Air Pollution Control Officer, Yolo-Solano Air Quality Management District; CEC docket number 51429).

PM Emission Rate from Cooling Tower

8. *Please provide the PM emission rate from the cooling tower and evaluate if the Applicant is prepared to modify the analysis.*

Response: At the April 22 workshop, CEC staff requested that the cooling tower stack parameters be reviewed for accuracy, and that if necessary dispersion modeling be revised. Subsequently, it was discovered that the volumetric air flow rate used in the initial modeling of cooling tower impacts was incorrect. The value used for modeling was 1,513,000 CFM for the entire tower. This flow rate is actually the volumetric flow rate per cell. The total air flow rate is therefore a factor of 12 higher than previously modeled; as a result, ambient air quality impacts associated with the cooling tower were over-estimated.

The PM, PM_{10}, and $PM_{2.5}$ emission rates contained in the AFC are correct. As disclosed in a previous submittal to the CEC, some of the labels in Table 5.1A-4 are incorrect. The corrected table, Table 5.1A-4R, is presented below.

TABLE 5.1A-4R *
Calculation of Cooling Tower Emissions

PM_{10} Emissions based on TDS Level		
TDS level, ppm		9000
PM, lb/hr		4.16
PM, lb/day		99.9
PM, tpy		18.22
PM_{10}, lb/hr		1.83
PM_{10}, lb/day		43.9
PM_{10}, tpy		8.02
$PM_{2.5}$, lb/hr		0.62
$PM_{2.5}$, lb/day		15.0
$PM_{2.5}$, tpy		2.73
Based on 8760 hrs/yr		
12	cells	
44.34	Height, ft	
37.2	Diameter, ft	
69	exhaust temp, F	
1513000	air flow, CFM (per cell)	
	PM_{10} fraction	0.44
	$PM_{2.5}$ fraction	0.15

*Table revised 5/22/09

Use of the correct stack parameters reduces the impacts of the cooling towers by a factor of 2. Cooling tower impacts are reduced because the additional momentum of the air flow carries the plume higher before returning to the surface, increasing dispersion.

The changes to 5.1-24R reflect the fact that the cooling tower dominates the project's PM_{10} impact (a 50% reduction in cooling tower PM_{10} impact results in nearly a 50% reduction in overall PM_{10} impact), while the turbines dominate the project's $PM_{2.5}$ impact (a 50% reduction in cooling tower impact results in a 10% reduction in overall impact).

TABLE 5.1-24R
Modeled Maximum Impacts from Facility

Pollutant	Averaging Time	Maximum Facility Impact (μg/m^3)	Background (μg/m^3)	Total Impact (μg/m^3)	State Standard (μg/m^3)	Federal Standard (μg/m^3)
NO_2	1-hour [c]	170.1	84	326	339	—
	Annual	2.3	16	18	57	100
SO_2	1-hour	12.9	51	64	655	—
	24-hour	3.6	13	17	105	365
	Annual	0.2	3	3	—	80
CO	1-hour	45.0	2,780	2,824	23,000	40,000
	8-hour	23.6	1,703	1,728	10,000	10,000
PM_{10}	24-hour	7.7	60	68	50	150
	Annual	2.4	18.2	21	20	—
$PM_{2.5}$	24-Hour	6.7	30.6	30.6[d]	—	35
	Annual	1.9	8.8	11	12	15

[c] Maximum 1-hour NO_2 impact shown occurs only during simultaneous startup of two turbines. Maximum impact during routine turbine operation will be approximately 30 μg/m^3.

[d] See Table 5.1B-10, Appendix 5.1B, for calculation of 98th percentile value.

Other corrections to the AFC are provided below in Tables 5.1-12R, 5.1-21R, 5.1-27R, and 5.1B-4R.

TABLE 5.1-12R
Cooling Tower Specifications

Parameter	Value
Water Flow Rate, 10E6 lb/hr	92.46
Water Flow Rate, gal/min	185,000
Drift Rate, %	0.0005
Exhaust Flow Rate, ft^3/min (per cell, 12 cells)	1,513,000

TABLE 5.1-21R
Summary of Project Impacts

Pollutant	Averaging Time	Modeled Concentration (μg/m³)		
		Normal Operation	Startup	Inversion Breakup Fumigation
NO_2	1-hour Annual	170.1 2.3	 Note a	6.6 Note c
SO_2	1-hour 3-hour 24-hour Annual	12.9 7.1 3.6 0.2	Note b Note b Note a Note a	2.5 2.1 0.9 Note c
CO	1-hour 8-hour	45.0 23.6	2,175 337	6.0 3.8
PM_{10} (including cooling tower)[d]	24-hour Annual	7.7 2,4	Note a Note a	1.1 Note c
$PM_{2.5}$ (including cooling tower)[d]	24-hour Annual	6.7 1.9	Note a Note a	1.1 Note c

[a]Not applicable, because startup emissions are included in the 8-hour and longer-term (“Normal Operation”) modeling.

[b]Not applicable, because emissions are not elevated above normal levels during startup.

[c]Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.

[d]Cooling tower not included in fumigation modeling.

TABLE 5.1-27R
Comparison of Maximum Modeled Impacts and PSD Significance Thresholds

Pollutant	Averaging Time	Maximum Modeled Impacts (μg/m³)	Significance Threshold (μg/m³)	Significant?
NO_2	Annual	2.3	1	yes
SO_2	3-Hour 24-Hour Annual	7.1 3.9 0.2	25 5 1	no no no
CO	1-Hour 8-Hour	1,019 221	2,000 500	no no
PM_{10}	24-Hour Annual	7.7 2.4	5 1	yes yes
$PM_{2.5}$	24-Hour Annual	6.7 1.9	N/A[b] N/A	no no

[a] NO_2 impact shown occurs only during the startup of two turbines simultaneously. Under typical operating conditions, 1-hour average NO_2 concentration will be 2.3 μg/m³.

[b] PSD significant impact level for $PM_{2.5}$ has not been finalized by EPA.

TABLE 5.1B-4R
Emission Rates and Stack Parameters for Refined Modeling

	Stack Diam, m	Stack Height m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s			
						NOx	SO2	CO	PM_{10}
Averaging Period: One hour									
Gas Turbine 1	5.639	45.720	345.372	~~483.598~~ 533.927	21.381	2.3589	0.8995	2.1543	n/a
Gas Turbine 2	5.639	45.720	345.372	~~483.598~~ 533.927	21.381	2.3589	0.8995	2.1543	n/a
Auxiliary Boiler	0.762	9.144	463.706	5.693	12.484	0.0505	0.0065	0.1708	n/a
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	0.3633	3.704E-04	0.0267	n/a
Emergency Engine	0.203	12.192	791.483	3.958	122.057	2.0083	1.966E-03	0.0792	n/a
Cooling Tower (per cell)	~~3.292~~ 11.351	13.515	~~303.706~~ 293.706	~~59.505~~ 714.056	~~6.992~~ 7.056	n/a	n/a	n/a	n/a
Averaging Period: Three hours									
Gas Turbine 1	5.639	45.720	345.372	~~483.598~~ 533.927	21.381	n/a	0.8995	n/a	n/a
Gas Turbine 2	5.639	45.720	345.372	~~483.598~~ 533.927	21.381	n/a	0.8995	n/a	n/a
Auxiliary Boiler	0.762	9.144	463.706	5.693	12.484	n/a	0.0065	n/a	n/a
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	n/a	1.235E-04	n/a	n/a
Emergency Engine	0.203	12.192	791.483	3.958	122.057	n/a	6.553E-04	n/a	n/a
Cooling Tower (per cell)	~~3.292~~ 11.351	13.515	~~303.706~~ 293.706	~~59.505~~ 714.056	~~6.992~~ 7.056	n/a	n/a	n/a	n/a
Averaging Period: Eight hours									
Gas Turbine 1	5.639	45.720	345.372	~~483.598~~ 533.927	~~19.365~~ 21.381	n/a	n/a	2.1543	n/a
Gas Turbine 2	5.639	45.720	345.372	~~483.598~~ 533.927	~~19.365~~ 21.381	n/a	n/a	2.1543	n/a
Auxiliary Boiler	5.639	9.144	463.706	5.693	0.228	n/a	n/a	0.1708	n/a
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	n/a	n/a	3.333E-03	n/a
Emergency Engine	0.203	12.192	791.483	3.958	122.057	n/a	n/a	9.896E-03	n/a

TABLE 5.1B-4R
Emission Rates and Stack Parameters for Refined Modeling

	Stack Diam, m	Stack Height m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s			
						NOx	SO2	CO	PM_{10}
Cooling Tower (per cell)	~~3.292~~ 11.351	13.515	~~303.706~~ 293.706	~~59.505~~ 714.056	~~6.992~~ 7.056	n/a	n/a	n/a	n/a
Averaging Period: 24-hour ~~NOx and~~ SOx									
Gas Turbine 1	5.639	45.720	345.372	~~483.598~~ 533.927	21.381	n/a	0.8995	n/a	n/a
Gas Turbine 2	5.639	45.720	345.372	~~483.598~~ 533.927	21.381	n/a	0.8995	n/a	n/a
Auxiliary Boiler	5.639	9.144	463.706	5.693	0.228	n/a	0.0027	n/a	n/a
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	n/a	1.544E-05	n/a	n/a
Emergency Engine	0.203	12.192	791.483	3.958	122.057	n/a	8.192E-05	n/a	n/a
Cooling Tower (per cell)	~~3.292~~ 11.351	13.515	~~303.706~~ 293.706	~~59.505~~ 714.056	~~6.992~~ 7.056	n/a	n/a	n/a	n/a
Averaging Period: 24-hour PM10									
Gas Turbine 1	5.639	45.720	363.706	317.432	12.711	n/a	n/a	n/a	0.9450
Gas Turbine 2	5.639	45.720	363.706	317.432	12.711	n/a	n/a	n/a	0.9450
Auxiliary Boiler	5.639	9.144	463.706	5.693	0.228	n/a	n/a	n/a	0.0146
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	n/a	n/a	n/a	4.167E-04
Emergency Engine	0.203	12.192	791.483	3.958	122.057	n/a	n/a	n/a	3.993E-04
Cooling Tower (per cell)	11.351	13.515	293.706	714.056	7.056	n/a	n/a	n/a	1.922E-02
Averaging Period: Annual NOx and SOx									
Gas Turbine 1	5.639	45.720	345.372	~~483.598~~ 533.927	~~19.365~~ 21.381	2.2504	0.2042	n/a	n/a
Gas Turbine 2	5.639	45.720	345.372	~~483.598~~ 533.927	~~19.365~~ 21.381	2.2504	0.2042	n/a	n/a
Auxiliary Boiler	5.639	9.144	463.706	5.693	0.228	0.0222	0.0007	n/a	n/a
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	0.0021	0.0000	n/a	n/a
Emergency Engine	0.203	12.192	791.483	3.958	122.057	0.0115	0.0000	n/a	n/a

TABLE 5.1B-4R
Emission Rates and Stack Parameters for Refined Modeling

	Stack Diam, m	Stack Height m	Temp, deg K	Exhaust Flow, m3/s	Exhaust Velocity, m/s	Emission Rates, g/s			
						NOx	SO2	CO	PM_{10}
Cooling Tower (per cell)	~~3.292~~ 11.351	13.515	~~303.706~~ 293.706	~~59.505~~ 714.056	~~6.992~~ 7.056	n/a	n/a	n/a	n/a
Averaging Period: Annual PM10									
Gas Turbine 1	5.639	45.720	363.706	300.228	12.022	n/a	n/a	n/a	1.0205
Gas Turbine 2	5.639	45.720	363.706	300.228	12.022	n/a	n/a	n/a	1.0205
Auxiliary Boiler	5.639	9.144	463.706	5.693	0.228	n/a	n/a	n/a	0.0154
Fire Pump Engine	0.127	12.192	683.150	0.821	64.825	n/a	n/a	n/a	5.470E-05
Emergency Engine	0.203	12.192	791.483	3.958	122.057	n/a	n/a	n/a	5.470E-05
Cooling Tower (per cell)	11.351	13.515	293.706	714.056	7.056	n/a	n/a	n/a	1.922E-02

ATTACHMENT WSQ4-1

Comparison of CEMS Data for Twelve California Power Plants

Table 1
Comparison of Key Plant Parameters

Site	Sutter	Delta	Metcalf	High Desert	Cosumnes	Elk Hills	Los Medanos	Magnolia	Moss Landing	Mountainview	Pastoria	Sunrise	CPV Vaca
CEC Case Number	97AFC-2	98-AFC-03	99-AFC-3	97-AFC-1	01-AFC-19	99-AFC-1	A98-AFC-2	01-AFC-6	99-AFC-4	00-AFC-2	99-AFC-7	98-AFC-4	
Owner	Calpine	Calpine	Calpine	Constellation	SMUD	Sempra	Calpine	SCPPA	LS Power	SoCal Edison	Calpine	Edison Mission	CPV
Turbine Model	501FD	501FD2	501FD2	501FD	7FA	7FA	7FA	7FA	7FA	7FA	7FA	7FA	7FA
Configuration	2x1	3x1	2x1	3x1x1	2x1	2x1	2x1	1x1	2x2x1	2x2x1	2x1 + 1x1	2x1	2x1
Air District	FRAQMD	BAAQMD	BAAQMD	MDAQMD	SMAQMD	SJVAPDC	BAAQMD	SCAQMD	MBUAPCD	SCAQMD	SJVAPCD	SJVAPCD	YSAQMD
NOx Limit (ppmc)	2.5 (1-hr avg)	2.5 (1-hr avg)	2.5 (1-hr avg)	2.5 (1-hr avg)	2 (1-hr avg)	2.5 (1-hr avg)	2.5 (1-hr avg)	2 (3-hr avg)	2.5 (1-hr avg)	2 (3-hr avg)	2.5 (1-hr avg)	2 (1-hr avg)	2 (1-hr avg)
NH3 Limit (ppmc)	10 (1-hr avg)	10 (3-hr avg)	5 (3-hr avg)	10 (3-hr avg)	10 (3-hr avg)	10 (3-hr avg)	10 (3-hr avg)	5 (1-hr avg)	5 (3-hr avg)	5 (1-hr avg)	10 (3-hr avg)	10 (3-hr avg)	5 (3-hr avg)
CO Limit (ppmc)	4 (3-hr avg)	10 (3-hr avg)	4 (3-hr avg)	4 (24-hr avg)	4 (3-hr avg)	4 (3-hr avg)	6 (3-hr avg)	2 (1-hr avg)	9 (3-hr avg)	6 (1-hr avg)	6 (3-hr avg)	4 (3-hr avg)	3 (3-hr avg)
NOx Excursion Language	none	none	none	none	10 hrs/yr, up to 30 ppm	none	2.5 ppm over 3 hours during transient condtions	none	10 hrs/yr, up to 30 ppm	15 hrs/yr, up to 25 ppm	none	none	10 hrs/yr, up to 30 ppm (proposed)
					AQ-26		AQ-22		AQ-18				

Note: Data based on permit application information and current permits. Some project elements may have changed prior to construction.

Air Districts:

BAAQMD	Bay Area Air Quality Management District
FRAQMD	Feather River Air Quality Management District
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MDAQMD	Mojave Desert Air Quality Management District
SCAQMD	South Coast Air Quality Management District
SJVAPCD	San Joaquin Valley APCD
SMAQMD	Sacramento Metropolitan Air Quality Management District

Table 2
Summary of NOx Exceedances from Applicable Permit Limits
(Exceedance Hours / Operating Hours Above Minimum Load)

		2001		2002		2003		2004		2005		2006		2007	
Site	**NOx Limit**	**Exceed**	**Operating**	**Exceed**	**Operating**	**Exceed**	**Operating**	**Exceed**	**Operating**	**Exceed**	**Operating**	**Exceed**	**Operating**	**Exceed**	**Operating**
501FD Units															
Sutter U1	2.5	0	3110	3	5753	7	6868	1	7270	3	4364	2	4286	0	5340
Sutter U2	2.5	2	3217	2	5784	5	6744	7	7065	4	3528	3	3560	5	4745
Delta U1	2.5	-	-	9	3975	1	4968	0	7325	0	6888	1	6858	0	6927
Delta U2	2.5	-	-	5	3687	0	3343	1	7241	0	6763	0	4792	0	6321
Delta U3	2.5	-	-	6	3798	0	3187	1	6650	0	6584	0	5712	0	5586
Metcalf U1	2.5	-	-	-	-	-	-	-	-	12	4133	4	4727	1	6008
Metcalf U2	2.5	-	-	-	-	-	-	-	-	23	4131	1	4383	2	5389
High Desert U1	2.5	-	-	-	-	50	2432	32	3517	29	4076	49	4400	12	5189
High Desert U2	2.5	-	-	-	-	37	2399	54	3824	17	4145	22	4483	350	5167
High Desert U3	2.5	-	-	-	-	20	2369	52	3772	56	4264	151	4287	20	5135
7FA Units															
Cosumnes U2	2.0	-	-	-	-	-	-	-	-	-	-	0	4571	0	7785
Cosumnes U3	2.0	-	-	-	-	-	-	-	-	-	-	2	5026	2	7636
Elk Hills U1	2.5	-	-	-	-	7	4071	1	7880	0	7259	0	6925	0	6846
Elk Hills U2	2.5	-	-	-	-	3	4092	5	7867	1	7241	0	6953	2	7010
Los Medanos U1	2.5	3	1628	0	2113	-	-	0	3867	9	6452	2	4216	-	-
Los Medanos U2	2.5	1	1471	2	2190	-	-	3	3791	13	7813	5	7211	-	-
Magnolia	2.0	-	-	-	-	-	-	-	-	0	726	1	2790	3	3588
Moss Landing U1	2.5	-	-	59	1094	2	4727	6	3986	0	4017	0	5170	4	6610
Moss Landing U2	2.5	-	-	30	1002	0	5054	4	4680	7	3642	2	4992	1	6587
Moss Landing U3	2.5	-	-	2	720	1	4544	7	5272	3	4436	3	5215	2	5586
Moss Landing U4	2.5	-	-	6	754	5	4611	4	4050	3	4456	0	5130	0	6990
Mountainview U3a	2.0	-	-	-	-	-	-	-	-	14	475	12	5768	4	7261
Mountainview U3b	2.0	-	-	-	-	-	-	-	-	9	420	5	4781	1	6272
Mountainview U4a	2.0	-	-	-	-	-	-	-	-	-	-	8	5158	2	6876
Mountainview U4b	2.0	-	-	-	-	-	-	-	-	-	-	13	4156	3	6746
Pastoria U1	2.5	-	-	-	-	-	-	-	-	0	2195	1	6531	1	6889
Pastoria U2	2.5	-	-	-	-	-	-	-	-	0	2321	0	6650	0	6692
Sunrise U1	2.0	-	-	-	-	4	2539	2	5032	0	5109	0	5596	0	5748
Sunrise U2	2.0	-	-	-	-	26	2205	0	4253	0	4938	0	5663	0	6006

Table 3
Exceedances Above Permit Limit

Site	NOx Limit	2004		2005		2006		2007	
		Exceed	Operating	Exceed	Operating	Exceed	Operating	Exceed	Operating
501FD Units									
Sutter U1	2.5	1	7270	3	4364	2	4286	0	5340
Sutter U2	2.5	7	7065	4	3528	3	3560	5	4745
Delta U1	2.5	0	7325	0	6888	1	6858	0	6927
Delta U2	2.5	1	7241	0	6763	0	4792	0	6321
Delta U3	2.5	1	6650	0	6584	0	5712	0	5586
Metcalf U1	2.5	-	-	12	4133	4	4727	1	6008
Metcalf U2	2.5	-	-	23	4131	1	4383	2	5389
High Desert U1	2.5	32	3517	29	4076	49	4400	12	5189
High Desert U2	2.5	54	3824	17	4145	22	4483	350	5167
High Desert U3	2.5	52	3772	56	4264	151	4287	20	5135
7FA Units									
Cosumnes U2	2.0	-	-	-	-	0	4571	0	7785
Cosumnes U3	2.0	-	-	-	-	2	5026	2	7636
Magnolia	2.0	-	-	0	726	1	2790	3	3588
Mountainview U3A	2.0	-	-	14	475	12	5768	4	7261
Mountainview U3B	2.0	-	-	9	420	5	4781	1	6272
Mountainview U4A	2.0	-	-	-	-	8	5158	2	6876
Mountainview U4B	2.0	-	-	-	-	13	4156	3	6746
Sunrise U1	2.0	2	5032	0	5109	0	5596	0	5748
Sunrise U2	2.0	0	4253	0	4938	0	5663	0	6006

Table 4
Exceedances Above 5 ppmc

Site	NOx Limit	2004		2005		2006		2007	
		Exceed	Operating	Exceed	Operating	Exceed	Operating	Exceed	Operating
501FD Units									
Sutter U1	2.5	1	7270	0	4364	0	4286	0	5340
Sutter U2	2.5	1	7065	0	3528	0	3560	0	4745
Delta U1	2.5	0	7325	0	6888	0	6858	0	6927
Delta U2	2.5	1	7241	0	6763	0	4792	0	6321
Delta U3	2.5	0	6650	0	6584	0	5712	0	5586
Metcalf U1	2.5	-	-	11	4133	0	4727	0	6008
Metcalf U2	2.5	-	-	18	4131	0	4383	1	5389
High Desert U1	2.5	2	3517	2	4076	4	4400	0	5189
High Desert U2	2.5	7	3824	0	4145	0	4483	1	5167
High Desert U3	2.5	6	3772	1	4264	1	4287	2	5135
7FA Units									
Cosumnes U2	2.0	-	-	-	-	0	4571	0	7785
Cosumnes U3	2.0	-	-	-	-	2	5026	0	7636
Magnolia	2.0	-	-	0	726	1	2790	0	3588
Mountainview U3A	2.0	-	-	6	475	7	5768	4	7261
Mountainview U3B	2.0	-	-	5	420	4	4781	1	6272
Mountainview U4A	2.0	-	-	-	-	6	5158	2	6876
Mountainview U4B	2.0	-	-	-	-	7	4156	3	6746
Sunrise U1	2.0	0	5032	0	5109	0	5596	0	5748
Sunrise U2	2.0	0	4253	0	4938	0	5663	0	6006

Table 5
Exceedances Above 10 ppmc

Site	NOx Limit	2004 Exceed	2004 Operating	2005 Exceed	2005 Operating	2006 Exceed	2006 Operating	2007 Exceed	2007 Operating
501FD Units									
Sutter U1	2.5	1	7270	0	4364	0	4286	0	5340
Sutter U2	2.5	0	7065	0	3528	0	3560	0	4745
Delta U1	2.5	0	7325	0	6888	0	6858	0	6927
Delta U2	2.5	1	7241	0	6763	0	4792	0	6321
Delta U3	2.5	0	6650	0	6584	0	5712	0	5586
Metcalf U1	2.5	-	-	10	4133	0	4727	0	6008
Metcalf U2	2.5	-	-	2	4131	0	4383	1	5389
High Desert U1	2.5	2	3517	0	4076	0	4400	0	5189
High Desert U2	2.5	3	3824	0	4145	0	4483	1	5167
High Desert U3	2.5	1	3772	0	4264	0	4287	0	5135
7FA Units									
Cosumnes U2	2.0	-	-	-	-	0	4571	0	7785
Cosumnes U3	2.0	-	-	-	-	2	5026	0	7636
Magnolia	2.0	-	-	0	726	0	2790	0	3588
Mountainview U3A	2.0	-	-	3	475	5	5768	4	7261
Mountainview U3B	2.0	-	-	2	420	1	4781	0	6272
Mountainview U4A	2.0	-	-	-	-	2	5158	1	6876
Mountainview U4B	2.0	-	-	-	-	2	4156	2	6746
Sunrise U1	2.0	0	5032	0	5109	0	5596	0	5748
Sunrise U2	2.0	0	4253	0	4938	0	5663	0	6006

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *CPV VACA STATION* BY THE *CPV VACAVILLE, L.L.C.*

Docket No. 08-AFC-11

PROOF OF SERVICE
(Established 2/18/2009)

APPLICANT

Andrew Welch - Vice President
Competitive Power Ventures, Inc.
8403 Colesville Road, Suite 915
Silver Spring, MD 20910
awelch@cpv.com

APPLICANT CONSULTANT

Douglas M. Davy - Program Manager
CH2MHill
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833
ddavy@ch2m.com

COUNSEL FOR APPLICANT

Michael J. Carroll
LATHAM & WATKINS LLP
650 Town Center Drive, 20th Floor
Costa Mesa, CA 92626-1925
michael.carroll@lw.com

INTERESTED AGENCIES

California ISO
e-recipient@caiso.com

INTERVENORS

ENERGY COMMISSION

JEFFREY D. BYRON
Commissioner and Presiding Member
jbyron@energy.state.ca.us

ARTHUR H. ROSENFELD
Commissioner and Associate Member
arosenfe@energy.state.ca.us

Raoul Renaud
Hearing Officer
rrenaud@energy.state.ca.us

Rod Jones
Project Manager
rjones@energy.state.ca.us

Deborah Dyer
Staff Counsel
ddyer@energy.state.ca.us

Melanie Moultry
Staff Counsel
mmoultry@energy.state.ca.us

Loreen McMahon
Public Adviser
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, Mary Finn, declare that on May 22, 2009, I served and filed copies of the attached CPV Vaca Station (08-AFC-11) Response to CEC Staff Workshop Queries 1 through 8. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/vacastation/index.html]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

For service to all other parties:

____ sent electronically to all email addresses on the Proof of Service list;

_x_ by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

____ **sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);**

OR

x___ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-11
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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

Mary Finn