Pico Power Project

Appendix 8.1-H
Cumulative Impacts Analysis

October 2002

Appendix 8.1H, Part 1
Cumulative Impacts Analysis Protocol
Pico Power Project

Potential cumulative air quality impacts that might be expected to occur resulting from the Pico Power Plant (PPP) and other reasonably foreseeable projects are both regional and localized in nature. These cumulative impacts were evaluated as follows.

Regional Impacts

Regional air quality impacts are possible for pollutants such as ozone, which involve photochemical processes that can take hours to occur. The PPP will provide emissions offsets (mitigation) for NOx at the ratios specified in the BAAQMD regulations. Additional mitigation for other pollutants may be required by the CEC.

Although the relative importance of POC and NO_x emissions in ozone formation differs from region to region, and from day to day, most air pollution control plans in California require roughly equivalent controls (on a ton per year basis) for these two pollutants. The change in emissions of the sum of these pollutants, equally weighted, will be used to provide a reasonable estimate of the impact of the PPP on ozone levels. The net change in emissions of ozone precursors from the PPP will be compared with emissions from all sources within Santa Clara County (Table 8.1H-1), and within the Bay Area Air Basin (Table 8.1H-2) as a whole.

Table 8.1H-1 Estimated Santa Clara County Emissions Inventory for 2001 (tons/day)

Source Category	TOG	ROG	CO	NOx	SOx	PM	PM10
Total Stationary Sources	186.55	34.79	12.33	12.23	1.44	4.38	2.83
Total Area Sources	40.83	22.81	35.39	5.24	0.15	80.32	42.86
Total Mobile Sources	81.88	75.00	695.44	124.15	4.04	4.69	4.63
Total Natural Sources	0.23	0.13	1.96	0.02	-	0.32	0.30
County Total	309.50	132.74	745.11	141.65	5.64	89.70	50.63

Source: CARB

Table 8.1H-2. Estimated Bay Area Air Basin Emissions Inventory for 2001 (tons/day).

Source Category	TOG	ROG	CO	NOx	SOx	PM	PM10
Total Stationary Sources	654.06	142.78	35.29	85.30	51.67	27.09	18.34
Total Area Sources	158.46	90.10	167.94	22.75	0.67	273.27	144.75
Total Mobile Sources	328.84	303.11	2603.34	517.03	29.89	23.50	23.13
Total Natural Sources	0.37	0.21	3.20	0.05	-	0.54	0.52
Basin Total	1141.74	536.20	2809.77	625.13	82.23	324.40	186.74

Source: CARB

Air quality impacts of fine particulate, or PM_{10}, have the potential to be either regional or localized in nature. On a regional basis, an analysis similar to that presented above for ozone will be performed, looking at the three pollutants that can form PM_{10} in the atmosphere, i.e., POC, SO_x, and NO_x as well as at directly emitted particulate matter. BAAQMD regulations do not require offsets to be provided for PM_{10} emissions from the project, as facility emissions do not exceed 100 tons per year. However, full mitigation may likely be required by the CEC.

As in the case of ozone precursors, emissions of PM_{10} precursors are expected to have approximately equivalent ambient impacts in forming PM_{10}, per ton of emissions on a regional basis. Table 8.1H-3 provides the comparison of emissions of the criteria pollutants from the PPP with emissions from all sources within Santa Clara, and within the Bay Area Air Basin as a whole.

Table 8.1H-3. Comparison of PICO Project Emissions to Estimated Inventory for 2001

Category	TOG	ROG[1]	CO	NOx	SOx	PM	PM10
PPP Emissions (tons/yr)	NA	11.53	49.5	51.5	2.93	NA	30.4
PPP Emissions (tons/day)	NA	0.035	0.19	0.201	0.008	NA	0.09
County Total (tons/day)	309.5	132.74	745.11	141.65	5.64	89.70	50.63
Air Basin Total (tons/day)	1141.74	536.20	2809.77	625.13	82.23	324.40	186.74
Tons per day basis:							
PPP % of County Total	NA	0.026	0.025	0.142	0.142	NA	0.178
PPP % of Air Basin Total	NA	0.0065	0.0067	0.032	0.01	NA	0.048

[1] PPP POC emissions compared to inventory ROG emissions.

Localized Impacts

Localized impacts from the PPP could result from emissions of carbon monoxide, oxides of nitrogen, sulfur oxides, and directly emitted PM_{10}. A dispersion modeling analysis of potential cumulative air quality impacts will be performed for all four of these pollutants.

In evaluating the potential cumulative localized impacts of the PPP in conjunction with the impacts of existing facilities and facilities not yet in operation but that are reasonably foreseeable, a potential impact area in which cumulative localized impacts could occur was identified by CEC staff as an area with a radius of 8 miles around the plant site. Based on the results of the air quality modeling analyses described in AFC Section 8.1 (Air Quality), "significant" air quality impacts, as that term is defined in federal air quality modeling guidelines, have not been shown for the PPP. Typically, if the project's impacts do not exceed the significance levels, no cumulative impacts would be expected to occur, and no further analysis would be required. Notwithstanding the above, a cumulative impacts analysis was prepared for all projects identified within a search area with a radius of 8 miles beyond the project's impact area. Within this search area, three categories of projects or sources were evaluated for inclusion in the analysis:

- Projects that are existing and have been in operation prior to 1-1-2002 (emissions are included in the overall background air quality assessment).
- Projects for which air pollution permits to construct have been issued and that began operation after 1-1-2002.

- Projects for which air pollution permits to construct have been issued after 1-1-2002, but that are not yet in operation.

Projects that are existing and have been in operation prior to 1-1-2002 will be reflected in the ambient air quality data that has been used to represent background concentrations; consequently, no further analysis of the emissions from this category of facilities will be performed. The cumulative impacts analysis adds the modeled impacts of selected facilities to the maximum measured background air quality levels, thus ensuring that these existing projects are taken into account.

Projects for which air pollution permits to construct have been issued after 1-1-2002 and are in operation, and those projects issued permits after 1-1-2002 but which are not yet in operation, were identified through a request of permit records from the Bay Area Air Quality Management District. The search was requested to be performed at two levels. For permits that are considered "major modifications" (i.e., emissions increases greater than 40 tons/year of NO_x or SO_2, 25 tons/year of total suspended particulate, 15 tons/year of PM_{10}), a region within 8 miles of the proposed project site will be evaluated. For projects that had smaller emissions changes, but still greater than 15 tons/year, a region within 8 miles of the proposed project site will also be evaluated. Projects that satisfy either of these criteria and that had a permit to construct issued after January 1, 2002, will be included in the cumulative air quality impacts analysis. Projects for which the emissions change was smaller than 15 tons/year will be assumed to be *de minimus*, and will not be included in the dispersion modeling analysis.

The PPP does not, at this time, trigger PSD review. Notwithstanding the foregoing, a list of sources within the project region meeting the above noted criteria has been requested from the BAAQMD staff.

Given the potentially wide geographic area over which the dispersion modeling analysis may be performed, the ISCST3 model was used to evaluate cumulative localized air quality impacts. The detailed modeling procedures, ISCST3 options, and meteorological data used in the cumulative impacts dispersion analysis was the same as those described in the AFC Air Quality section. The receptor grid spacing was determined in consultation with the BAAQMD for the area in which the detailed modeling analysis is to be performed.

Cumulative Impacts Dispersion Modeling

The dispersion modeling analysis of cumulative localized air quality impacts for the proposed project was evaluated in combination with other reasonably foreseeable projects and air quality levels attributable to existing emission sources, and the impacts was compared to state or federal air quality standards for significant impact. As discussed above, the highest second-highest modeled concentrations was used to demonstrate compliance with standards based on short-term averaging periods (24 hours or less).

Supporting information used in the analysis included the following:

- 2000 estimated emissions inventory for Santa Clara County (Table 8.1H-1) and for the San Francisco Bay Area Air Basin (Table 8.1H-2);
- List of projects and their respective coordinate locations resulting from the screening analysis of permit files by the BAAQMD;
- Stack parameters for sources included in the cumulative air quality impacts dispersion modeling analysis; and
- Output files for the dispersion modeling analysis.

Appendix 8.1H, Part 2
Multisource Modeling Cumulative Impacts Analysis for the Pico Power Project

Procedure

A source emissions inventory was obtained from BAAQMD for the area surrounding the Pico Power Plant (PPP) project site. There were a total of 61 facilities with active Authority to Construct permits which have not yet commenced operation within 8 miles, or 12.9 kilometers, of the PPP location. at UTM coordinates 576900 meters east and 4165400 meters north. Out of the 61 facilities provided, only 30 were included in the multisource modeling analysis since the other facilities had only VOC emissions. Since many of the 30 sources had emissions less than 0.5 tons per year, the SCREEN3 model was used to reduce the number of sources. Here, each source was modeled as a point source with F stability and a 1 m/s wind speed. Any background source that was greater than or equal to the applicable SIL was included in the cumulative modeling analysis. Out of the 30 background sources, 16 were included in the final analysis. These 16 modeled facilities with PM, SO_2, NO_X, or CO emissions are shown below on Table 1.

Each multisource facility was conservatively modeled with ISCST3 as a single stack. For sources where BAAQMD did not provide stack parameters, a conservative assumption was made about the stack information that included a 10 meter high stack with negligible plume rise (ambient temperature, 0.01 m/s exit velocity, and a 0.1 meter stack diameter). Modeled emissions were based on 8760 hours/year of operation (i.e., 0.126 g/s per lb/hour x tons/year x 2000 lbs/ton / 8760 hours/year). NO_X emissions were modeled with ISC3OLM to determine 1-hour NO_2 concentrations based on the Ozone Limiting Method and annual ISCST3 NO_2 concentrations were assumed to be 75% of the annual NO_X concentrations modeled with ISCST3 and based on the Ambient Ratio Method.

The background facilities were modeled with the downwash and facility fenceline receptor grids modeled earlier for the proposed project. This was done since all maximum modeled concentrations from PPP occurred on the 10 meter facility downwash grid, or along the PPP fenceline. Results of the multisource analysis were added to maximum modeled concentration from the proposed project, independent of where the maximum occurred. Then, the maximum background concentrations were added to this total and compared to state and federal ambient air quality standards.

Results

Table 2 below summarizes the results of the cumulative modeling analysis. These maximum modeled concentrations are added to maximum background concentrations and then compared to the state and federal ambient air quality standards. As can be seen, maximum ambient (modeled plus background) concentrations are less than the applicable standards for all pollutants except 24-hour PM_{10}. For PM_{10}, the 24-hour modeled concentrations exceeded the state but not the federal ambient air quality standard. PPP's contributions to all modeled concentrations are less than the significant impact levels for all modeled receptors.

Table 1. Emissions data, 16 modeled facilities.

Plant	X(m)	Y(m)	--Emissions(tpy)-- PM	NOx	SO2	CO	Dist (km)	24 PM	ANN PM	1 NOx	ANN NOx	1 SO2	3 SO2	24 SO2	ANN SO2	1 CO	8 CO	MAX %
41	592852	4136684			0.4		0.33					20%	18%	39%	39%			39.40%
592	588123	4138060	0.1	4.5		11.7	4.97	0%	0%	4%	9%					0%	0%	8.58%
632	591782	4137720				6.2	1.40									0%	1%	1.11%
2511	593637	4135513	0.1	1.1	0.1	3.9	1.62	1%	1%	4%	8%	0%	0%	1%	1%	0%	1%	8.32%
2884	593339	4148690		1.6		2.0	11.71			1%	1%					0%	0%	1.02%
5495	589858	4138180		0.5	0.1		3.33			1%	2%	0%	0%	0%	0%			1.60%
12965	596282	4138720	0.3	9.3		37.0	3.74	1%	1%	12%	24%					1%	2%	24.33%
12969	598205	4132545		2.2		0.9	6.86			1%	3%					0%	0%	2.69%
12972	589573	4137547		0.9		0.1	3.44			1%	3%					0%	0%	2.88%
13040	593022	4130981	0.3	1.4		3.6	6.01	0%	0%	1%	2%					0%	0%	1.88%
13289	594597	4142304	44.2	75.2	5.8	73.1	5.56	66%	66%	56%	112%	4%	4%	9%	9%	1%	2%	112.20%
13300	592489	4140745		0.6		0.1	3.79			1%	2%					0%	0%	1.57%
13306	592450	4137239		2.2		0.7	0.58			49%	98%					0%	1%	98.17%
13335	594644	4128994	0.1	3.8			8.17	0%	0%	2%	4%							3.64%
13399	594703	4141884	0.1	4.5	0.1	0.7	5.19	0%	0%	4%	8%	0%	0%	0%	0%	0%	0%	7.54%
13625	590915	4138295		0.7		0.1	2.44			2%	3%					0%	0%	3.01%

Table 2. Modeling results.

Pollutant	Averaging Time	Maximum Multisource Concentration (µg/m^3)	Background (µg/m^3)	Total Ambient Concentration (µg/m^3)	PPP Contribution (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2	1-hour	197.04	244	441.04	36.91	470	-
	Annual	12.17	49	62.17	0.39	-	100
SO_2	1-hour	41.26	78.6	119.86	2.72	650	-
	3-hour	30.26	44.2	74.46	2.57	-	1300
	24-hour	10.19	21	31.19	1.01	109	365
	Annual	2.53	8	10.53	0.038	-	80
CO	1-hour	328.83	10350	10678.8	35.98	23,000	40,000
	8-hour	165.58	7811	7976.58	51.41	10,000	10,000
PM_{10}	24-hour	4.49	114	118.49	4.46	50	150
	Ann.Geo.	1.22	28.7	29.92	0.889	30	-
	Ann.Arith.	1.22	25.3	26.52	0.889	-	50