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October 20, 2011

VIA EMAIL

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

Re: Pio Pico Energy Center Project (11-AFC-01)
Air Quality: Nitrogen Deposition Modeling Methodology

Dear Mr. Solorio:

On Wednesday, October 19, 2011, you received by email Applicant Pio Pico Energy Center, LLC's response to questions from Energy Commission Staff related to the nitrogen deposition modeling conducted for the Pio Pico Energy Center Project. Provided herewith for docketing, please find such response. Service of same will be made pursuant to the attached proof of service.

Respectfully submitted,

mbe Hellwig
Paralegal

KJH:jmw
Enclosure
cc: Proof of Service List

October 19, 2011

sierra research

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Eric Solorio
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: Pio Pico Energy Center Power Project (11-AFC-01)
Nitrogen Deposition Modeling Methodology

Dear Mr. Solorio:

In response to questions contained in an email sent from Tao Jiang to Maggie Fitzgerald on October 13, 2011, Sierra Research is providing the following information on behalf of Apex Power Group, LLC (Apex).

1. Nitrogen emission rate
Please describe how the emission rate for Nitrogen is calculated. Staff compared the emission rates in the AERMOD input files and those provided in Table DR-B10-28-1 . It seems the applicant calculated the Nitrogen emission from NOx emissions using the mass fraction of N as in NO2. According to source test data for gas turbines, approximately 90 percent of the NOx is NO and remaining 10 percent is NO2 (See the reference for the NO2/NOx ratios provided by the San Joaquin Valley APCD at http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm4modeling resources). Using 100 percent of the mass fraction of N as in NO2underestimates the emission rate of N from NOx (with 90% of NO and 10% NO2).

Emissions of NOx (as NO2) and NH3 used for the modeling are shown in Table DR-B10-28.1. NOx emissions from the Project are calculated using the project's annual NOx emission rate (70.4 TPY NOx as NO2). Emissions from each turbine are 1/3 of the total. The emission rate (in grams per second) is calculated by dividing annual emissions from each turbine (in grams) by the number of seconds in a year. Expressing NOx emissions as NO2 makes the value independent of the NO2/NOx ratio in the stack.

2. AERMOD input parameters
The input parameters for Nitrogen deposition modeling are different from those used in a recent approved CEC project, Oakley Generating Station Project. The following table provides a comparison of the parameters for Nitric acid used by the applicant and those used in the Oakley Generating Station Project. Please justibr the values used for Pio Pico and provide references for the selection of these input parameters.

Input Parameters for HNO3	*Pio Pico Energy Center*	*Oakley Generating Station Project*
Diffusivity in air (cm^2/s)	*0.1543*	*0.1628*
Diffusivity in water (cm^2/s)	*4.40E-6*	*2.98E-5*
Henry's constant (Pa-m^3/mol)	*3.10E-10*	*8.0E-8*
Leaf lipid resistance (s/cm)	*1.0E+5*	*1.0E+5*

AERMOD requires many input parameters. All parameters used in the modeling are included in the modeling files previously provided in electronic form. The physical parameters for HNO3 and NH3 used in the PPEC modeling analysis, and the references for these parameters, are summarized in the table below.

Input Parameter	HNO3		NH_3	
	Value	Reference	Value	Reference
Diffusivity in air (cm^2/s)	0.1543	Weseley'	0.2243	Weseley[1]
Diffusivity in water (cm2/s)	4.40E-6	Weseley[i]	8.77E-6	Weseley[1]
Henry's Law Constant (PA-m^3/mol)	3.10E-10	Seinfeld & Pandis[2]; assume pH=5*	9.60E-5	Seinfeld & Pandis[3]; assume pH=5*
Leaf lipid resistance (s/cm)	1.0E+5	Default value suggested by Weseley[4]	1.0E+5	Default value suggested by Weseley[4]

'Normal precipitation has a pH of 5.6; it was assumed that water on plant surfaces would be slightly more acid, particularly in an urban airshed.

3. *Conversion of concentration onto the map*

Please describe how the concentrations in the output files of AERMOD are converted to the values in the maps (e.g. Figure DR-B10 27.1, Figure DR-BIO 29.1 and Figure DR-BIO 29.2). Please indicate if the annual values are worst case or typical values averaged over the modeling years. Please describe which region of receptors was selected to plot the map contours. According to the AERMOD output for the cumulative analysis, the maximum Nitrogen deposition does not occur at the location shown in the maps. Please correct or explain this difference.

Weseley et al., *Deposition Parameterizations for the Industrial Source Complex (ISC3) Model,* June 2002, p. 22

[2]Seinfeld & Pandis, *Atmospheric Chemistry and Physics: From Air Pollution to Climate Change,* 1998. p. 1004

[3]Seinfeld & Pandis, *Atmospheric Chemistry and Physics: From Air Pollution to Climate Change,* 1998. p. 353

[4]Weseley et al., *Deposition Parameterizations for the Industrial Source Complex (ISC3) Model,* June 2002, p. 27

Nitrogen deposition was modeled using AERMOD. The following two scenarios were modeled:

- Scenario 1, Project Only; and
- Scenario 2, Project Plus Nearby Sources.

The nearby sources in Scenario 2 are the same sources included in the cumulative air impact modeling for criteria pollutants.

Cumulative nitrogen deposition rates were calculated by adding the regional background deposition rate of 11.56 kg/ha/yr to the modeling results from Scenario 2. For each receptor, the reported annual value is the maximum total deposition for that receptor for any of the five years (2004-2008) that were modeled. This substantially overstates the potential cumulative impact.

The modeling results are presented graphically in Figures DR-BIO 27.1 (project impact only, taken directly from the modeling results from Scenario 1), DR-BIO 29.1 (cumulative impacts, where the modeling results from Scenario 2 were added to the regional background at all receptors), and DR-BIO 29.2 (background only, where the modeling results from Scenario 1 were subtracted from the cumulative impacts presented in DR-BIO-29.1). Each figure includes the entire area directly impacted by the project (i.e., the area where project impacts exceed 0.1 kg/ha/yr, which is less than 1% of the regional background deposition rate). For any receptor outside the area shown in the figures, more than 99% of the nitrogen deposition is due to direct impacts from non-project sources and/or regional background deposition.

The maximum modeled nitrogen deposition rate for Scenario 2 is well outside the area directly impacted by the project, and results from a localized impact from a non-project source. For these reasons the map was not expanded to include this receptor.

The maximum modeled cumulative impact occurs at the location shown on the maps.

Please do not hesitate to call me if you have any questions.

Sincerely,

Steve Hill

cc:Gary Chandler, PPEC
David Jenkins, PPEC
Maggie Fitzgerald, URS
John McKinsey, Stoel Rives, LLC
Steve Moore, SDAPCD

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APPLICATION FOR CERTIFICATION FOR THE *PIO PICO ENERGY CENTER, LLC*	**Docket No. 11-AFC-1 PROOF OF SERVICE (Revised 5/15/11)**

Pio Pico Energy Center, LLC
Letter to Eric Solorio, Siting Project Manager, California Energy Commission, dated October 20, 2011 re Air Quality: Nitrogen Deposition Modeling Methodology

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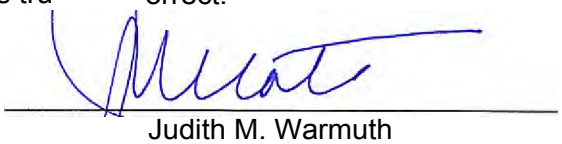
DECLARATION OF SERVICE

I, Judith M. Warmuth, declare that on October 20, 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 that the foregoing is tru• orrect.



Judith M. Warmuth