PSD Increment Consumption Status Report
April 16, 2008

Summary
Under the requirements of the Clean Air Act, the New Source Review program includes Prevention of Significant Deterioration (PSD) measures, which protect air quality in areas that currently have clean air. Bay Area Air Quality Management District Regulation 2-2-416, *Report, PSD Increment Consumption*, requires that "The District shall conduct an annual review of the increment status for each attainment pollutant, and the APCO, upon request of the Board of Directors, shall provide a report on the consumption of PSD increments which have occurred during the period of interest." This report has been prepared to satisfy that requirement.

The District has received four permit applications that required Prevention of Significant Deterioration (PSD) increment consumption analyses. The pollutants and averaging times that required analysis were the annual average nitrogen dioxide (NO_2), annual average particulate matter (PM_{10}) and 24-hour average PM_{10}. The results of the analyses showed that, within the District boundaries, the PSD increment consumption for these pollutants are below the Class II maximum allowable increases established by EPA. Table 1 lists the projects that required a PSD increment consumption analysis, the pollutants and averaging times analyzed, the increment consumed and the increment consumption allowed.

Table 1 - PSD Increment Consumption for the Bay Area,
(micrograms per cubic meter, $\mu g/m^3$)

Project Description	Plant# / Application#	Analysis Report Date	Pollutant, Averaging Period	Increment Consumed	Class II Maximum Allowed as of Report Date
Crockett Cogeneration Project, Crockett	P#8664 A#8658	02/25/1993	NO_2, Annual TSP, Annual TSP, 24-hour	7.7 8 30.8	25 19 37
Metcalf Power Plant, Coyote	P#12183, A#27215/ A#11251	04/18/2000	PM_{10}, Annual PM_{10}, 24-hour	1.1 9.3	17 30
Ox Mountain Landfill Gas-to-Energy Plant, Half Moon Bay	P#17040/ A#12649	04/06/2006	NO_2, Annual	6.5	25
Tesla Power Plant, Livermore	P#13424, A#3506	11/30/2006	PM_{10}, Annual PM_{10}, 24-hour	2.2 11.2	17 30

Average pollutant concentrations measured at air monitoring stations that have operated continuously over the period from the minor source baseline year (or earliest year after baseline year for which data is available) to 2005 show that SO_2, NO_2 and PM_{10} concentrations have decreased over time. The District's annual emission inventories show decreases in SO_2 emissions from the 1980 baseline year to 2005 and decreases in NO_2 emissions from the1988 baseline year to 2005. These data provide support that the PSD increment consumption in the District has not exceeded allowable limits.

Background

PSD increments for particulate matter (PM_{10}), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) are the maximum increases in concentration that are allowed to occur above baseline concentrations for each pollutant for which an increment has been established. Significant deterioration occurs when the amount of new pollution would exceed the applicable PSD increment. Table 2 shows the maximum allowable PSD increment by pollutant and averaging time.

Table 2 - Prevention of Significant Deterioration (PSD) Increments
Maximum Allowable Increase
(micrograms per cubic meter, $\mu g/m^3$)

Pollutant / Averaging Period	Class I	Class II	Class III
Particulate Matter:			
PM_{10}, Annual arithmetic mean	4	17	34
PM_{10}, 24-hr maximum	8	30	60
Sulfur Dioxide:			
SO_2, Annual arithmetic mean	2	20	40
SO_2, 24-hr maximum	5	91	182
SO_2, 3-hr maximum	25	512	700
Nitrogen Dioxide:			
NO_2, Annual arithmetic mean	2.5	25	50

For any period other than an annual period, the applicable increase may be exceeded during one such period per year at any one location.

The PSD requirements provide for a system of area classifications which affords States an opportunity to identify local land use goals. There are three area classifications: I, II and III. Class I areas have the smallest allowable increments and thus allow only a small degree of air quality deterioration. Class II areas accommodate normal well-managed industrial growth. Class III areas have the largest allowable increments and thereby provide for a larger amount of development that either Class I or Class II areas. In the District, the Point Reyes National Seashore, Pinnacles National Monument, Ventana National Wilderness and any other Class I area under Part C of the Clean Air Act are Class I areas. All other areas in the District are Class II areas.

An impact area is a circular area extending from the source to the most distant point where modeling indicates that the ambient impact will be significant. Table 3 shows the significance levels for each pollutant and averaging period.

Table 3 - Significance Levels for Air Quality Impacts
(micrograms per cubic meter, $\mu g/m^3$)

Pollutant	Annual	24-hour	3 hour
PM_{10}	1.0	5	-
SO_2	1.0	5	25
NO_2	1.0	-	-

All major sources that have had significant permitted increases in the applicable pollutant since the major source baseline date within 50 km of the impact area must be considered. All nearby minor sources that have had permitted increases of the applicable pollutant since the minor source baseline date and that may have an effect on air quality in the impact area must also be considered. Federal regulations establish the dates after which major and minor source impacts on increment consumption need to be considered. The minor source baseline date, which is

defined for each pollutant and area, is established at the time that the first complete PSD application affecting the pollutant and area is received by the District, regardless of whether or not the permit is ultimately denied or is voluntarily withdrawn by the applicant. The baseline concentration, which is defined for each pollutant and averaging time, is the ambient concentration of the pollutant existing at the minor source baseline date. Table 4 shows the pollutant, major source baseline date, trigger date and minor source baseline date.

Table 4 - PSD Baseline Dates

Pollutant	Major Source Baseline Date	Trigger Date	Minor Source Baseline Date
SO_2	January 6, 1975	August 7, 1977	March 25, 1980
NO_2	February 8, 1988	February 8, 1988	July 1, 1988
PM10	January 6, 1975	August 7, 1977	By County: San Francisco: March 25, 1980 San Mateo: March 25, 1980 Napa: July 29, 1983 Contra Costa: February 8, 1985 Santa Clara: March 2, 2000 Alameda: June 18, 2001 Other Counties: Not yet set

Applications Evaluated for PSD Increment Consumption

Crockett Cogeneration Project, Crockett – Crockett Cogeneration Ltd. P#8664, A#8658, February 25, 1993: An air quality impact analysis was required for the emissions of NO_2 and PM_{10} from the Crockett cogeneration project. A PSD increment consumption analysis was required for the annual average NO_2, annual average TSP, and 24-hour average TSP impacts. (Note that the current PSD increment consumption allowance is for PM_{10} and no longer for TSP.) Based on the modeling, an area approximately 7 km in radius surrounding the project site was identified as the area in which the proposed project could have a significant air quality impact on ambient NO_2 levels and an area approximately 2 km in radius surrounding the proposed project would have a significant air quality impact on ambient TSP levels. All major sources that have had significant permitted increases in NO_2 since February 8, 1988 within 57 km of the impact area and all minor sources that have had permitted increases in NO_2 since July 1, 1988 within 27 km of the impact area were included in the analysis. All major sources that have had significant permitted increases in PM_{10} since January 6, 1975 within 52 km of the impact area and all minor sources that have had permitted increases in TSP since February 8, 1985 within 22 km of the impact area were included in the analysis. The maximum modeled annual average NO_2 increment consumption is 7.7 $\mu g/m^3$, which is below the allowable Class II Increment of 25. The maximum modeled annual average TSP increment consumption is 8 $\mu g/m^3$, which is below the allowable Class II Increment of 19. The maximum modeled 24-hour average PM_{10} increment consumption is 30.8 $\mu g/m^3$, which is below the allowable Class II Increment of 37.

Metcalf Power Plant, Coyote – Metcalf Energy Center P#12183, A#27215 and A#11251, April 18, 2000: An air quality impact analysis was required for the emissions of NO_2, CO, and PM_{10} from the Metcalf power plant project. A PSD increment consumption analysis was required only for the annual average and 24-hour average PM_{10} impacts. Based on the modeling, an area approximately 2 km in radius surrounding the project site was identified as the area in which the proposed project could have a significant air quality impact on ambient PM_{10} levels. All major sources that have had significant permitted increases in PM_{10} since January 6, 1975 within 52

km of the impact area were to be included in the analysis; however, no such sources were found. Since this project establishes the minor source baseline date for Santa Clara, this project is the only minor source included in the analysis. The maximum modeled annual average PM_{10} increment consumption is 1.1 $\mu g/m^3$, which is below the allowable Class II Increment of 17. The maximum modeled 24-hour average PM_{10} increment consumption is 9.3 $\mu g/m^3$, which is below the allowable Class II Increment of 30.

Ox Mountain Landfill Gas-to-Energy Plant, Half Moon Bay - Ameresco Half Moon Bay, LLC P#17040, A#12649, April 6, 2006: An air quality impact analysis was required for the emissions of NO_2 and CO from the Ox Mountain Landfill Gas-to-Energy Plant project. A PSD increment consumption analysis was required only for the annual average NO_2 impacts. Based on the modeling, an area approximately 3.1 km in radius surrounding the project site was identified as the area in which the proposed project could have a significant air quality impact on ambient NO_2 levels. The District's emissions data bank was searched for all major sources that have had significant permitted increases in NO_2 since February 8, 1988 within 50 km of the impact area and for all minor sources that have had permitted increases in NO_2 since July 1, 1988 within 20 km of the impact area. The maximum modeled annual average NO_2 increment consumption is 6.5 $\mu g/m^3$, which is below the allowable Class II Increment of 25.

Tesla Power Plant, Livermore - Midway Power, LLC P#13424, A#3506, November 30, 2006: An air quality impact analysis was required for the emissions of NO_2, CO and PM_{10} from the Tesla Power Plant project. A PSD increment consumption analysis was required only for the annual average and 24-hour average PM_{10} impacts. The nearest Tesla Power Plant project fence line is located within 0.7 km of the boundary line between District and the San Joaquin Air Pollution Control District (SJAPCD). Based on the modeling, an area approximately 5.1 km in radius surrounding the project site was identified as the area in which the proposed project could have a significant air quality impact on ambient PM_{10} levels. Maximum ambient impacts from the project emissions, emission increases from permitted major stationary sources within 50 km of the impact area, emissions from minor stationary sources within 20 km of the impact area and estimated emission increases from area and mobile sources within 20 km of the project site were included in the analysis. Sources and impact areas within SJAPCD were included in this analysis. The maximum modeled 24-hour average PM_{10} increment consumption is 140 $\mu g/m^3$, and annual average PM_{10} increment consumption is 30 $\mu g/m^3$. Although these values exceed the allowed Class II increments for PM_{10}, the location of the exceedance is in SJAPCD, which is non-attainment for PM_{10}. The contribution of the proposed project to the maximum modeled increment consumed, located in SJAPCD, is not significant (< 1 $\mu g/m^3$). Within the District boundaries, the maximum modeled 24-hour average PM_{10} increment consumption is 11.2 $\mu g/m^3$, and annual average PM_{10} increment consumption is 2.2 $\mu g/m^3$. The Class II increment is not exceeded within the District.

Pollutant Trends

Ambient Concentrations Measured at Air Monitoring Stations

Table 5 shows SO_2 and NO_2 concentrations measured at air monitoring stations that have operated continuously over the period from the minor source baseline year to 2005. This data shows that SO_2 and NO_2 concentrations have decreased over time and provides support that the PSD increment consumption in the region has not exceeded allowable limits for these pollutants.

Table 5 - Ambient SO_2 and NO_2 Concentrations Measured at Air Monitoring Stations

Bay Area	Pollutant	Averaging Period	Minor Source Baseline Year	Baseline Year Conc., ppb[(1)]	2005 Conc., ppb[(1)]	% change
SO_2 monitors	SO_2	Annual Mean	1980	2.88	1.56	-46%
SO_2 monitors	SO_2	Max. 24-hour	1980	16.9	6.9	-59%
SO_2 monitors	SO_2	Max. 3-hour	1980	51.1	20.0	-61%
NO_2 monitors	NO_2	Annual Mean	1988	21.6	13.0	-40%

(1) Concentrations presented are an average of three years: the previous year, the year listed and the following year. SO2 data before 1991 were recorded only to the nearest 10 ppb. Thus, all observations between 0 and 4.999 were recorded as 0. David Fairley used a method that attempted to reconstruct the distribution of the observations and give a less biased result. The estimates from that method are presented. Only 6 sites, which had data records going back to 1974, were included. These sites are clustered around the refineries. Monitoring sites RI (Richmond) and SP (San Pablo) were treated as a single site (the site was moved in 1997).

No data is available for measured ambient PM_{10} concentrations prior to 1987. Table 6 shows PM_{10} concentrations measured at air monitoring stations that have operated continuously over the period from the minor source baseline year, (or earliest year after baseline year for which data is available) to 2005. This data shows that PM_{10} concentrations have decreased over time and provides support that the PSD increment consumption for PM_{10} in the region has not exceeded allowable limits.

Table 6 - Ambient PM_{10} Concentrations Measured at Air Monitoring Stations

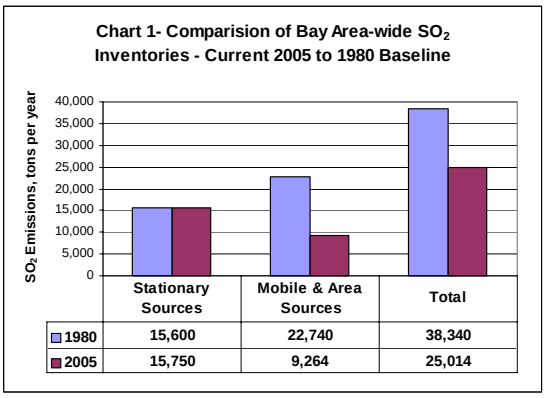
County	Pollutant	Averaging Period	Minor Source Baseline Year or Earliest Year with Available Data [(1)]	Baseline Year Concentration, ug/m^3 [(2)]	2005 Concentration, ug/m^3 [(2)]	% change
San Francisco	PM_{10}	Annual Mean	1988	30.2	21.0	-31%
San Francisco	PM_{10}	Max. 24-hour	1988	94.3	50.4	-47%
San Mateo	PM_{10}	Annual Mean	1988	30.0	19.9	-34%
San Mateo	PM_{10}	Max. 24-hour	1988	89.3	68.7	-23%
Napa	PM_{10}	Annual Mean	1988	31.9	19.7	-38%
Napa	PM_{10}	Max. 24-hour	1988	100.3	48.7	-51%
Contra Costa	PM_{10}	Annual Mean	1988	30.0	18.2	-39%
Contra Costa	PM_{10}	Max. 24-hour	1988	94.3	59.4	-37%
Alameda	PM_{10}	Annual Mean	2001	23.6	20.0	-15%
Alameda	PM_{10}	Max. 24-hour	2001	81.2	54.3	-33%
Santa Clara	PM_{10}	Annual Mean	2000	28.1	21.4	-24%
Santa Clara	PM_{10}	Max. 24-hour	2000	89.1	58.1	-35%

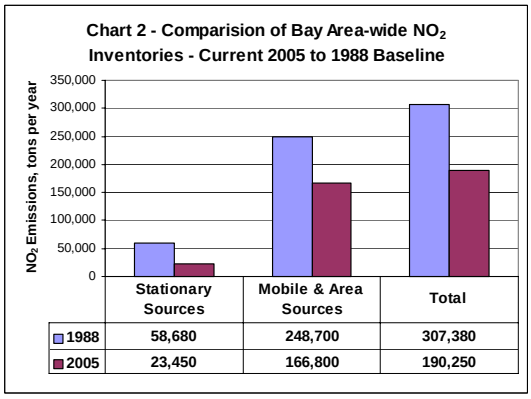
(1) Baseline year or earliest year after baseline year for which data is available. The minor source baseline year for PM_{10} in San Francisco and San Mateo Counties is 1980, for Napa County is 1983 and for Contra Costa County is 1985.

(2) Concentrations presented are an average of three years: the previous year, the year listed and the following year. PM10 wasn't measured routinely at the District until 1987. So the earliest data provided is the average for 1987-1989. There is generally one site to represent a county. These sites were chosen because they were the only ones that have operated (more or less) continuously since 1987.

Emissions Inventory - SO_2 and NO_2

Charts 1 and 2 below show the District's 2005 annual inventory and the inventory as of the baseline year for SO_2 and NO_2. Annual SO_2 emissions have decreased by 13,326 tons per year since the 1980 baseline year to 2005 and annual NO_2 emissions have decreased by 117,130 tons per year since the1988 baseline year to 2005. These data provide support that the PSD increment in the region has not exceeded allowable limits for SO_2 and NO_2.

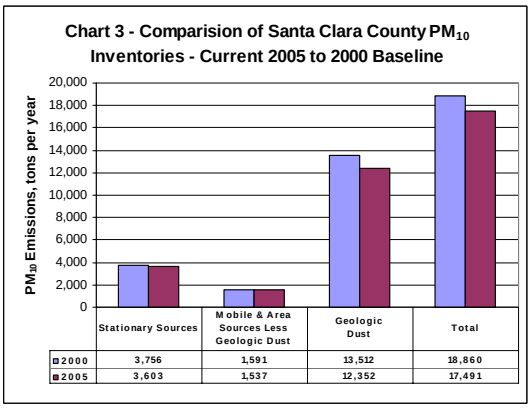


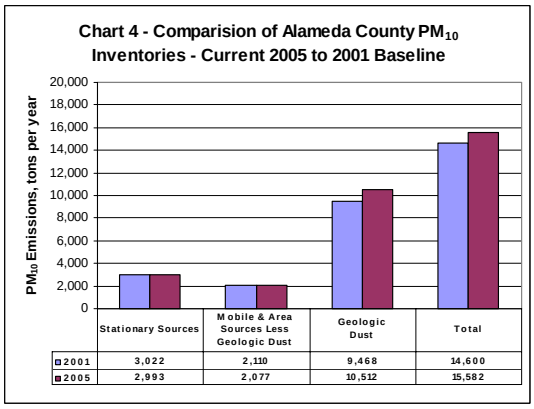


Emissions Inventory - PM_{10}

The District's annual PM_{10} inventory shows that only Santa Clara County had decreases in PM_{10} emissions from the baseline year to 2005. San Francisco, San Mateo, Napa, Contra Costa, and Alameda counties all had increases in PM_{10} inventory emissions due mainly to increases in mobile and area source emissions. However, the District's PM_{10} inventory is not as reliable as the SO_2 and NO_2 inventories because the PM_{10} inventory may overestimate emissions from entrained road dust and does not include secondary PM_{10} pollutants, ammonium sulfate and ammonium nitrate, that are formed from reactions of nitrogen oxides and sulfur oxides in the atmosphere.

The District's PM_{10} inventory estimates for mobile and area source emissions, by county, are two to five times higher than for stationary source emissions. Most of the estimated mobile and area source PM_{10} emissions are from geological dust (entrained road dust emissions). The method of estimation of the entrained road dust emissions is not very accurate. Overestimation of geological dust biases the total PM_{10} emission results. For example, Charts 3 and 4 for Santa Clara and Alameda counties show that emissions from stationary sources and other mobile and area sources are dwarfed in comparison to geological dust emissions.





Ambient measurements of PM_{10} show an order of magnitude less geological dust (e.g. entrained road dust) than that which is found in the District's PM_{10} inventory. Air monitoring data also show that there has been a significant reduction in overall PM_{10} levels as well as reductions in secondary PM_{10}. The reductions in secondary PM_{10} levels appear to be the result of SO_2 and NO_2 reductions. Air monitoring data measures PM_{10} pollutants from all causes, including secondary PM_{10} pollutants; the District's PM_{10} inventory does not.

The method of estimation of the entrained road dust emissions is not very accurate and biases the total PM_{10} inventory emissions on the high side. The PM_{10} inventory does not include secondary PM_{10} pollutant emissions and would not reflect the reduction in these emissions over time. Thus, a comparison of baseline PM_{10} inventory estimates and current PM_{10} inventory estimates would not reflect actual PM_{10} emission reductions.

Conclusion

For the pollutant PM_{10}, PSD increment consumption analysis prepared for permit applications and trends in concentrations measured at ambient air monitoring stations provide support that the PSD increment consumption in the District has not exceeded allowable limits. For pollutants SO_2 and NO_2, PSD increment consumption analysis prepared for permit applications, trends in concentrations measured at ambient air monitoring stations, and trends in emission inventory data all provide support that the PSD increment consumption in the District has not exceeded allowable limits.