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April 23, 2007

James W. Reede, Jr., Ed.D.
Energy Facility Siting Project Manager
California Energy Commission
1516 - 9th Street
Sacramento, CA 95814

RE: Revised Response to Panoche Energy Center Round 2 Data Request #26

Dear Dr. Reede:

Panoche Energy Center, LLC hereby submits its revised response to Panoche Energy Center Round 2 Data Request #26. This data request response (DRR) and associated air quality modeling were revised based on requests made by the CEC at the April 13, 2007 workshop. Please have you staff replace DRR #26 in their copy of the March 1, 2007 submittal (starts on page AQ-15 under the Supplemental Data Request Responses section) with this revised response.

Please find the enclosed 20 hard copies and 10 electronic copies (on CD) of the revised Panoche Energy Center Round 2 DRR #26. The revised air quality modeling files are included on the electronic copies.

If you have any questions or concerns please do not hesitate to call me at 714-648-2759.

Sincerely,

Margaret M. Fitzgerald
Program Manager

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**Follow-up to Data Request Responses – Round 1
January 9, 2007 Submittal**

TECHNICAL AREA: AIR QUALITY

Data Request 26 Rev: Please provide the cumulative modeling analysis, including the nearby Calpeak and Wellhead Energy peaker sites as proposed in the modeling protocol, as well as all District identified cumulative sources and the recently proposed Starwood Power-Midway Peaking Project (06-AFC-10).

Response:

January 9, 2007 Submittal Response:

Contrary to PEC's prior understanding, the District stated at PEC's meeting with the District on January 4, 2007 that the District would not perform the cumulative modeling analysis because it is not required to do so. PEC is willing to provide this analysis via its consultant, but requests until January 18, 2007 in which to submit a final analysis to the CEC. This cumulative analysis will consider the significance and appropriate inclusion of emissions from facilities in the District's PAS Listing, along with those of the proposed PEC and Starwood projects.

April 23, 2007 Revised Response:

Cumulative Air Quality Modeling Analysis

As required by CEC policy, a dispersion modeling analysis has been conducted to evaluate the maximum cumulative air quality effects of the Starwood Midway facility, the Panoche Energy Center and other new sources within six miles of the Midway site, that are either under construction, newly permitted in 2006 or currently in the permitting process. In addition, CEC has determined that the two existing peaker generation plants adjacent to the Midway and Panoche facilities should be included because of their proximity. These two sites are the existing CalPeak and Wellhead peaker generation facilities. The rationale for selecting these facilities for the cumulative analysis has been explained in previous data request responses. The cumulative analysis thus included the following specific point sources:

- The two Starwood Midway Swiftpac generator sets;
- The four 100 MW simple-cycle gas turbines of the proposed PEC project;
- The two 30 MW simple-cycle gas turbines of the existing CalPeak facility, which are exhausted through a single stack; and
- The two 25 MW simple-cycle turbines which are exhausted through a single stack, and the auxiliary natural gas-fired internal combustion engine of the Wellhead peaker plant.

Stack parameters and criteria pollutant emission rates for the proposed PEC and Midway projects were obtained from their recent AFC impact analyses. Comparable data for the existing CalPeak and Wellhead facilities were supplied by SJVAPCD. Based on the fact that all of these facilities

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are peaking power plants, as is the Midway facility, it is possible that a situation could occur in which all four plants may be operating simultaneously at maximum capacity for short periods. Accordingly, the modeling simulations to evaluate cumulative impacts for averaging times up to 24 hour assumed maximum hourly emission rates for all sources. Model runs to evaluate annual average impacts did take into account permit limitations on the allowable annual emission or hours of operation for the respective facilities. Stack parameters and emission rates for the CalPeak, Wellhead and PEC facilities are presented in Tables 1 through 3. Midway emission rates are the same as those presented in the AFC (as modified in the responses to recent data requests) and are presented in Table 4. The highest hourly emission rates associated with turbine startup or shutdown were used for the PEC and Midway facilities in the simulations for all averaging times from 1-hour to 24 hours. The assumption of concurrent unit startups for all turbines of the two new projects (PEC and Midway) gives particularly conservative results for short-term NO₂ and CO concentrations. The CalPeak and Wellhead emissions data were obtained from the SJVAPCD. The annual emission rates used in the analysis for these existing sources came from actual annual facility emissions in 2004 and 2005. The short-term emission rates for CalPeak came from the Potential to Emit values provided by SJVAPCD. The short-term emission rates used for Wellhead correspond to permit limits for non-startup/shutdown conditions.

The same five-year record of hourly meteorological input data from the Fresno-Yosemite International Airport that was used in the modeling for the Midway and PEC facilities individually was also used for the cumulative modeling.

Because of the close spatial grouping of the four power projects, basically the same receptor grid used in the Midway modeling was also used for the cumulative modeling. The minor difference is that the center point of the 25-meter receptor grid is located between the PEC facility and the Midway facility and extends out 1.5 km from that point to ensure the 25-meter grid extends at least 1 km from each facility. Downwash structures were included in both the PEC and Midway facilities. Fenceline receptors were placed around each facility fenceline with 25-meter spacing. Small dense grid receptors were placed around locations of maximum concentrations that lie outside the 25-meter

Maximum concentrations due to the combined emissions of the four existing and proposed power generation facilities were calculated and the results were added to conservative background pollutant concentrations reported in the Midway and PEC AFCs. The results are presented in Table 5. As demonstrated by these results, maximum predicted concentrations for all pollutants are below applicable ambient standards, except for PM₁₀ and PM_{2.5}. For these pollutants, the maximum background concentrations exceed the state and federal standards, but the maximum contributions from the four modeled facilities are very small. Based on these dispersion modeling results it is concluded that the combined off-property pollutant impacts of the Midway facility and other cumulative sources close to the Midway site will be below the state and federal ambient air quality standards. Electronic input/output files are provided to accompany these responses.

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Table 1 CalPeak Power Emission Rates and Stack Parameters¹

| Pollutant | Averaging Time | Emission Rate (lb/hr) | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|----------------|-----------------------|------------------|--------------------|----------------------|-----------------------|
| CO | 1-, 8-hour | 10.73 | 15.24 | 3.6576 | 644.11 | 36.5608 |
| NO ₂ | 1-hour | 6.17 | | | | |
| | Annual | 0.06 | | | | |
| PM ₁₀ | 24-hour | 3.24 | | | | |
| | Annual | 0.0131 | | | | |
| SO ₂ | 1-hour | 1.42 | | | | |
| | 3-hour | 1.42 | | | | |
| | 24-hour | 1.42 | | | | |
| | Annual | 0.0033 | | | | |

¹ Two combustion turbines emitting from 1 stack. Emissions are max 1-hour values for both units operating at maximum load. Annual numbers are 2004 actual emissions.

Table 2a Wellhead Power Emission Rates and Stack Parameters - CTGs

| Pollutant | Averaging Time | Emission Rate (lb/hr) | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|---------------------|-----------------------|------------------|--------------------|----------------------|-----------------------|
| CO | 1-, 8-hour | 24.2 | 9.14 | 1.72 | 727 | 25.4 |
| NO _x | 1-hour ¹ | 6.2 | | | | |
| | Annual ² | 0.06 | | | | |
| PM ₁₀ | 24-hour | 4.45 | | | | |
| | Annual | 0.093 | | | | |
| SO ₂ | 1-hour | 1.92 | | | | |
| | 3-hour | 1.92 | | | | |
| | 24-hour | 1.92 | | | | |
| | Annual | 0.004 | | | | |

¹ Short-term emission rates based on non-thermal permit limits.

² Annual emission values are from 2005 actual emissions.

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Table 2b Wellhead Power Emission Rates and Stack Parameters - Natural Gas Fired Engine

| Pollutant | Averaging Time | Emission Rate (lb/hr)¹ | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|-----------------------|--|-------------------------|---------------------------|-----------------------------|------------------------------|
| CO | 1-, 8-hour | 4.13 | 6.1 | 0.15 | 888.71 | 38.29 |
| NO _x | 1-hour | 0.0521 | | | | |
| | Annual | 0.0521 | | | | |
| PM ₁₀ | 24-hour | 0.0514 | | | | |
| | Annual | 0.0514 | | | | |
| SO ₂ | 1-hour | 0.0075 | | | | |
| | 3-hour | 0.0075 | | | | |
| | 24-hour | 0.0075 | | | | |
| | Annual | 0.0075 | | | | |

¹ Short-term emission rate is based on allowable emission factors in g/hp-hr times 329 horsepower, i.e., maximum hourly emission rates. Annual emission rates are maximum values allowed by the permit

Table 3a PEC CTG Emission Rates and Stack Parameters – Per CTG

| Pollutant | Averaging Time | Emission Rate (lb/hr) | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|-----------------------|------------------------------|-------------------------|---------------------------|-----------------------------|------------------------------|
| CO | 1-, 8-hour | 59.2 | 27.43 | 4.115 | 692.6 | 31.535 |
| NO _x | 1-hour | 26.31 | | | | |
| | Annual | 5.53 | | | | |
| PM ₁₀ | 24-hour | 6 | | | | |
| | Annual | 3.42 | | | | |
| SO ₂ | 1-hour | 1.9 | | | | |
| | 3-hour | 1.9 | | | | |
| | 24-hour | 1.9 | | | | |
| | Annual | 1.09 | | | | |

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Table 3b PEC Firepump Emission Rates and Stack Parameters

| Pollutant | Averaging Time | Emission Rate (lb/hr) | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|-----------------------|------------------------------|-------------------------|---------------------------|-----------------------------|------------------------------|
| CO | 1-, 8-hour | 0.23 | 5.182 | 0.154 | 739.8 | 31.298 |
| NO _x | 1-hour | 1.38 | | | | |
| | Annual | 0.0082 | | | | |
| PM ₁₀ | 24-hour | 0.0022 | | | | |
| | Annual | 3.14E-04 | | | | |
| SO ₂ | 1-hour | 0.0023 | | | | |
| | 3-hour | 0.0023 | | | | |
| | 24-hour | 0.0023 | | | | |
| | Annual | 1.34E-05 | | | | |

**Table 3c PEC Cooling Tower Emission Rates and Stack Parameters
– Per Cell**

| Pollutant | Averaging Time | Emission Rate (lb/hr) | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|-----------------------|------------------------------|-------------------------|---------------------------|-----------------------------|------------------------------|
| CO | 1-, 8-hour | | 12.8 | 6.71 | 310.9 | 6.1 |
| NO _x | 1-hour | | | | | |
| | Annual | | | | | |
| PM ₁₀ | 24-hour | 0.35 | | | | |
| | Annual | 0.2 | | | | |
| SO ₂ | 1-hour | | | | | |
| | 3-hour | | | | | |
| | 24-hour | | | | | |
| | Annual | | | | | |

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Table 4 Midway CTG Emission Rates and Stack Parameters – Per Swiftpac

| Pollutant | Averaging Time | Emission Rate (lb/hr) | Stack Height (m) | Stack Diameter (m) | Exit Temperature (K) | Exit Velocity (m/sec) |
|------------------|-----------------------|------------------------------|-------------------------|---------------------------|-----------------------------|------------------------------|
| CO | 1-, 8-hour | 9.26 | 15.24 | 4.572 | 744.26 | 23.465 |
| NO _x | 1-hour | 3.21 | | | | |
| | Annual | 1.28 | | | | |
| PM ₁₀ | 24-hour | 1.85 | | | | |
| | Annual | 0.84 | | | | |
| SO ₂ | 1-hour | 0.44 | | | | |
| | 3-hour | 0.44 | | | | |
| | 24-hour | 0.44 | | | | |
| | Annual | 0.13 | | | | |

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Table 5 ISCST3 Cumulative Impact Modeling Results

| Pollutant | Averaging Period | Maximum Modeled Impact ($\mu\text{g}/\text{m}^3$) | PSD Significant Impact Level ($\mu\text{g}/\text{m}^3$) | Background ($\mu\text{g}/\text{m}^3$) | Total Predicted Concentration ($\mu\text{g}/\text{m}^3$) | UTM Coordinates | |
|---------------------------|------------------|---|---|---|--|-----------------|-----------|
| | | | | | | East (m) | North (m) |
| Cumulative Impacts | | | | | | | |
| CO | 1 hour | 173.81 | 2,000 | 7,705 | 7,879 | 716,739 | 4,058,856 |
| | 8 hour | 81.47 | 500 | 5,156 | 5,237 | 716,664 | 4,048,906 |
| NO ₂ | 1 hour | 91.70 | NA | 169.2 | 260.9 | 715,864 | 4,058,606 |
| | Annual | 0.13 | 1 | 42.0 | 42.1 | 707,675 | 4,056,950 |
| PM ₁₀ | 24 hour | 3.30 | 5 | 193.0 | 196.3 | 707,700 | 4,056,825 |
| | Annual | 0.14 | 1 | 43.0 | 43.1 | 716,689 | 4,058,881 |
| PM _{2.5} | 24 hour | 3.30 | NA | 110.0 | 113.3 | 707,700 | 4,056,825 |
| | Annual | 0.14 | NA | 21.6 | 21.7 | 716,689 | 4,058,881 |
| SO ₂ | 1 hour | 4.22 | NA | 23.6 | 27.8 | 710,925 | 4,053,600 |
| | 3 hour | 3.07 | 25 | 15.6 | 18.7 | 711,100 | 4,053,400 |
| | 24 hour | 1.04 | 5 | 10.5 | 11.5 | 707,700 | 4,056,825 |
| | Annual | 0.023 | 1 | 5.3 | 5.3 | 707,675 | 4,056,950 |

Notes:
 $\mu\text{g}/\text{m}^3$ = micrograms per cubic meter
 CO = carbon monoxide
 ISCST3 = USEPA Industrial Source Complex model, Version 02035
 m = meters
 NA = Not applicable
 NAAQS = Most stringent ambient air quality standard for the averaging period
 NO₂ = nitrogen dioxide
 PM₁₀ = particulate matter less than or equal to 10 microns in diameter
 PM_{2.5} = particulate matter less than or equal to 2.5 microns in diameter. All PM emissions during operation assumed to be PM_{2.5}
 PSD = Prevention of Significant Deterioration
 SO₂ = sulfur dioxide
 UTM = Universal Transverse Mercator