STOEL RIVES LLP
ATTORNEYS AT LAW

DOCKET
00-AFC-14C
DATE APR 15 2010
RECD. APR 15 2010

500 Capitol Mall, Suite 1600
Sacramento, California 95814
main 916.447.0700
fax 916.447.4781
www.stoel.com

MELISSA A. FOSTER
Direct (916) 319-4673
mafoster@stoel.com

April 15, 2010

VIA E-MAIL AND HAND DELIVERY

Joseph Douglas
Compliance Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Re: El Segundo Power Redevelopment (00-AFC-14C)
National Air Quality Standard NO_2 Modeling Analysis

Dear Mr. Douglas:

On behalf of El Segundo Power II LLC, please find the enclosed correspondence from Sierra Research regarding National Air Quality Standard NO_2 Modeling Analysis for docketing for the El Segundo Power Redevelopment Project.

Should you have any questions regarding this document, please contact our office at (916) 447-0700 or George Piantka at (760) 710-2156.

Respectfully submitted,

Melissa A. Foster
MAF:jmw

Enclosure
cc: George Piantka, NRG Energy, Inc.
Tom Andrews, Sierra Research, Inc.

sierra
research

1801 J Street
Sacramento, CA 95811
Tel: (916) 444-6666
Fax: (916) 444-8373

Ann Arbor, MI
Tel: (734) 761-6666
Fax: (734) 761-6755

April 14, 2010

Mr. Joseph Douglas
Compliance Project Manager
California Energy Commission
1516 9th Street, MS-200
Sacramento, CA 95814

Subject: Proposed El Segundo Power Redevelopment (ESPR) Project – National Air Quality Standard NO_2 Modeling Analysis

Dear Mr. Douglas:

On behalf of El Segundo Power II LLC, we are pleased to submit a supplemental dispersion modeling analysis that was performed to demonstrate compliance with the new one-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (NAAQS) that goes into effect on April 12, 2010. The detailed supplemental modeling methodology is provided as an attachment to this letter. Based on this new approach, the supplemental modeling results are summarized in the following table. As demonstrated by the table, the El Segundo Power Redevelopment (ESPR) Project will be in compliance with the new one-hour NO_2 NAAQS. The modeling files for this analysis are also included in the enclosed portable hard drive.

If you have any questions or need any additional information, please do not hesitate to contact me at 916-273-5139.

Sincerely,

Tom Andrews
Senior Engineer

Enclosure: Supplemental modeling methodology, portable hard drive

cc (with hard drive): Brenner Munger, CEC

cc (w/o hard drive): Jack Caswell, CEC
CEC Docket Unit (00-AFC-14C)
George Piantka, El Segundo Power II LLC
John McKinsey, Stoel
Kimberly Hellwig, Stoel
Russ Kingsley, AECOM

Supplemental One-Hour NO_2 Modeling Analysis El Segundo Power Redevelopment Project		
Equipments and Operating Mode	**Modeled Impact[a] ($\mu g/m^3$)**	**NAAQS ($\mu g/m^3$)**
New Turbine, Unit 5 only, Normal Operation	119.2	188
New Turbine, Unit 6 only, Normal Operation	119.2	188
Two New Turbines, Unit 5 and 6, Normal Operation	119.3	188
Two New Turbines, Unit 5 and 6, Normal Operation plus Existing Equipment[b]	120.2	188
New Turbine, Unit 5 only, Startup	120.2	188
New Turbine, Unit 6 only, Startup	120.2	188
Two New Turbines, Unit 5 and 6, Startup	120.8	188
Two New Turbines, Unit 5 and 6, Startup plus Existing Equipment[b]	121.0	188
New Turbine, Unit 5 only, Commissioning	120.8	188
New Turbine, Unit 6 only, Commissioning	120.8	188
Two New Turbines, Unit 5 and 6, Commissioning	122.0	188
Two New Turbines, Unit 5 and 6, Commissioning plus Existing Equipment[b]	123.0	188
Construction Equipments (Tug and Trucks)	139.0	188

Notes:
a. The predicted total hourly NO_2 concentration at each receptor is calculated by adding the modeled hourly project impact at the receptor to the corresponding hour NO_2 concentration measured at the West Los Angeles VA Hospital ambient monitoring station. The concentrations reported here are the maximum three-year average (2005~2007) of 98th percentile one-hour average NO_2 impacts among all the receptors.
b. Existing equipment comprised of El Segundo Generating Station Units 3 and 4.

El Segundo Power Redevelopment Project
Supplemental Modeling Analysis Methodology
1-Hour NO_2 NAAQS Compliance

1. Background

On February 9, 2010, the U.S. Environmental Protection Agency (EPA) revised the primary nitrogen dioxide (NO_2) NAAQS, establishing a new one-hour NO_2 standard to supplement the existing annual standard (75 FR 6473). The new standard is effective on April 12, 2010.

The new one-hour standard is a statistically based standard at a level of 100 ppb (188$\mu g/m^3$), based on the 3-year average of the 98th percentile of the yearly distribution[1] of 1-hour daily maximum concentrations.[2]

On behalf of El Segundo Power II LLC, Sierra Research is submitting this supplemental modeling analysis to the California Energy Commission (CEC) to demonstrate compliance of the El Segundo Power Redevelopment (ESPR) project with the new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard. This modeling analysis follows modeling guidance provided by the U.S. EPA in its "*Guideline on Air Quality Models*" (including supplements), and requirements in the new 1-hour NO_2 NAAQS Final Rule.

The proposed ESPR project will consist of constructing and operating two fast-start Siemens SGT6-5000F combustion gas turbines in combined-cycle mode. Existing El Segundo Generating Station Boilers 1-3 will be shut down and Existing Boiler 4 will continue to operate.

The original modeling analysis, submitted in June 2007, governed the air dispersion modeling for all other pollutants and averaging times, and for the state 1-hour NO_2 AAQS. This supplemental analysis only repeats some basic information about the proposed and existing emitting units (sources) to provide context for the various modeling runs required for the supplemental air quality impact analysis.

The original modeling analysis for the ESPR project was performed using the Industrial Source Complex, Short-Term Model ISCST3. However, the South Coast Air Quality Management District (SCAQMD or District) recently adopted the AERMOD model as the replacement for ISCST3. Therefore, this supplemental modeling analysis was performed using the AERMOD model (version 09292) following the District's modeling guidance.[3]

This supplemental modeling analysis addressed the potential one-hour NO_2 ambient impacts of commissioning, startups, shutdowns, and normal operation of the two new combustion gas

---

[1] For a reasonably complete annual set of daily measurements, the 98th percentile is the 8th highest measurement.

[2] 75 FR 6474

[3] AQMD Modeling Guidance for AERMOD, http://www.aqmd.gov/smog/metdata/AERMOD_ModelingGuidance.html

turbines plus operation of existing Boilers 3 and 4 (while Boiler 3 will be shutdown, there may be a limited amount of time when Boiler 3 will operate during the commissioning of the new gas turbines).

All source locations, emission rates, receptor grids, and stack parameters are the same as those used in the final modeling analyses for the ESPR project previously approved by the District.

2. Meteorological Data

The District has prepared meteorological data sets for several locations in the District and has processed them, using AERMET, into the format required by AERMOD. Three years (2005 through 2007) of meteorological data collected at the Los Angeles Airport station (LAX) were available from the District's website[4] and used for this analysis. This three-year period represents the most current meteorological data available on the District website for this monitoring location. The LAX station is located approximately three miles from the project site, and it is the nearest District-approved meteorological station to the project site. There is no intervening terrain between the project site and the monitoring station that would dictate the use of an alternative monitoring station.

3. Existing Ambient Air Quality Data

Modeling of the ESPR project 1-hour NO_2 impacts required the use of ambient monitored O_3 concentrations. In addition, computation of total hourly NO_2 concentrations required the use of ambient monitored hourly NO_2 concentrations from a nearby monitoring station. Background ambient O_3 concentrations for the project area during 2005-2007 were obtained from the monitoring station at LAX (same location as meteorological station). These data are available from the District's website.[5]

Ambient NO_2 data are not collected at the LAX monitoring station. Therefore it was necessary to locate a nearby NO_2 monitoring station. The Hawthorne monitoring station is the District ambient NO_2 monitoring station nearest to the project site. However, data collection at this station ended in December 2004. The next nearest District monitoring station for NO_2 is a station located at the West Los Angeles VA Hospital (approximately nine miles from the project site). Consequently, NO_2 data collected at the West Los Angeles monitoring station during the period from 2005 to 2007 were used for the analysis.

Missing data substitution was not used for the O_3 and NO_2 data for the reasons explained below.

---

[4] http://www.aqmd.gov/smog/metdata/AERMOD_Table1.html

[5] http://www.aqmd.gov/smog/metdata/AERMOD_Table4.html

For O_3 data, according to the District's guidance[6]:

> *"When using the PVMRM option, the following default values should be used:*
>
> - *Ambient Equilibrium NO_2/NO_X Ratio = 0.90*
> - *In-stack NO_2/NO_X Ratio = 0.10*
> - *Default Ozone Value = 40 PPB*

Therefore, no missing data substitution was needed for O_3 data.

For ambient NO_2 data, the data are used to establish the baseline ambient conditions for an area of interest. As such, based on EPA guidance related to determinations of compliance with the new 1-hour average NO_2 NAAQS,[7] no data substitution was needed for the NO_2 data. Instead, it was necessary to determine whether there are sufficient hourly data available for a complete day, quarter, and year. Under this EPA guidance,[8] a day is classified as complete if it has at least 75% of the hourly concentrations recorded (i.e., at least 18 hours per day); a quarter is classified as complete if it has at least 75% of the sampling days with complete data (i.e., at least 67 to 69 depending on quarter); and a year is classified as complete if it has four complete quarters. In order to determine whether a day, quarter, or year is complete, it was necessary to identify missing data. Missing hourly NO_2 ambient concentrations were replaced with the value -99, which informed the computation algorithm that no valid NO_2 concentration was measured for that hour. If more than six hourly concentrations were missing in the same day, the entire day was identified as invalid, again following the same EPA regulatory guidance.[9]

4. Combining Existing Ambient Air Quality Data with Modeled Impacts

The plume volume molar ratio method (PVMRM) adaptation of the Ozone Limiting Method (Cole and Summerhays, 1979) was used to determine the extent to which the NO emitted from the exhaust stacks is converted to NO_2 when it reaches the ground. AERMOD PVMRM calculated the NO_2 concentration using hourly ozone data. Modeled concentrations were then added to this representative background NO_2 concentration data set to determine compliance with the new NAAQS using the procedure outlined below, which complies with the requirements of the final federal NO_2 rule.

The modeled and monitored one-hour NO_2 concentrations were combined as follows:

---

[6] http://www.aqmd.gov/smog/metdata/AERMOD_ModelingGuidance.html

[7] Federal Register, Volume 75, Number 26, Part III, Environmental Protection Agency, 40 CFR Parts 50 and 58, *Primary National Ambient Air Quality Standards for Nitrogen Dioxide; Final Rule,* Appendix S, pages 6532-6533, February 9, 2010.

[8] Ibid, p. 6532.

[9] Ibid.

- The modeled hourly NO_2 concentrations were limited by the available ozone according to the use of AERMOD and PVMRM option. AERMOD with the DAYTABLE option was employed to retain the hourly concentrations at each receptor for the entire modeled period.

- The predicted total hourly NO_2 concentration at each receptor was then calculated by adding the modeled hourly project impact at the receptor to the corresponding hour NO_2 concentration measured at the West Los Angeles-VA Hospital ambient monitoring station.

- A postprocessor, coded with Fortran, was developed to gather information from AERMOD DAYTABLE modeling output files, combined with measured ambient one-hour average NO_2 concentrations from the ambient monitoring station. The postprocessor takes two files as input: (1) an AERMOD one-hour average NO_2 DAYTABLE output file (processed with PVMRM); and (2) hourly ambient background NO_2 concentrations (in units of ug/m^3). The output from the postprocessor includes a table with the top-8 concentrations for each receptor (tagged by Julian day). The missing data treatment was included in this postprocessor as follows:

  - For hours with missing ambient monitored background NO_2 concentrations, the resulting total hourly concentrations (modeled impacts plus background concentrations) were labeled as missing using the value -99 at every receptor.
  - The daily maximum total hourly NO_2 concentration for each day was determined for each receptor. If there were fewer than 18 complete hours for a day, that day was labeled as missing using the value of -99.

- The postprocessor output was then imported into an Excel spreadsheet to calculate the maximum total hourly NO_2 concentration, for comparison to the new one-hour NO_2 NAAQS. If there were four complete quarters for a given complete year, the 98^{th} percentile daily maximum total hourly NO_2 concentration was determined for that year for each receptor based on the following EPA guidance:[10]

  - 8^{th} highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was at least 351.

  - 7^{th} highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 301 and 350.

  - 6^{th} highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 251 and 300.

    - If the year was not complete, the above sequential scale was used, per the same EPA guidance, to determine the 98^{th} percentile daily maximum total hourly NO_2 concentration for that year for each receptor.

[10] Ibid, Table 1, p. 6534.

- 5th highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 201 and 250.

- 4th highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 151 and 200.

- 3rd highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 101 and 150.

- 2nd highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 51 and 100.

- 1st highest value if the annual number of valid daily maximum total hourly NO_2 concentrations was between 1 and 50.

- The arithmetic mean of the three highest 98% percentile daily maximum total NO_2 concentrations was calculated for the three consecutive years for each receptor.

- From the field of receptors, the receptor with the highest three-year average was selected to represent the maximum total hourly NO_2 concentration for the project impact area. This maximum total hourly NO_2 concentration was compared to the new one-hour NO_2 NAAQS.

The one-hour NO_2 NAAQS level is 100 parts per billion by volume (ppb), and hourly monitoring concentrations are to be reported to no more detail than "one place after the decimal"[11] (tenths of a ppb), with additional digits to the right of the decimal being truncated. The NAAQS level of 100 ppb is equivalent to 188$\mu g/m^3$, and the analysis procedure described above was conducted in units of $\mu g/m^3$. For comparison to the NAAQS level, the final NO_2 concentration, calculated as described above, was "rounded to the nearest whole number" or 1 $\mu g/m^3$, with decimals 0.5 and greater rounded up to the nearest whole number and decimals lower than 0.5 rounded down to the nearest whole number, following regulatory guidance.[12]

[11] Federal Register, Volume 75, Number 26, Part III, Environmental Protection Agency, 40 CFR Parts 50 and 58, *Primary National Ambient Air Quality Standards for Nitrogen Dioxide; Final Rule,* Appendix S, page 6533, February 9, 2010.
[12] Ibid.