

MIDWAY DATA REQUEST NO. 23
ADDITIONAL RESPONSE

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An Excel spreadsheet describing the calculation of construction emissions for each phase of project construction has already been submitted to CEC, including a summary tab that totals up the emissions for different activities. Tables 1, 2 and 3, respectively, present the estimated maximum hourly daily and total emissions of air pollutants over the 10-month construction project. These emission numbers that were included in the construction modeling analyses for these averaging times are indicated in bold type. It is important to note that the daily emissions are not simply the total of 8 hours of the maximum hourly emissions. The maximum daily emissions are the sum of the actual estimated emissions from equipment operating at different hours of the day. In other words, not all onsite construction equipment are operating 8 hours per day and thus the maximum daily totals are less than 8 times the maximum hourly totals.

The excavation activity refers to trenching related to installation of the water line from the existing well at the CalPeak facility to the new Midway facility. Note that excavation, even though presented separately in the tables below, occurs during the first month of building, so the combined effects of excavation and building were modeled together.

**TABLE 1
HOURLY MAXIMUM CRITERIA POLLUTANT CONSTRUCTION EMISSIONS (LBS/HOUR)**

Emission Type	PM10	CO	VOC	NOx	SOx
Site Grading (Month 1)					
Combustion exhaust	0.44	3.20	1.10	10.24	0.01
Fugitive dust	0.38	-	-	-	-
Site Grading Emissions Hourly Max	0.8	3.2	1.1	10.2	0.0
MODELED EMISSIONS FOR GRADING	0.8	3.2	1.1	10.2	0.0
Excavation Water Line only (Month 2)					
Combustion exhaust	0.22	1.72	0.58	4.12	0.00
Fugitive dust	0.09	-	-	-	-
Excavation Emissions Hourly Max	0.3	1.7	0.6	4.1	0.0
Building (Months 2-10)					
Combustion exhaust	0.79	5.87	1.99	16.59	0.02
Fugitive dust	0.9	-	-	-	-
Building Emissions Hourly Max	1.7	5.9	2.0	16.6	0.02
MODELED COMBINED EXCAVATION + BUILDING EMISSIONS	2.0	7.6	2.6	20.7	0.02
On Road Vehicles (Duration of Project)					
Passenger Vehicles	21.3	-	-	-	-
Heavy Duty Trucks	-	-	-	-	-
Hourly Emissions from On-Road Vehicles	21.3	0.0	0.0	0.0	0.0

Notes:

- = not applicable

CO = carbon monoxide

lbs = pounds

NO_x = nitrogen oxide(s)

PM₁₀ = particulate matter less than 10 micrometers in diameter

VOC = volatile organic compounds

SO_x = sulfur oxide(s)

TABLE 2
DAILY MAXIMUM CRITERIA POLLUTANT CONSTRUCTION EMISSIONS (LBS/DAY)

Emission Type	PM₁₀	CO	VOC	NO_x	SO_x
Site Grading (Month 1)					
Combustion exhaust	2.51	18.19	6.19	57.46	0.05
Fugitive dust	2.33	-	-	-	-
<i>Site Grading Emissions Daily Max</i>	<i>4.8</i>	<i>18.2</i>	<i>6.2</i>	<i>57.5</i>	<i>0.1</i>
<i>MODELED EMISSIONS FOR GRADING</i>	<i>4.8</i>	<i>18.2</i>	<i>6.2</i>	<i>57.5</i>	<i>0.1</i>
Excavation Water Line only (Month 2)					
Combustion exhaust	1.17	9.30	3.09	20.72	0.02
Fugitive dust	0.44	-	-	-	-
<i>Excavation Emissions Daily Max</i>	<i>1.6</i>	<i>9.3</i>	<i>3.1</i>	<i>20.7</i>	<i>0.0</i>
Building (Months 2-10)					
Combustion exhaust	4.90	36.94	12.54	107.65	0.10
Fugitive dust	4.70	-	-	-	-
<i>Building Emissions Daily Max</i>	<i>9.6</i>	<i>36.9</i>	<i>12.5</i>	<i>107.7</i>	<i>0.1</i>
<i>MODELED COMBINED EXCAVATION + BUILDING EMISSIONS</i>	<i>11.2</i>	<i>46.2</i>	<i>15.6</i>	<i>128.4</i>	<i>0.1</i>
On Road Vehicles (Duration of Project)					
Passenger Vehicles	43.16	85.38	9.21	9.06	0.06
Heavy Duty Trucks	4.92	3.21	0.87	11.01	0.01
<i>Daily Emissions from On-Road Vehicles</i>	<i>48.1</i>	<i>88.6</i>	<i>10.1</i>	<i>20.1</i>	<i>0.1</i>

Notes:

- = not applicable

CO = carbon monoxide

lbs = pounds

NO_x = nitrogen oxide(s)PM₁₀ = particulate matter less than 10 micrometers in diameter

VOC = volatile organic compounds

SO_x = sulfur oxide(s)

TABLE 3
TOTAL PROJECT CONSTRUCTION EMISSIONS OF CRITERIA POLLUTANTS (TONS)

Emission Type	PM₁₀	CO	VOC	NO_x	SO_x
Site Grading (Month 1)					
Combustion exhaust	0.03	0.20	0.07	0.63	0.00
Fugitive dust	0.07	-	-	-	-
Total Emissions from Site Grading	0.1	0.20	0.07	0.63	0.00
Excavation Water Line only (Month 2)					
Combustion exhaust	0.01	0.10	0.03	0.23	0.00
Fugitive dust	0.00	-	-	-	-
Total Emissions from Excavation	0.02	0.10	0.03	0.23	0.00
Building (Months 2-10)					
Combustion exhaust	0.49	3.66	1.24	10.66	0.01
Fugitive dust	0.47	-	-	-	-
Total Emissions from Building	0.95	3.66	1.24	10.66	0.01
MODELED ANNUAL EMISSIONS	1.06	3.96	1.34	11.52	0.01
On Road Vehicles (Duration of Project)					
Passenger Vehicles	4.28	9.39	1.01	1.00	0.01
Heavy Duty Trucks	0.4	0.26	0.07	0.90	0.00
Total Emissions from On-Road Vehicles	4.68	9.65	1.08	1.90	0.01
Total Project Emissions (tons)	5.65	13.41	2.35	12.79	0.2

Notes:

- = not applicable

CO = carbon monoxide

NO_x = nitrogen oxide(s)PM₁₀ = particulate matter less than 10 micrometers in diameter

VOC = volatile compounds

SO_x = sulfur oxide(s)

**REVISED CUMULATIVE AIR QUALITY MODELING ANALYSIS
FOR
STARWOOD-MIDWAY AND PANOCHÉ ENERGY CENTER**

REVISED CUMULATIVE AIR QUALITY MODELING ANALYSIS
FOR
STARWOOD-MIDWAY AND PANOCHÉ ENERGY CENTER

As required by CEC policy, a dispersion modeling analysis has been conducted to evaluate the maximum cumulative air quality effects of the Starwood Power-Midway, LLC Peaking Project (Midway), the Panoche Energy Center (PEC) and other new sources within six miles of the Midway Project, 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 Project should be included because of their proximity. These two sites are the existing CalPeak Panoche 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 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 Panoche 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 Panoche and Wellhead facilities were supplied by SJVAPCD. Based on the fact that all of these facilities 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 Panoche, 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 Panoche 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 Panoche 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.

**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 stabilization permit limits.

² Annual emission values are from 2005 actual emissions.

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				

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					

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				

**TABLE 5
ISCST3 CUMULATIVE IMPACT MODELING RESULTS**

Pollutant	Averaging Period	Maximum Modeled Impact (µg/m ³)	PSD Significant Impact Level (µg/m ³)	Background (µg/m ³)	Maximum Total Predicted Concentration (µg/m ³)	Most Stringent AAQS (µg/m ³)	UTM Coordinates	
							East (m)	North (m)
Cumulative Impacts								
CO	1 hour	173.81	2,000	7,705	7,879	23,000	716,739	4,058,856
	8 hour	81.47	500	5,156	5,237	10,000	716,664	4,048,906
NO ₂	1 hour	91.70	NA	169.2	260.9	470	715,864	4,058,606
	Annual	0.13	1	42.0	42.1	100	707,675	4,056,950
PM ₁₀	24 hour	3.30	5	193.0	196.3	50	707,700	4,056,825
	Annual	0.14	1	43.0	43.1	20	716,689	4,058,881
PM _{2.5}	24 hour	3.30	NA	110.0	113.3	65	707,700	4,056,825
	Annual	0.14	NA	21.6	21.7	12	716,689	4,058,881
SO ₂	1 hour	4.22	NA	23.6	27.8	655	710,925	4,053,600
	3 hour	3.07	25	15.6	18.7	1,300	711,100	4,053,400
	24 hour	1.04	5	10.5	11.5	105	707,700	4,056,825
	Annual	0.023	1	5.3	5.3	80	707,675	4,056,950

Notes:

- µg/m³ = 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

STATUS OF MIDWAY PROJECT ERC ACQUISITION

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Information on the current status of emissions offsets for the Starwood-Midway Project was requested at the CEC Data Response and Issue Resolution Workshop (April 13, 2007). This is provided in the following table, which demonstrates that all required emission reduction credits have been acquired to offset project emissions based on the offset ratios presented in the AFC and a SO₂ to PM₁₀ interpollutant ratio of 1.87 to 1, as specified by SJVAPCD.

STATUS OF EMISSION REDUCTION CREDITS OBTAINED FOR THE STARWOOD-MIDWAY PROJECT

As Purchased		Annual	1st	2nd	3rd	4th	Comments
Cert. Number							
S-2382-2	NOx	68378	13676	18234	18234	18234	
	Re-Allocation	68378	13676	13676	23931	17095	
	Req'd	68378	13676	13676	23932	17095	
	Final NOx	0	0	0	1	0	
S-2368-1	VOC	11400	2263	3046	3046	3045	
	Re-Allocation	11400	2566	2566	3061	3207	
	Req'd	12829	2566	2566	4490	3207	
	Additional VOC	1429	0	0	1429	0	Additional VOC needed -- 1429 lb in 3 rd Qtr.
S-2423-1	VOC	1500	0	500	500	500	
	Re-Allocation		0	0	1500	0	Moved 500 pounds each to 3rd Qtr from 2nd and 4th Qtr
	Final VOC		0	0	71	0	Excess VOC -- Waiting for APCD to issue revised certificate.
S-2386-5	SO₂	90000	21500	21500	25500	21500	
	As SO ₂	4531	911	911	1595	1139	
	Req'd	4531	911	911	1595	1139	
	Final SO ₂	0	0	0	0	0	
	SO ₂ as PM ₁₀	85469	20589	20589	23905	20361	SO ₂ to be provided at 1.87 to 1 ratio to cover PM ₁₀ offset requirements
	Re-Allocation	85443	16606	20589	27491	20757	Moved 1st Qtr credits to 3rd and 4th Qtr
	Required	83028	16606	16606	29060	20757	

	Additional SO ₂	-2415	0	-3983	1568	0	Excess SO ₂ in 2nd Qtr. -- Need 1568 lb in 3rd Qtr
N-598-5	SO₂ as PM₁₀	1600	0	0	1600	0	Acquired 1600 lb in 3rd Qtr. -- Waiting for APCD to issue revised certificate.
	Re-Allocation	-4015	0	-3983	-32	0	
	SO ₂ before trade	-4015	0	-3983	-32	0	
S-2386-5	SO ₂						
	Trade for N-598-5			-3200			Traded 3200 lb in 2nd Qtr for 1600 lb in 3rd Qtr. -- Waiting for APCD to issue revised certificate.
	Final SO ₂	815	0	783	32	0	Excess SO ₂ in second Qtr