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December 5, 2011

VIA EMAIL

Mr. Eric Solorio, Siting Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Pio Pico Energy Center Project (11-AFC-01)
Responses to USEPA Inquiries Related to Air Quality Modeling

Dear Mr. Solorio:

On behalf of Applicant Pio Pico Energy Center, LLC, enclosed please find additional information submitted to the United States Environmental Protection Agency, Region 9, on December 1, 2011. Due to the voluminous nature of the documents, a paper copy of only the correspondence will be submitted to the Docket Unit. Files containing cumulative modeling data will be provided electronically via email. If you have any questions regarding this submittal, please do not hesitate to contact this office.

Respectfully submitted,

Melissa A. Foster

MAF:jmw
Enclosures
cc: Proof of Service List

From: Steve Hill [SHill@sierraresearch.com]
Sent: Thursday, December 01, 2011 10:33 AM
To: Foster, Melissa A.
Cc:

Subject:
Attachments:

From: Steve Hill
Sent: Thursday, December 01, 2011 10:29 AM
To: Gerardo Rios (rios.gerardo@epa.gov)
Cc: Kohn.Roger@epamail.epa.gov; Holladay.Cleveland@epamail.epa.gov; David Jenkins (djenkins@apexpowergroup.com); Fitzgerald, Maggie (maggie.fitzgerald@urs.com); McKinsey, John A.; Gary Rubenstein
Subject: Response to PSD Modeling Questions for Pio Pico Energy Center PSD Permit

Attached is a letter providing answers to EPA's questions about modeling for the PPEC permit application.

Also attached are the spreadsheets requested by EPA.

Hard copies are being sent by US mail.

Please let me know if you have any questions.

--Steve Hill

December 1, 2011

sierra research

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Mr. Gerardo Rios
Chief, Permits Office
USEPA Region IX
75 Hawthorne Street
San Francisco, CA 94105

Subject: Pio Pico Energy Center PSD Permit Application
Modeling Questions

Dear Mr. Rios:

As requested by EPA in a telephone conversation between Cleveland Holladay (EPA), Roger Kohn (EPA), Steve Hill (Sierra), Eric Walther (Sierra), and David Jenkins (Pio Pico Energy Center) on November 2, 2011, we are submitting clarifying information on behalf of Pio Pico Energy Center, LLC (Applicant). EPA requested additional justification for the selection of the air quality and meteorological data sets used in the compliance modeling demonstrations, as well as clarification of procedures used to fill data gaps.

It should be noted that the proposed modeling protocol for this project was submitted to EPA on December 1, 2010, with a request for review and comment, consistent with EPA's policy encouraging early consultation on modeling issues.[1] EPA did not respond to that request. In the absence of any questions or concern expressed by EPA on the protocol, the Applicant proceeded with modeling and analysis consistent with the protocol, and has expended considerable time and effort in reliance on EPA's tacit approval.

The PSD permit application was submitted on April 1, 2011. Subsequent to that submittal, Sierra discussed the modeling with the EPA modeler previously assigned to this project, Carol Bohnenkamp, on several occasions in June 2011. In response to comments provided at that time, additional information was submitted on July 6, 2011.

This new request for additional information therefore comes four months after the Applicant responded to EPA's initial review of the modeling, seven months after submittal of the original permit application, and almost a year after EPA received, and did not comment on, the modeling protocol.

[1] Appendix W, Section 10.2.1: "[e]very effort should be made by the Regional Office to meet with all parties involved in a SIP revision or a PSD permit application prior to the start of any work on such a project. During this meeting, a protocol should be established between the preparing and reviewing parties to define the procedures to be followed, the data to be collected, the model to be used, and the analysis of the source and concentration data."

Background Concentrations

$PM_{2.5}$

Comment: *Provide justification for use of Chula Vista monitoring data to characterize regional ambient background concentrations. Specifically, explain why onsite monitoring data is not necessary, and why Chula Vista (located 10 miles to the west of the project site, and 1.4 miles from the San Diego Bay) is more representative than El Cajon (located 16 miles north of the project site, and at a similar distance from the ocean).*

Response: The justification for use of background air quality data from the Chula Vista monitoring station was presented in the November 2010 modeling protocol at pp. 6-7. As discussed in the monitoring protocol, the Chula Vista monitoring station was selected by the San Diego APCD as the monitoring location most representative of the project site. The request for this additional justification was not included in EPA's request for additional modeling information in June, 2011, nor was it included in EPA's August 2011 letter requesting additional information regarding PPEC. Finally, as shown in the resubmitted PSD permit application (Sept. 2011, Table 4-25, p. PSD-4.45), the maximum 24-hour average $PM_{2.5}$ concentration associated with the proposed project is 2.5 $\mu g/m^3$, well below the Significant Monitoring Concentration of 4 $\mu g/m^3$. Consequently, we do not believe that on-site monitoring is required for $PM_{2.5}$.

As described in the Appendix W Modeling Guidelines, the procedure for demonstrating compliance with the NAAQS requires the Applicant to model project impacts and to assess the combined impact of the project with existing sources of air pollution. This is done by adding project impacts to background concentrations. Background concentrations are determined by adding the impacts of significant nearby sources to the regional ambient background concentrations.

The purpose of the ambient background data is to characterize the background concentration for the region. The ideal location for collecting such data is a site that experiences similar air quality to the region as a whole, but is not impacted by nearby sources. The Chula Vista $PM_{2.5}$ station is the closest source of existing $PM_{2.5}$ data that is not heavily impacted by a known nearby source. The project site itself is already impacted by the adjacent Otay Mesa Generating Project (as demonstrated by the modeling already submitted), and is therefore clearly not a superior location for collecting background data.

The El Cajon site is separated from the project site by substantial elevated terrain surrounding San Miguel Mountain, and is almost due north of the project site. The project site is located east of Chula Vista, not El Cajon, and the prevailing wind flow is to the southeast from Chula Vista as shown in the attached Chula Vista wind rose (see attached Figure 1). The prevailing wind flow from El Cajon is to the northeast as shown in the attached El Cajon wind rose (Figure 2, attached). Therefore, $PM_{2.5}$ concentrations measured at Chula Vista are more likely than those measured at El Cajon to characterize the regional background $PM_{2.5}$ concentrations in the project area.

NO_2

Comment: *Provide justification for use of Chula Vista monitoring data to characterize regional ambient background concentrations. Specifically, explain why onsite monitoring data is not necessary, and why Chula Vista (located 10 miles to the west of the project site, and 1.4 miles from the San Diego Bay) is more representative than El Cajon (located 16 miles north of the project site, and at a similar distance from the ocean).*

Response: The justification for selecting Chula Vista over El Cajon, and over onsite data, is the same for NO_2 as for $PM_{2.5}$. As shown in the resubmitted PSD permit application (Sept. 2011, Table 4-25, p. PSD-4.45), the maximum annual average NO_2 concentration associated with the proposed project is 0.3 $\mu g/m^3$, well below the Significant Monitoring Concentration of 14 $\mu g/m^3$. Consequently, we do not believe that on-site monitoring is required for NO_2.

Comment: *Consider using El Cajon to represent background concentrations at receptors that are closer to it than to Chula Vista.*

Response: As discussed previously, the ambient background measurements are used in this analysis to characterize regional background concentrations; the impact of significant stationary sources is explicitly modeled, and combined with the regional background concentration to determine background concentrations. We believe that the approach set forth in the November 2010 modeling protocol is consistent with EPA guidelines.

However, to address EPA's concerns expressed in our November 2011 telephone call, we propose to divide the receptor grid into two parts split by a line orthogonal to, and at the half way point along, a line connecting the two monitoring stations. In each portion of the receptor grid the respective background NO_2 concentration from the nearest monitoring station will be added hour-by-hour to the modeled 1-hour NO_2 concentration.

Comment: *Consider using the Otay Mesa border station site to represent background concentrations at receptors that are immediately surrounding the station. EPA did not require explicit modeling of non-US sources, and the Otay Mesa data should include impacts of such sources on ambient concentrations.*

Response: The suggested rationale for using Otay Mesa data to characterize background concentrations is not technically valid. As discussed in the November 2010 modeling protocol at pp. 6-7, the Otay Mesa site is heavily impacted by hundreds of foreign vehicles that pass through, and idle near, the border crossing per day. As a result, the Otay Mesa data reflect the combined impacts of the regional background, significant nearby Mexican stationary sources, the industrial area that has developed on the U.S. side, *and the heavy vehicle traffic at the border crossing.* Measurements taken at the Otay Mesa station cannot be considered representative of any other location.

Nonetheless, to address EPA's concerns expressed in the Nov. 2, 2011 telephone call, we propose to use the Otay Mesa ambient data to characterize the background concentration at the receptor closest to the Otay Mesa station. Because the Otay Mesa ambient monitoring data already reflect the impacts from nearby sources (including the vehicles at

the border), only project emissions will be modeled for cumulative impacts at that receptor.

Meteorological Data

Data Substitution

Comment: *Describe how missing data were filled in by the District.*

Response: Using the EPA-approved meteorological preprocessor AERMET, the District used National Weather Service surface meteorological data obtained from Brown Airfield (located 3.5 miles directly west [upwind] of the site) to replace the few data missing from the District's surface data set obtained at the Otay Mesa meteorological monitoring station, located at the International Border Crossing.

Source of Meteorological Data

Comment: *EPA is considering requiring use of 1 minute ASOS data and AERMINUTE for meteorological data when such information is available.*

Response: The current analysis is based on EPA guidance in existence at the time that the application was submitted, and which has not yet been revised by EPA. We understand that EPA is evaluating a revised approach to meteorological data requirements, as summarized in the comment above. Once EPA has completed its assessment of the new procedure, and has completed the public review process necessary to ensure that such a substantive change in the methodology for demonstrating compliance is valid, it will be appropriate to require its use. Imposing this requirement on PPEC, however, not only would be premature because review of the methodology is not yet complete, but also would be a substantial hardship due to its introduction at this late date, more than one year after the modeling protocol for the project was submitted, and more than eight months after the permit application was submitted.

Surface Roughness

Comment: *Justify the values used for albedo, Bowen ratio, and surface roughness.*

Response: The values used in the PPEC PSD permit application were developed by the San Diego APCD. The District followed EPA's "AERMOD Implementation Guide" (2008 version) in using EPA's AERSURFACE processor with the National Land Cover Data 1992 archive to determine surface characteristics for AERMET (Class II Modeling Protocol p.2-9 to 2-14 pdf.14 to 19). The surface parameters used in the AERMOD dispersion modeling were developed by a sector analysis surrounding the Otay Mesa and Brown Airfield meteorological stations and are shown in Tables 1 and 2, respectively.

Table 1: Otay Mesa Meteorological Station Surface Characteristics[a]

Month	Sector	Alb	Bo	Zo[b]
1	1	0.18	1.09	0.7
2	1	0.18	1.09	0.7
3	1	0.16	0.65	0.7
4	1	0.16	0.65	0.7
5	1	0.18	0.7	0.7
6	1	0.18	0.7	0.7
7	1	0.18	0.7	0.7
8	1	0.18	0.7	0.7
9	1	0.18	0.7	0.7
10	1	0.18	1.09	0.7
11	1	0.18	1.09	0.7
12	1	0.18	1.09	0.7

Sector = 360 degrees, Alb = Albedo, Bo = Bowen Ratio, and Zo = surface roughness.
[a] Used in AERMET for AERMOD Air Dispersion Modeling.
[b] Values adjusted by SDAPCD from the AERSURFACE values of 0.2.

Table 2: Brown Airfield Meteorological Station Surface Characteristics[a]

Month	Sector	Alb	Bo	Zo
1	1	0.18	1.12	0.221
2	1	0.18	1.12	0.221
3	1	0.17	0.65	0.179
4	1	0.17	0.65	0.179
5	1	0.18	0.78	0.221
6	1	0.18	0.78	0.221
7	1	0.18	0.78	0.221
8	1	0.18	0.78	0.221
9	1	0.18	0.78	0.221
10	1	0.18	1.12	0.221
11	1	0.18	1.12	0.221
12	1	0.18	1.12	0.221

Sector = 360 degrees, Alb = Albedo, Bo = Bowen Ratio, and Zo = surface roughness.
[a] Used in AERMET for AERMOD Air Dispersion Modeling

The surface parameters in Tables 1 and 2 were developed according to the following EPA guidance[2] as implemented in the software AERSURFACE: "The recommended approach for processing digitized land cover data to determine the effective Bowen ratio and Albedo for input to AERMET is to average the surface characteristics across a representative domain without any direction or distance dependency. The recommended default domain is a 10 km by 10 km region centered on the measurement site. A domain representative of the application site may be more appropriate for some applications, particularly if the majority of sources are elevated releases."

[2] USEPA. *AERMOD Implementation Guide*, March 19, 2009.

AERSURFACE uses a Land Use data base from 1992, and does not take buildings into account. The District reviewed aerial photos for the area, which show that the vicinity of the Otay Mesa meteorological tower is surrounded by a light industrial and residential area that includes northern Mexico and the U.S border area. Using this information, the District adjusted the surface roughness factor from 0.2 to 0.7 to represent the current terrain and structures surrounding the Otay Mesa meteorological monitoring station location. This adjustment would tend to increase modeled impacts close to the project, where impacts are greatest, and is therefore a conservative assumption.

SDAPCD performed a qualitative review of the values in Table 1 and Table 2 to ensure that they were reasonably representative of the project site. It did this by examining the 10 km by 10 km domain centered on the project site, and determined that the data in the two tables are reasonably representative of the domain as a whole. This conclusion is not surprising, because both meteorological stations are located within that 10 km by 10 km domain.

The Applicant used the values provided by the District.

NO_2 Analysis

Ambient Data

Comment: *Justify the ozone and background NO_2 data used for the PVMRM analysis.*

Response: The justification for selecting Chula Vista over El Cajon, and over onsite data, is the same for ozone as for $PM_{2.5}$. Justification for the use of Chula Vista data for NO_2 was provided above.

Comment: *Describe the procedure for data substitution for ozone.*

Response: The methodology used by the District is described below.[3]

Screening Procedure for Filling Hours with Missing Ozone Background Concentrations

Below is the filling procedure for missing monitored background ozone for purposes of AQIA modeling to determine compliance with the federal 1-hour NO_2 standard. The data are recorded by the District monitoring (ppm) and then converted to units of $\mu g/m^3$ for use in AERMOD based on the ambient temperature reported by the monitor.

For missing ozone concentration data:

1) Fill any single missing hour with the maximum of the:
   a. Preceding hour
   b. Succeeding hour

[3] Email, Steve Moore (SDAPCD) to Eric Walther (Sierra Research), 12/1/2010.

c. Same hour of day on previous day
d. Same hour of day on succeeding day

If there are missing data for either c and/or d, use only the maximum of the available data to fill the missing hour (both a and b are guaranteed to be present since only single missing hours are filled in this step). Note that the most likely scenario for both c and d to be missing is for years when the monitor is calibrated at the same hour each day. In this case, the 30-day rolling average (see step 2) for that hour will also not be available.

2) For hours that are not filled by step 1 (all periods with more than one hour missing), fill the missing hour with the maximum for that hour of day for a 30-day rolling period centered on the hour (i.e., for the 15 preceding days and the 15 succeeding days). Note that 30-day rolling period will extend into the preceding and succeeding year at the start or end, respectively, of the modeling period.
3) For hours not filled by step 2, fill the missing data with the maximum of the 30-day rolling period for the preceding or succeeding hour.
4) Any hours not filled by steps 1–3, are likely periods with more than a month of missing data for all hours. These will be filled on a case-by-case basis.

Comment: *Describe the procedure for data substitution for NO_2.*

Response: The methodology used by the District is described below.[4]

1) Fill any single missing hour with the maximum of the:

   a. Preceding hour
   b. Succeeding hour
   c. Same hour of day on previous day
   d. Same hour of day on succeeding day

   If there is missing data for either c and/or d, use only the maximum of the available data to fill the missing hour (both a and b are guaranteed to be present since only single missing hours are filled in this step). Note that the most likely scenario for both c and d to be missing is for years when the monitor is calibrated at the same hour each day. In this case, the 30-day rolling average (see step 2) for that hour will also not be available.

2) For hours that are not filled by step 1(all periods with more than one hour missing), fill the missing hour with the maximum for that hour of day for a 30-day rolling period centered on the hour (i.e., for the 15 preceding days and the 15 succeeding days). Note that 30-day rolling period will extend into the preceding and succeeding year at the start or end, respectively, of the modeling period.
3) For hours not filled by step 2, fill the missing data with the maximum of the 30-day rolling period for the preceding or succeeding hour.

[4] Email, Steve Moore (SDAPCD) to Steve Hill (Sierra Research), 6/7/2011.

4) Any hours not filled by steps 1–3, are likely periods with more than a month of missing data for all hours. These will be filled on a case-by-case basis.

5) Check all filled hours for which the filled concentration is higher than the maximum monitored concentration recorded for that day (for a complete day of missing data, the maximum monitored concentration is considered zero for purposes of this comparison). If the filled concentration is higher than the appropriate nth highest daily maximum monitored concentration for the calendar year for determining compliance with federal 1-hour standard (e.g., for 351 or more days of valid data, the 8th highest daily maximum is the appropriate value), then replace filled concentration with the appropriate nth highest daily maximum to fill that hour. Note: This prevents the filling procedure from changing the nth highest daily maximum for the year.

Comment: *Justify use of PVMRM Tier 3 non-regulatory default option. Specifically, please provide more information on prongs 1 and 4 of the 5-prong demonstration under Appendix W Section 3.2.2.*

Response: Prongs 1 and 4 of the 5-prong demonstration are contained in Appendix W, Section 3.2.2(e)(i) and (iv) as follows:

(i) "The model has received a scientific peer review" and

(iv) "Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates."

EPA's June 29, 2010 guidance memorandum[5] addresses these two factors as follows:

> "... items i and iv of the alternative model demonstration for these options can be fulfilled in part based on existing documentation (Cole and Summerhays, 1979; Hanrahan, 1999a; Hanrahan, 1999b; MACTEC, 2005)."

In the March 1, 2011 letter clarifying application of Appendix W to 1-hour NO_2 modeling, EPA indicated that two key model inputs were important to the application of PVMRM methods: in-stack ratios of NO_2/NOx, and background ozone concentrations. As discussed below, the in-stack NO_2/NOx ratios used in this analysis were provided by the District, and are based on extensive source testing. In the case of the nearby non-project sources, the ratios were developed from tests conducted on the sources themselves. In the case of the project stacks, ratios are based on tests of several similar units.

The ozone data used in this analysis were collected at the Chula Vista site. The justification for considering these data to be representative of the project site is provided above.

As described in the March 1 clarifying letter, PVMRM's algorithms could contribute to overestimating conversion to NO_2, which in turn constitutes a possible conservative bias to the results. The March 1 letter also indicates that PVMRM has limitations for area source applications; there are no area sources of NOx emissions included in this analysis.

[5] "Guidance Concerning the Implementation of the 1-hour N02 NAAQS for the Prevention of Significant Deterioration Program", Stephen D. Page, June 29, 2010.

Finally, EPA has added to the conservative nature of the compliance demonstration through its requirement to use synthetic daily NOx concentrations rather than actual hourly measurements. The synthetic daily profile is comprised of the highest measured value for each clock hour, determined on a monthly basis. This is a strongly conservative assumption as applied to the use of the PVMRM and OLM methods.

Comment: *Justify the in-stack NO_2/NOx ratios used for the combustion sources.*

Response: The District specified the NO_2/NOx ratios used in the analysis as follows.[6]

> *For purposes of the AQIA in a submittal of a new or revised application for the Pio Pico Energy Center, the District tentatively recommends the following in-stack NO_2/NOx ratios for the LMS100 turbine proposed for the project:*
>
> *"Normal Operations: 0.13*
>
> *"Commissioning, Startup, or any other situation when the SCR is not fully operational: 0.24*

The District provided the following justification for these values:[7]

> *The tentative recommendation for normal operations is based on source tests of four natural-gas-fired LM6000PC SPRINT turbines equipped with water injection, SCR, and oxidation catalysts. Preliminarily, these appear to be the closest analogue to the LMS100 as proposed for Pio Pico (i.e., aeroderivative, simple cycle, diffusion flame combustors, same NO_X controls, oxidation catalysts, and interstage cooling—albeit with water injection for the SPRINT). The value is an average over the four turbines (rounded up) of the average NO_2/NOx ratio for each turbine. The average NO_2/NOx ratios for the four turbines were .0393 (2 tests), .0603 (2 tests), 0.185 (1 test), and 0.205 (1 test), respectively.*
>
> *For situations when the SCR is not operating, the tentative ratio is based on source tests of 11 natural-gas-fired GE Frame 5 turbines. These turbines all have water injection but no other NOx controls and no oxidation catalyst. The NO_2/NOx ratio for these turbines ranges from about 0.18 to 0.285 (averaged over 7–10 source tests of each turbine).*
>
> *The source tests were all at greater than 80% load.*

The NO_2/NOx ratios used for non-project sources were all specified by the District based on source test data for each of the facilities in question.

The Pacific Recovery NO_2/NOx ratio of 75% was taken from source test data for the facility. The data were provided by the District to be used for this analysis. Over

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[6] Email, Steve Moore (SDAPCD) to Steve Hill (Sierra Research), 12/23/2010 2:36 PM.
[7] Email, Steve Moore (SDAPCD) to Steve Hill (Sierra Research), 12/23/2010 2:36 PM.

four test runs, average NO_2/NOx ratios ranged from 55% to 75%, while maximum NO_2/NOx ranged from 68% to 78%. For the cumulative impact analysis, the Applicant selected the most conservative average value to characterize this source.

The Otay Mesa NO_2/NOx ratio of 5% was taken from source test data for the Otay Mesa facility. The data were provided by the District to be used for this analysis. The NO_2/NOx ratio ranged from 4% to 6% with the duct burners, and 4-7% without duct burners. For the cumulative impact analysis, the Applicant selected a round number within the range.

Comment: *Provide a complete trail of results for the post-processing spreadsheets used for the compliance calculations, including live spreadsheets, showing how the NO_2 values were calculated.*

Response: Outlined below are the steps in the NO_2 1- hour average modeling. The files mentioned below can also be found on the Modeling Disk.

1. SCREENING: AERMOD was used to model 1-hour NO_2 impacts using the normal operation and startup emission rates with a Cartesian grid (receptors within 10 km of the project) and a Polar grid (receptors between 10 km and 50 km from the project), respectively. The purpose of these runs is to identify the receptors that have a maximum 24-hr impact higher than the SIL (7.5 $\mu g/m^3$) level. Startup emissions resulted in maximum impacts for all receptors.

Directory:\Refined\1HRNO2\Startup\, Filename: NO2_SIL_REC.rou.

2. REFINED CUMULATIVE MODELING: AERMOD was used to model 1-hour NO_2 cumulative impacts (project startup emissions, nearby sources, and measured background) for each hour, for each for each receptor identified in step 1.

The modeling files for the refined cumulative modeling runs are also included in the Modeling Disk in the directory of \Cumulagive\1HRNO2. The 5-year AERMOD input, output, and Postfile output files are listed below.

PON04.ADI	2004 AERMOD 1hour NO2 PVMRM Cumulative impact input file
PON05.ADI	2005 AERMOD 1hour NO2 PVMRM Cumulative impact input file
PON06.ADI	2006 AERMOD 1hour NO2 PVMRM Cumulative impact input file
PON07.ADI	2007 AERMOD 1hour NO2 PVMRM Cumulative impact input file
PON08.ADI	2008 AERMOD 1hour NO2 PVMRM Cumulative impact input file
PONO04.out	2004 AERMOD 1hour NO2 PVMRM Cumulative impact output file
PONO05.out	2005 AERMOD 1hour NO2 PVMRM Cumulative impact output file
PONO06.out	2006 AERMOD 1hour NO2 PVMRM Cumulative impact output file
PONO07.out	2007 AERMOD 1hour NO2 PVMRM Cumulative impact output file
PONO08.out	2008 AERMOD 1hour NO2 PVMRM Cumulative impact output file
H4NO2S.OUT	2004 AERMOD 1-Hr NO2 AERMOD Cumulative impact output Postfile
H5NO2S.OUT	2005 AERMOD 1-Hr NO2 AERMOD Cumulative impact output Postfile
H6NO2S.OUT	2006 AERMOD 1-Hr NO2 AERMOD Cumulative impact output Postfile
H7NO2S.OUT	2007 AERMOD 1-Hr NO2 AERMOD Cumulative impact output Postfile
H8NO2S.OUT	2008 AERMOD 1-Hr NO2 AERMOD Cumulative impact output Postfile

The Postfile modeling output files were used in the next step in the demonstration of compliance.

3. A postprocessor (stripNO1.exe, the executable file; Strip.bat, the postprocessor batch file, both were in the Modeling Disk) was employed to gather highest-eighth-highest (H8H) information from POSTFILE modeling output files, combined with ambient 1-hr average NO_2 concentrations from Chula Vista. The postprocessor takes two files as input: an AERMOD 1-hr average NO_2 POSTFILE output file (processed with PVMRM), and hourly ambient background NO_2 concentrations (in units of ug/m^3). The five-year hour-by-hour average ambient background NO_2 concentrations were provided by SDAQMD, based on the ambient data; the Monthly Hour-Of-Day values were used as background data, which also included in the Modeling Disk as follows:

NO2MTH04.txt	2004 1-Hr Monthly Hour-Of-Day	NO_2 synthetic background concentration (ug/m^3) file
NO2MTH05.txt	2005 1-Hr Monthly Hour-Of-Day	NO_2 synthetic background concentration (ug/m^3) file
NO2MTH06.txt	2006 1-Hr Monthly Hour-Of-Day	NO_2 synthetic background concentration (ug/m^3) file
NO2MTH07.txt	2007 1-Hr Monthly Hour-Of-Day	NO_2 synthetic background concentration (ug/m^3) file
NO2MTH08.txt	2008 1-Hr Monthly Hour-Of-Day	NO_2 synthetic background concentration (ug/m^3) file

The postprocessor outputs produce two tables: the first contains the maximum daily average for each receptor, and the second contains the Top-8 concentrations for each receptor (tagged by Julian day). Maxima for the second table yield the highest eighth-highest concentration for all the receptors, for comparison to the federal standard. The 5-year Postprocessor output files for cumulative impacts were also included in the Modeling Disk at directory \Cumulative\1HRNO2, as listed below.

PONO04ST.OUT	2004 1-Hr NO_2 Cumulative impacts postprocessor output file
PONO05ST.OUT	2005 1-Hr NO_2 Cumulative impacts postprocessor output file
PONO06ST.OUT	2006 1-Hr NO_2 Cumulative impacts postprocessor output file
PONO07ST.OUT	2007 1-Hr NO_2 Cumulative impacts postprocessor output file
PONO08ST.OUT	2008 1-Hr NO_2 Cumulative impacts postprocessor output file

4. For each of the five years, the second table from the post processor output (Column P from Excel) was imported to a spreadsheet, which is included on the disk enclosed with this document (POP_1HRNO2_Cumulative_H8H.xlsx). The 5-year average cumulative impacts H8Hs for each receptor were calculated at column R, The highest of these values (cell B6) was used in demonstrating compliance.

$PM_{2.5}$ Analysis

Comment: *Provide a complete trail of results for the post-processing spreadsheets used for the compliance calculations, including live spreadsheets, showing how the $PM_{2.5}$ values were calculated.*

Response: The procedure for demonstrating compliance with the $PM_{2.5}$ 24-hour standard is outlined below. The files mentioned can be found on the modeling disk: PIO PICO Energy Center Project (PPEC) Modeling Files for PSD application (Pio Pico Energy Center, PSD modeling CD), Sierra Research – Wei Liu – August 29, 2011.

1. SCREENING: AERMOD was used to model 24-hour $PM_{2.5}$ impacts using the normal operation emission rates with a Cartesian grid (receptors within 10 km of the project) and a Polar grid (receptors between 10 km and 50 km from the project). The purpose of these runs is to identify the receptors that have a maximum 24-hr impact higher than the SIL (1.2 $\mu g/m^3$) level.

Directory:\Refined\PM2.5\, Filename: PM2.5_SIL_REC.rou.

2. REFINED CUMULATIVE MODELING: AERMOD was used to model 24-hour $PM_{2.5}$ cumulative impacts cumulative impacts (project normal emissions, nearby sources, and measured background concentrations) for each day for each receptor identified in step 1. The modeling files for the cumulative modeling runs were also included in the Modeling Disk in the directory of **\Cumulative\PM2.5.** The 5-year AERMOD input, output, and Postfile output files are listed below.

POPM04.ADI	2004 AERMOD 24-Hr PM2.5 Cumulative impacts input file
POPM05.ADI	2005 AERMOD 24-Hr PM2.5 Cumulative impacts input file
POPM06.ADI	2006 AERMOD 24-Hr PM2.5 Cumulative impacts input file
POPM07.ADI	2007 AERMOD 24-Hr PM2.5 Cumulative impacts input file
POPM08ADI	2008 AERMOD 24-Hr PM2.5 Cumulative impacts input file
POPM04.out	2004 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output file
POPM05.out	2005 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output file
POPM06.out	2006 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output file
POPM07.out	2007 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output file
POPM08.out	2008 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output file
H4PMN.OUT	2004 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output Postfile
H5PMN.OUT	2005 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output Postfile
H6PMN.OUT	2006 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output Postfile
H7PMN.OUT	2007 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output Postfile
H8PMN.OUT	2008 AERMOD 24-Hr $PM_{2.5}$ Cumulative impacts output Postfile

The Postfile modeling output files were used in the next step in the compliance demonstration.

3. A postprocessor (stripPM6.exe, the executable file; StripPM.bat, the postprocessor batch file, both were in the Modeling Disk) was employed to calculate H8H values for each receptor. Results from POSTFILE modeling output files were combined with ambient 24-hr average $PM_{2.5}$ concentrations provided by the district, matched day-by-day. The postprocessor takes two files as input: an AERMOD 24-hr average $PM_{2.5}$ POSTFILE output file, as listed above; and 24-hour average ambient background $PM_{2.5}$ concentrations (in units of ug/m^3). The five-year 24-hour average ambient background $PM_{2.5}$ concentrations were also included in the Modeling Disk, as listed below.

PIPM04.OUT	2004 24-Hr $PM_{2.5}$ postprocessor Cumulative impacts output file
PIPM05.OUT	2005 24-Hr $PM_{2.5}$ postprocessor Cumulative impacts output file
PIPM06.OUT	2006 24-Hr $PM_{2.5}$ postprocessor Cumulative impacts output file
PIPM07.OUT	2007 24-Hr $PM_{2.5}$ postprocessor Cumulative impacts output file
PIPM08.OUT	2008 24-Hr $PM_{2.5}$ postprocessor Cumulative impacts output file

The postprocessor outputs produce two tables: the first contains the maximum daily average for each receptor, and the second contains the Top-8 concentrations for each receptor (tagged by Julian day). Maxima for the second table yield the highest eighth-highest concentration for all the receptors, for comparison to the federal standard. The 5-year Postprocessor output files, listed below, were also included in the Modeling Disk.

PIPM04.OUT	2004 24-Hr $PM_{2.5}$ postprocessor output file
PIPM05.OUT	2005 24-Hr $PM_{2.5}$ postprocessor output file
PIPM06.OUT	2006 24-Hr $PM_{2.5}$ postprocessor output file
PIPM07.OUT	2007 24-Hr $PM_{2.5}$ postprocessor output file
PIPM08.OUT	2008 24-Hr $PM_{2.5}$ postprocessor output file

4. For each of the five years, the second table from the post processor output (Column P opened from Excel) was imported to a spreadsheet, which is included on the disk enclosed with this document (PIOPICO_PM2 5_24Hour_Cumulative_H8H.xlsx). The 5-year average H8H for each receptor was calculated (column L). The highest of these values (cell B3) was used in demonstration of compliance.

Comment: *Provide a Class II Increment Analysis for $PM_{2.5}$.*

Response: Within the impact area of a source that does have a significant impact, increment consumption is calculated using the source's proposed emissions increase, along with other emissions increases or decreases of the particular pollutant from sources in the area, which have occurred since the minor source baseline date established for that area. (For major sources, emissions increases or decreases that have occurred since the major source baseline date consume or expand increment.) Thus, an emissions inventory of sources whose emissions consume or expand the available increment in the area must be compiled. The inventory includes not only

sources located directly in the impact area, but also sources outside the impact area that affect the air quality within the impact area.

The inventory of emissions includes emissions from increment-affecting sources at two separate time periods: the baseline date, and the current period of time. For each source that was in existence on the relevant baseline date (major source or minor source), the inventory includes the source's actual emissions on the baseline date and its current actual emissions. The change in emissions over these time periods represents the emissions that consume increment (or, if emissions have gone down, expand the available increment). For sources constructed since the relevant baseline date, all their current actual emissions consume increment and are included in the inventory.

For $PM_{2.5}$, the increment analysis trigger date is October 20, 2011. Implementation for PSD permits issued after that date will include a review of the amount of increment consumed by major stationary sources after the PSD major source baseline date of October 20, 2010. See 75 Fed. Reg. 64877, 64898-99 (October 20, 2010).

No PSD permits have been issued that impact the area affected by PPEC since the PSD baseline date of October 20, 2010. The inventory used for $PM_{2.5}$ increment consumption for this project is therefore comprised of the project itself.

The PSD increment analysis is summarized in the table below.

Averaging time	Class II $PM_{2.5}$ Increment ($\mu g/m^3$)	Project Impact($\mu g/m^3$)
Annual	4	0.26
24-hour	9	2.6

Comment: *Provide a Class I Increment Analysis for Class I areas within 300 km of the project site.*

Response: Written EPA policy provides that, in general, Class I areas within 100 km of the project site must be evaluated in a Class I increment analysis, although additional Class I areas may be requested by a Federal Land Manager. We are unaware of the basis for the 300 km criterion requested by EPA during the Nov. 2, 2011 telephone call. Nonetheless, the requested analysis is provided below.

Emission impacts below the Significant Impact Level are considered by EPA to be *de minimis* in the relevant area. SILS are used for demonstrating compliance with the $PM_{2.5}$ NAAQS and for the $PM_{2.5}$ increment analysis under the federal PSD program.

The attached Figure 3 shows the areas where the modeled 24-hour $PM_{2.5}$ impact from the project exceeds the Class I SIL of 0.07 $\mu g/m^3$. The most distant location is 52 km from the project site. The closest Class I area, Agua Tibia Wilderness, is 91 km from the project site.

Figure 4 shows the areas where the modeled annual $PM_{2.5}$ impact from the project exceeds the Class I SIL of 0.06 $\mu g/m^3$. The most distant location is 6 km from the project site. The closest Class I area, Agua Tibia Wilderness, is 91 km from the project site.

Figure 5 shows the areas where the modeled annual NO_2 impact from the project exceeds the Class I SIL of 0.1 $\mu g/m^3$. The most distant location is less than 7 km from the project site. The closest Class I area, Agua Tibia Wilderness, is 91 km from the project site.

Project impacts are below the SILS at Class I areas within 300 km of the project site. The project therefore does not consume increment at any Class I area.

If you have any questions regarding this information, please contact the Applicant's representative David Jenkins at (317) 431-1004, or Gary Rubenstein or me at (916) 444-6666.

Sincerely,

Steve Hill

cc: John McKinsey, Stoel Rives LLP
David Jenkins, Apex Power Group
Steve Moore, SDAPCD

Attachment

Enclosure: CD

Figure 1
Wind Rose, Chula Vista Meteorological Station, 2004-2006

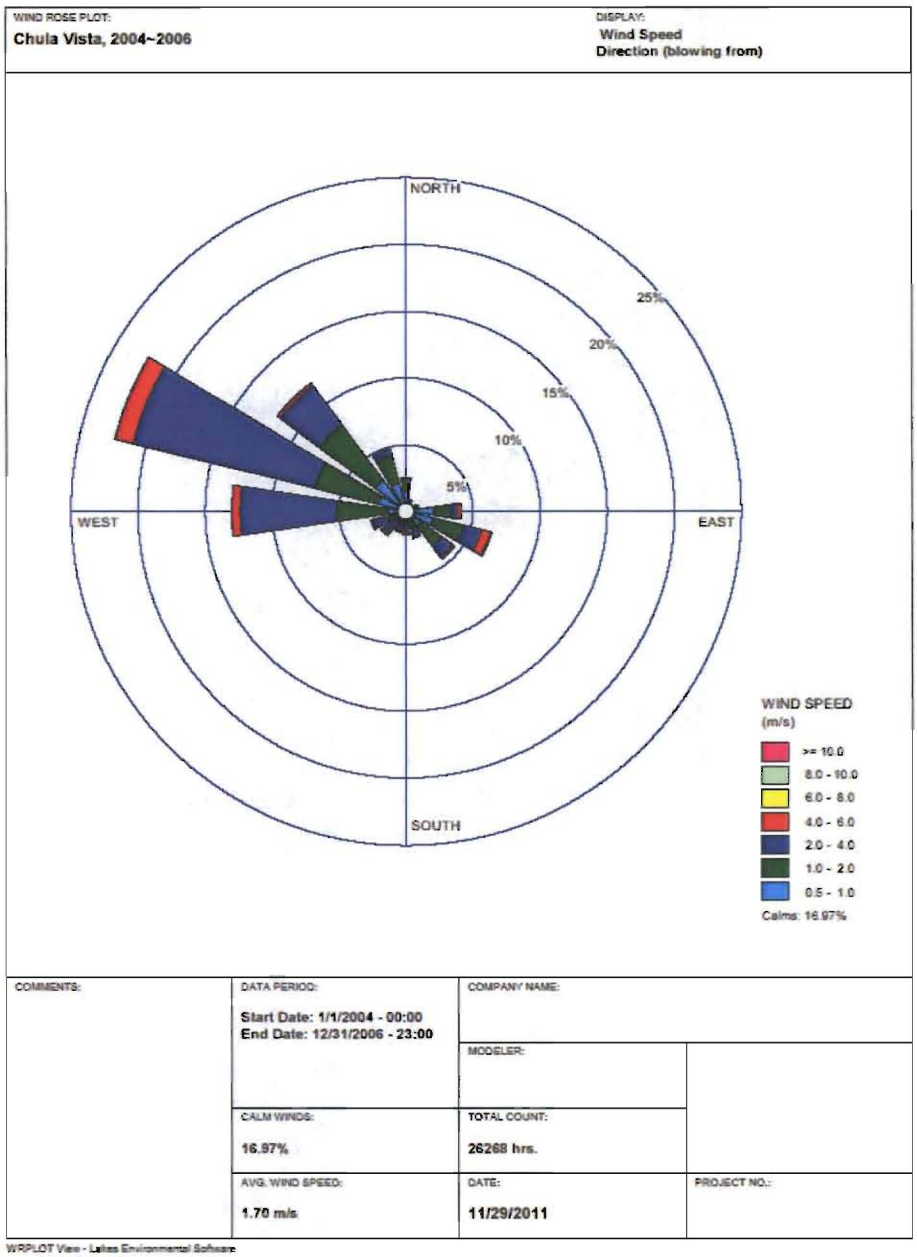

Figure 2
Wind Rose, El Cajon Meteorological Station, 2004-2006

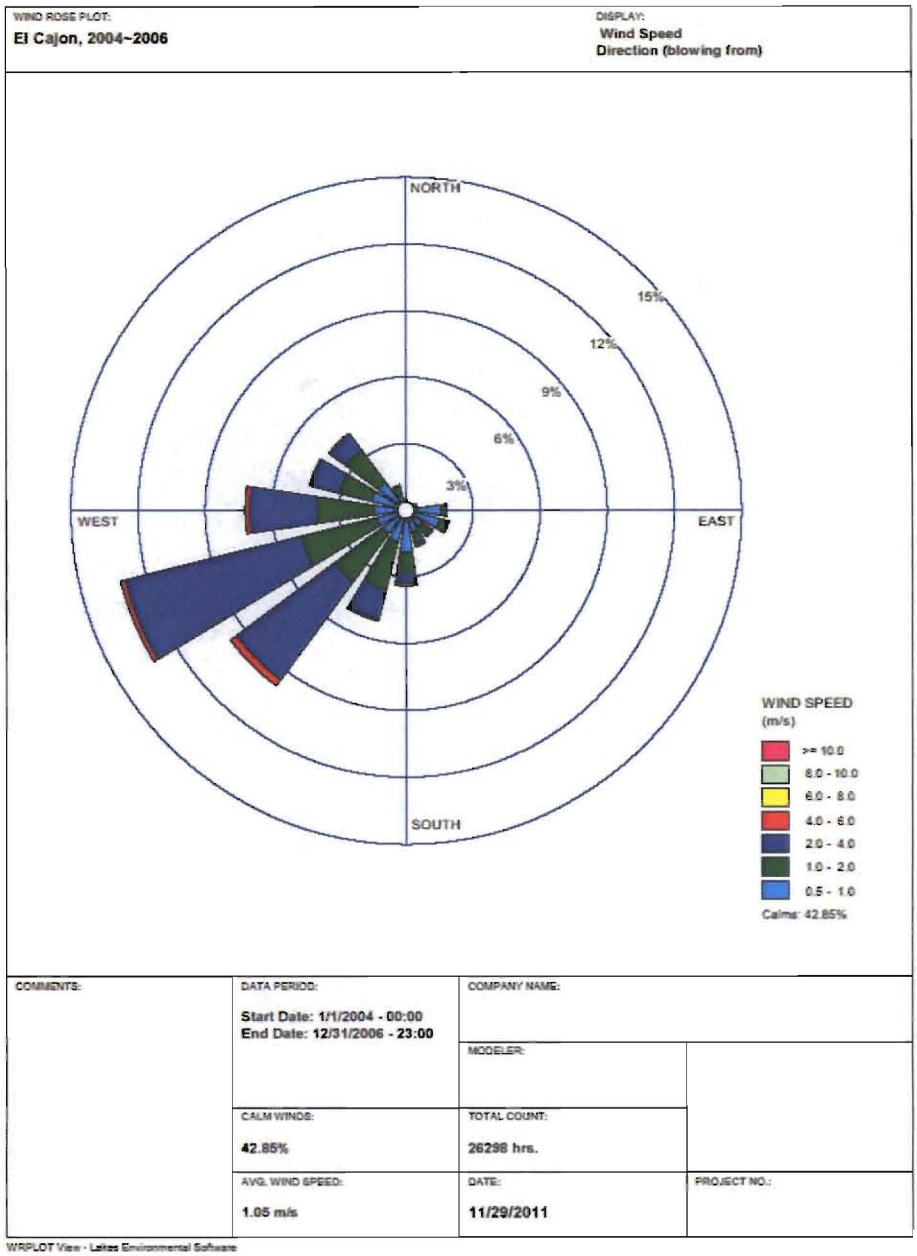

Figure 3
Areas Where Project 24-Hour Average $PM_{2.5}$ Impact Exceeds Class I SIL of 0.07 µg/m^3

Figure 4
Areas Where Project Annual Average $PM_{2.5}$ Impact Exceeds Class I SIL of 0.06 $\mu g/m^3$

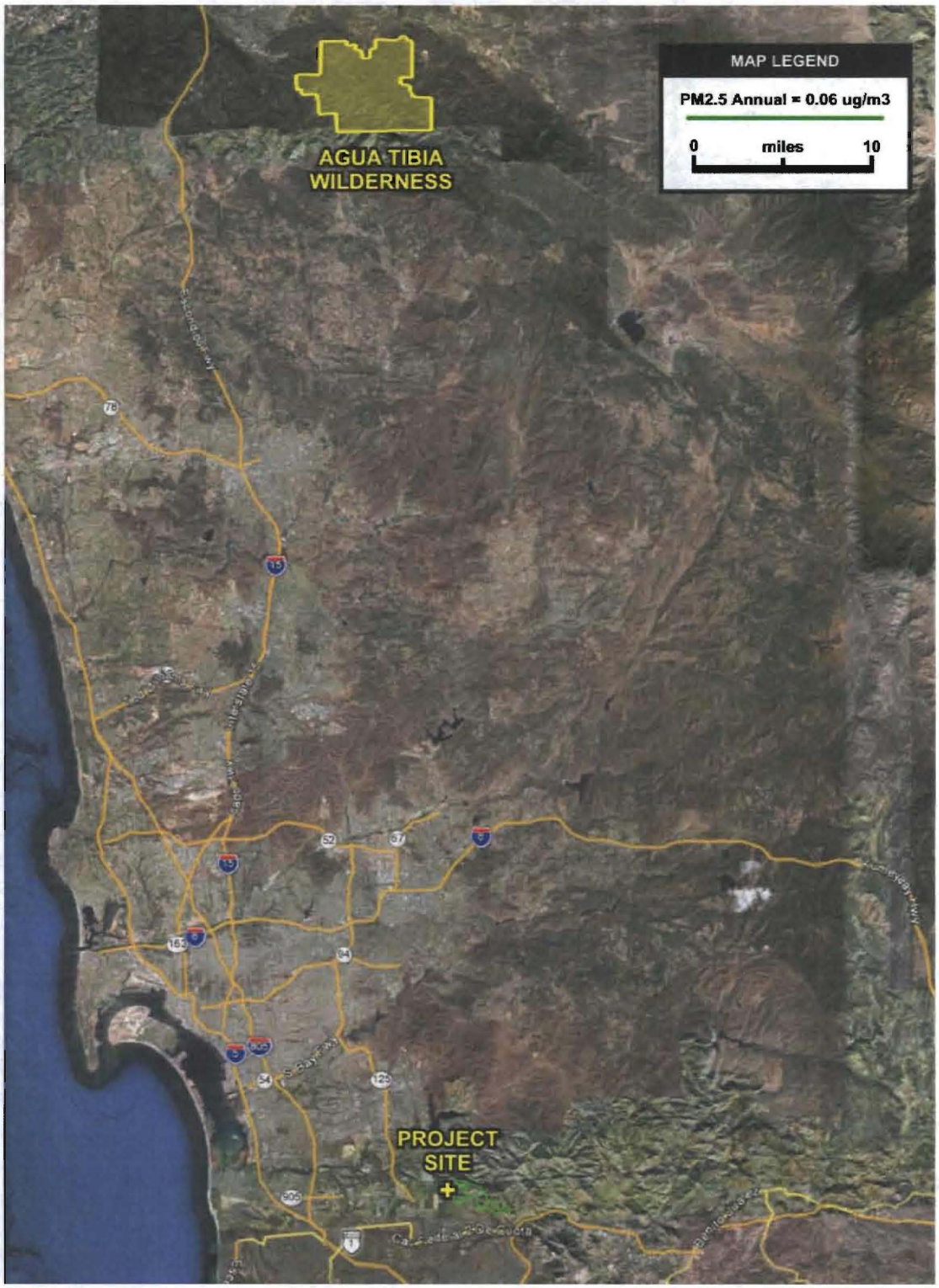

Figure 5
Areas Where Project Annual Average NO_2 Impact Exceeds Class I SIL of 0.1 $\mu g/m^3$

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 *PIO PICO ENERGY CENTER, LLC*

Docket No. 11-AFC-1
PROOF OF SERVICE
(Revised 11/22/11)

Pio Pico Energy Center, LLC
Applicant's Responses to USEPA Inquiries Related to Air Quality Modeling

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DECLARATION OF SERVICE

I, Judith M. Warmuth, declare that on December 5, 2011, I deposited copies of the aforementioned document and, if applicable, a disc containing the aforementioned document in the United States mail at 500 Capitol Mall, Suite 1600, Sacramento, California 95814, with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

AND/OR

Transmission via electronic mail, personal delivery and first class U.S. mail were consistent with the requirements of California Code of Regulations, Title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Judith M. Warmuth