San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

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May 27, 2009

Mr. Joseph Douglas
Project Manager
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

Subject: CEC Docket No. 08-AFC-1, Avenal Power Center, LLC
Interpollutant Offset Ratio Development

Dear Mr. Douglas:

In the Avenal Power Center, LLC, Preliminary Staff Assessment (PSA) Workshop, questions were raised about the development of the SOx for PM10 interpollutant offset ratio used in the District's Final Determination of Compliance (FDOC) for this project. These questions were clarified in a Report of Conversation provided by the CEC (Brewster Birdsall) on February 19, 2009, to the District.

The methodology used for an interpollutant offset ratio in this project is the same methodology that has been used in numerous previous projects, such as Starwood Power – Midway Peaking Power Plant (06-AFC-10), Panoche Energy Center (06-AFC-5) and MID Electrical Generating Station – Ripon (03-SPPE-1). District Rule 2201, Section 4.13.3, requires a project that proposes to use interpollutant offsets to not cause or contribute to a violation of an ambient air quality standard, and the offset ratio will be based on an air quality analysis. As this is tied to whether the project would cause or contribute to a violation of an ambient air quality standard, the interpollutant analysis will look at the project location. Additionally, District Rule 2201, Section 4.8, contains the requirements for the use of credits from reductions that occurred away from the project location, and are not conditional upon whether the offsetting is interpollutant or not.

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The specific questions raised in the Report of Conversation are answered in an attachment to this letter. However, on a more general note, the methodology uses the best available and most recent modeling for the area in which the project is proposed. At the time this analysis was performed for this project, that modeling was from regional studies and models, and cannot be defined at finer resolution than a county-wide analysis. The county-wide modeling is used to determine the relationship between air monitoring data and industrial source emissions. This is done by determining the industrial source contribution to PM10 ambient levels and relating that to the PM10 industrial source inventory, and doing the same for the sulfate portion of the PM10 ambient levels and the SOx inventory. These two numbers are then used to calculate the amount of SOx emissions that would have the same impact on ambient PM10 levels as one ton of directly emitted PM10, which is the interpollutant offset ratio.

It should be noted that since the analysis was performed for this project, the District has undertaken a more comprehensive evaluation of interpollutant offset ratios for PM10, using modeling done for our PM2.5 SIP, and expanding this valley-wide rather than county by county. This latest analysis shows that the SOx to PM10 ratio is 1:1 for every location in the San Joaquin Valley. The summary of this analysis is included as an attachment, and this summary has also been submitted with the Preliminary Determinations of Compliance for three current projects: Tracy Combined Cycle Power Plant (08-AFC-7), Lodi Energy Center (08-AFC-10) and Henrietta Combined Cycle Power Plant (Henrietta Peaker Amendment 01-AFC-18C). The full analysis for each of these submittals is available upon request.

Additionally, we would like to take this opportunity to address an apparent conceptual misunderstanding represented by one statement within the PSA. On page 4.1-31, under Particulate Matter, the PSA questions if using SOx for PM10 offsets would interfere with the District's 2008 PM2.5 Plan. This question is apparently based on the Plan's conclusion that reducing SOx is not as effective as reducing directly emitted PM2.5 or NOx. It must be pointed out that the Plan does not conclude that reducing SOx has no impact on reducing PM2.5, instead it concludes that the inventory of SOx is too small to have enough of an impact on ambient PM2.5 levels, especially compared to the inventories of directly emitted PM2.5 and NOx, for SOx inventory reductions to be considered as a major element of the attainment strategy. The goals of the plan, for which types of control measures to pursue, do not have a direct connection to the atmospheric relationships, as the goals must take into account the relative pollutant and precursor inventories and potential reductions from identified control measures, and therefore have no direct bearing on an interpollutant offset ratio analysis.

We believe that this letter, along with the attachments, answers all of your questions on the interpollutant offset ratio determined for this project. If you have any further questions regarding this matter, please contact myself at (559) 230-6000 or at jim.swaney@valleyair.org.

Sincerely,

David Warner
Director of Permit Services

Jim Swaney, P.E.
Permit Services Manager

DW:js

Attachments

Attachment I

Answers to the nine specific questions from the CEC Record of Conversation

1. Has the SJVAPCD provided the methodology used in developing the interpollutant trading ratios to either U.S. EPA or the California Air Resources Board for comment and/or review?

A. Yes. Projects triggering New Source Review that contain this analysis method have been submitted to both US EPA and CARB for their review. The modeling methods used to prepare the basis for the analysis were submitted to both US EPA and CARB as part of prior State Implementation Plan (SIP) submissions. Modeling protocols were submitted to both US EPA and CARB for this SIP modeling. The Chemical Mass Balance (CMB) modeling was performed by CARB in consultation with the District and the District performed speciated rollback modeling based on the results of CMB output that were submitted for review by both US EPA and CARB. The use of these modeling results as the basis for the interpollutant assessment was selected due to the extensive review which this information has already received.

2. What is the role of the Chemical Mass Balance modeling in developing the ratios?

A. CMB receptor analysis provides evaluation which differentiates motor vehicle exhaust and vegetative burning from industrial emissions. An interpollutant relationship requires identifying how much particulate is observed per ton of emissions released. A ratio determination would only be qualitative without the ability to separate industrial emissions from other sources. CMB does not provide the full analysis by itself. The analysis also uses speciated rollback, with consideration of spatial extent of contributing sources, and regional modeling, to provide the nonlinear relationship for secondary formation of particulates from nitrogen oxides and sulfur oxides.

3. What years of ambient air quality data were used and how do the interpollutant ratios vary over the years?

A. Much of the analysis was conducted using the extensive evaluation of special sampling collected in 1999-2001 for the California Regional PM10/PM2.5 Air Quality Study (CRPAQS). Extensive evaluation was used to identify contributing sources and spatial influence of sources. Additionally, the speciation analysis projected the results to design value years for the SIP and future projected years. Recent reevaluation with new regional modeling conducted for the 2008 PM2.5 Plan answers the second part of the question by showing that there is very little change projected for the ratio between 2005 and 2014 (summary of the evaluation is included as an attachment). This information was not available at the time of the evaluation of this project.

4. Does the inventory of sulfate emissions (shown in the Avenal FDOC as 3.15 ton per day for Kings and Tulare County, with a typo saying "NOx" on the SJVAPCD sulfate spreadsheet) include the inventory of banked sulfur dioxide credits for that area, and if not, should it?

A. No, banked emission reduction credits are not included in the inventory, and they do not need to be included. District SIP modeling procedures include forecasting of growth for future years for all emission categories. Experience at the District has indicated that growth projections adequately represent the future increases. It is not reasonable to assume that the use of emission credits would be larger than the maximum of trends of industrial growth. Therefore, the growth estimate is considered as a reasonable estimate of emissions increase with or without the use of emission credits.

5. In the February 13, 2009 "Draft Initial Comments" on the PSA from Avenal Power Center to CEC, Avenal says that "the relevant emission inventory and ambient air quality data for purposes of evaluating interpollutant trading ratios should come from the general vicinity of the new source of emissions [...]." CEC staff asks, how is the wider geographical scope considered, given that the locations of the proposed SOx credits (mainly from Stockton or Kern County) are outside the boundaries of the Kings and Tulare County inventory?

A. The ratio analysis was conducted on a County specific basis. The wider scope of particulate influence is accounted for in District SIP modeling, but not in terms pertinent to this question. Provisions within the District New Source Review Rule (Rule 2201, Section 4.8) adjust for the use of offsite reductions.

6. Given that the inventory of Kings and Tulare County is used to develop the ratio, should Avenal be required to surrender only credits from Kings and Tulare County?

A. No. Only if the proposed project was, by itself, capable of producing a local exceedance of the ambient air quality standard would it be necessary to require credits that are local. The creation or retirement of credits from areas with higher PM levels should be considered as highly desirable; therefore, the use of credits issued with Kern County should be especially favorable, but no special weighting criteria has been established to encourage this use. The District New Source Review Rule allows the use of credits issued in the San Joaquin Valley with appropriate consideration for distance from the proposed emission source.

7. Should a separate interpollutant ratio be applied to each credit considering the inventory and air quality of the vicinity of each original credit, rather than use a single local ratio for all distant credits?

A. No, District regulations call for the analysis to establish reasonable requirements for the proposed facility location. The atmospheric relationships where a credit was issued are not germane to the evaluation of the proposed facility.

8. Should a single district-wide interpollutant trading ratio, or the worst-case of the vicinity interpollutant ratios, be applied to all new source transactions in the district, since new sources may use credits from parts of the district with different local inventories and air quality?

A. Not for this request. The District had not determined at the time of this project what a District-wide ratio should be. The evaluation was conducted at a local level in accordance with District regulations, as has been done in past projects. Recent requests for a ratio evaluation in the Northern part of the San Joaquin Valley have led to a determination that a valley-wide approach will be the best option for the District to address these requests in the future. This constitutes a change from policy in effect when the Avenal request was processed.

9. What would be the interpollutant trading ratio considering a district-wide inventory and district-wide ambient air quality data?

A. A valley-wide ratio has recently been determined, and the evaluation summary is included as an attachment. This was evaluated with new modeling conducted for the 2008 PM2.5 Plan and establishes a ratio of 1:1 for SOx to PM2.5 and PM10 and 2.63:1 for NOx to PM2.5 and PM10, for projects received in 2009 and thereafter to 2014. This information was not available at the time of the original evaluation for Avenal.

Attachment II

Interpollutant Offset Ratio Explanation

The Air District's Rule 2201, "New and Modified Source Review", requires facilities to supply "emissions offsets" when a permittee requests new or modified permits that allow emissions of air contaminants above certain annual emission offset thresholds. In addition, Rule 2201 allows interpollutant trading of offsets amongst criteria pollutants and their precursors upon the appropriate scientific demonstration of an adequate trading ratio, herein referred to as the interpollutant ratio. A technical analysis is required to determine the interpollutant offset ratio that is justified by evaluation of atmospheric chemistry. This evaluation has been conducted using the most recent modeling analysis available for the San Joaquin Valley. The results of the analysis are designed to be protective of health for the entire Valley for the entire year, by applying the most stringent interpollutant ratio throughout the Valley.

It is appropriate for District particulate offset requirements to be achieved by either a reduction of directly emitted particulate or by reduction of the gases, called particulate precursors, which become particulates from chemical and physical processes in the atmosphere. The District interpollutant offset relationship quantifies precursor gas reductions sufficient to serve as a substitute for a required direct particulate emissions reduction. Emission control measures that reduce gas precursor emissions at the facility may be used to provide the offset reductions. Alternatively, emission credits for precursor reductions may be used in accordance with District regulations.

The amount of particulate formed by the gaseous emissions must be evaluated to determine how much credit should be given for the gaseous reductions. Gases combine and merge with other material adding molecular weight when forming into particles. Some of the gases do not become particulate matter and remain a gas. Both the extent of conversion into particles and resulting weight of the particles are considered to establish mass equivalency between direct particulate emissions and particulate formed from gas precursors. The Interpollutant offset ratio is expressed as a per-ton equivalency.

The District interpollutant analysis uses the most recent and comprehensive modeling of San Joaquin Valley particulate formation from sulfur oxides (SOx) and nitrogen oxides (NOx). Modeling compares industrial directly emitted particulate to particulate matter from precursor emissions. The interpollutant modeling procedure, assumptions and uncertainties are documented in an extensive analysis file. Additional documentation of the modeling procedure for the San Joaquin Valley is contained in the 2008 PM2.5 Plan and its appendices. The 2008 PM2.5 Plan provides evaluation of the atmospheric relationships for direct particulate emissions and precursor gases when they are highest during the fourth quarter of the year. The southern portion of the Valley is evaluated by both receptor modeling and regional modeling of chemical relationships for precursor particulate formation. Regional modeling was conducted for the entire Valley through 2014. The two modeling approaches are combined to determine interpollutant offset ratios applicable to, and protective of, the entire Valley (SOx for PM 1:1 and NOx for PM 2.629:1).

DEVELOPMENT OF THE INTERPOLLUTANT RATIO

For the proposed substitution of reductions of sulfur oxides (SOx) or nitrogen oxides (NOx) for directly emitted particulate matter

March 2009

Introduction

Goal of Interpollutant Evaluation: Establish the atmospheric exchange relationship for substitution of alternative pollutant or precursor reductions for required reductions of directly emitted particulate

Evaluation to establish the atmospheric relationship of different pollutants is required as a prerequisite for establishing procedures for allowing a required reduction to be met by substitution of a reduction of a different pollutant or pollutant precursor. Proposed new facility construction or facility modifications may result in increased emissions of a pollutant. The District establishes requirements for reductions of the pollutant to "offset" the proposed increase. A facility may propose a reduction of an alternative pollutant or pollutant precursor where reductions of that material have already been achieved at the facility beyond the amount required by District regulations or where emission reductions credits for reductions achieved by other facilities are economically available; however, for such a substitution to be allowed the District must establish equivalency standards for the substitution. The equivalency relationship used for offset requirements is referred to in this discussion as the interpollutant ratio. The interpollutant ratio is a mathematical formula expressing the amount of alternative pollutant or precursor reduction required to be substituted for the required regulatory reduction. This discussion is limited to the atmospheric relationships and does not address other policy or regulatory requirements for offsets such as are contained in District Rule 2201.

The following description is provided to explain key elements of the analysis conducted to develop the atmospheric relationship between the commonly requested substitutions. Emission reductions of sulfur oxide emissions or nitrogen oxide emissions are proposed by many facilities as a substitution for reduction of directly emitted particulates. Elemental and organic carbon emissions are the predominant case and dominant contribution to directly emitted particulate mass from industrial facilities, although other types of directly emitted particulates do occur. Therefore this atmospheric analysis examines directly emitted carbon particulates from industrial sources in comparison to the formation of particles from gaseous emissions of sulfur oxides and nitrogen oxides.

Analyses included in Interpollutant evaluation

Factors Considered

The foundation for this analysis is provided by the atmospheric modeling conducted for the 2008 PM2.5 Plan. Modeling conducted for this State Implementation Plan was conducted by the District and the California Air Resources Board using a variety of modeling approaches. Each separate model has technical limitations and uncertainties. To reduce the uncertainty of findings, a combined evaluation of results of all of the modeling methods is used to establish "weight of evidence" support for technical analysis and conclusions. The modeling methods are supported by a modeling protocol which was sent to ARB and EPA Region IX for review and was included in the appendices to the Plan.

The analysis file prepared for the interpollutant ratio evaluation includes emissions inventories, regional model daily output files, chemical mass balance modeling and speciated rollback modeling as produced for the 2008 PM2.5 Plan. This well examined and documented modeling information was used as a starting point for additional evaluation to determine interrelationships between directly emitted pollutants and particulates from precursors.

The interpollutant ratio analysis is limited to evaluation of directly emitted PM2.5 from industrial sources and formation of PM2.5 from precursor gases. While both directly emitted particulates and particulate from precursor gases also occur in the PM10 size range, there is much more uncertainty associated with deposition rates and particle formation rates for the larger size ranges. Additionally, because PM2.5 is a subset of PM10; all reductions of PM2.5 are fully creditable as reductions towards PM10 requirements. This analysis concentrates on the quarter of the year when both directly emitted carbon from industrial sources and secondary particulates are measured at the highest levels. Assessing atmospheric ratios at low concentrations is subject to much greater uncertainty and has limited value toward assessment of actions to comply with the air quality standards.

Elements from 2008 PM 2.5 Plan

- Regional modeling daily output for eleven locations
- Chemical Mass Balance (CMB) modeling for four locations – source analysis, speciation profile selection, event meteorology evaluation
- Receptor speciated rollback modeling with adjustment for nitrate nonlinearity for four locations, evaluation of spatial extent of contributing sources
- Emission inventories and projections to future years as developed for the 2008 PM 2.5 Plan

- Modeling protocols for receptor modeling, regional modeling, and Positive matrix Factorization (PMF) analysis and evaluation of technical issues applicable to particulate formation in the San Joaquin Valley
- Model performance analysis as documented in appendices to the 2008 PM 2.5 Plan

Extension by additional analysis

Additional evaluation was conducted to evaluate the receptor modeling relationship between direct PM from industrial sources and sulfate and nitrate particulate formed from SOx and NOx precursor gases. Area of influence adjustments were evaluated to ensure appropriate consideration of contributing source area for different types of pollutants for both directly emitted and secondary particulate. This evaluation was possible only for the southern four Valley counties and was conducted for both 2000 and 2009.

The regional model output was evaluated for the fourth quarter to evaluate general atmospheric chemistry in 2005 and 2014 to determine the correlation between northern and southern areas of the Valley. This evaluation determined that the atmospheric chemistry observed and modeled in the north was within the range of values observed and modeled in the southern SJV. This establishes that a ratio protective of the southern Valley will also be protective in the north.

The District determined from the additional analyses of both receptor and regional modeling that the most stringent ratio determined for the southern portion of the Valley would also be protective of the northern portion of the Valley. Due to the regional nature of these pollutants, actions taken in other counties must be assumed to have at least some influence on other counties; therefore to achieve attainment at the earliest practical date it is appropriate to require all counties to establish a consistent interpollutant ratio for the entire District.

Strengths

The interpollutant ratio analysis uses established and heavily reviewed modeling and outputs as foundation data. Analysis of model performance has already been completed for the models and for the emissions inventories used for this analysis. The modeling was performed in accordance with protocols developed by the District and ARB and in accordance with modeling guidelines established by EPA. The combination of modeling approaches provides an analysis for the current year and provides projection to 2014. Weight of evidence comparison of various modeling approaches establishes the reliability of the foundation modeling, with all modeling approaches showing strong agreement in predicted results. Additional analysis performed to develop the interpollutant ratio uses both regional and receptor evaluations which were the primary models used for the 2008 PM 2.5 Plan.

Limitations

Both industrial direct emissions and secondary formed particulate may be both PM2.5 and PM10. The majority of secondary particulates formed from precursor gases are in the PM2.5 range as are most combustion emissions from industrial stacks, however both secondary and stack emissions do contain particles larger than PM2.5. Regional modeling is more reliable for the smaller fraction due to travel distances and deposition rates. Large particles have much higher deposition and are much more difficult to replicate with a regional model. This leads to a strong technical preference for evaluating both emission types in terms of PM2.5 because the integration of receptor analysis and regional modeling for coarse particle size range up to PM10 has a much greater associated uncertainty.

Analyses contained in Receptor modeling

Factors Considered

This modeling approach uses speciated linear modeling based on chemical mass balance evaluation of contributing sources with San Joaquin Valley specific identification of contributing source profiles, adjustments from regional modeling for the nonlinearity of nitrate formation, adjustments for area of influence impacts of contributing sources developed from back trajectory analysis of high concentration particulate episodes and projections of future emission inventories as developed for the 2008 PM2.5 Plan.

Analyses in receptor modeling that use input from regional modeling

The receptor modeling analysis uses a modified projection of nitrate particulate formation from nitrogen oxides based upon results of regional modeling. The atmospheric chemistry associated with nitrate particulate formation has been determined to be nonlinear; while the default procedures for speciated rollback modeling assume a linear relationship. This adjustment has been demonstrated as effective in producing reliable atmospheric projections for the prior PM10 Plans.

Extension by additional analysis

Additional evaluations were added to results of the receptor modeling performed for the 2008 PM2.5 Plan. Calculations determine the observed micrograms per ton of emission for each contributing source category that can be resolved by chemical mass balance modeling methods. These ten categories allow differentiation of industrial direct emissions of organic and elemental carbon from other sources that emit elemental and organic carbon. The interpollutant calculation is developed as an addition to the receptor analysis by calculating the ratio of emissions per ton of directly emitted industrial PM2.5 to the per ton ratio of secondary particulate formed from NOx and SOx emissions. Summary tables and issue and documentation discussion was added to the analysis.

Strengths

Receptor modeling provides the ability to separately project the effect of different key sources contributing to carbon and organic carbon. This is critical for establishing the atmospheric relationship between industrial emissions and the observed concentrations due to industrial emissions. Regional modeling methods at this time do not support differentiation of vegetative and motor vehicle carbon contribution from the emissions form industrial sources. The area of influence of contributing sources was also considered as a factor with the methods developed by the District to incorporate the gridded footprint of contributing sources into the receptor analysis. While regional

models use gridded emissions, current regional modeling methods do not reveal the resulting area of influence of contributing sources.

Limitations

Receptor modeling uses linear projections for future years and cannot account for equilibrium limitations that would occur if a key reaction became limited by reduced availability of a critical precursor due to emission reductions. The regional model was used to investigate this concern and did not project any unexpected changes due to precursor limitations.

Analyses contained in Regional modeling

Factors Considered

The analysis file includes the daily modeling output representing modeled values for the base year 2005 and predicted values for 2014 for each of the eleven Valley sites that have monitoring data for evaluation of the models performance in predicting observed conditions. These sites are located in seven of the eight Valley counties. Madera County does not have monitoring site data for this comparison.

Modeling data for all quarters of the year was provided. Due to the higher values that occur due to stagnation events in the fourth quarter, both industrial carbon concentrations and secondary particulates forming from gases are highest in the fourth quarter. Evaluating the interpollutant ratio for other quarters would be less reliable and of less significance to assisting in the reduction of high particulate concentrations. Modeling for lower values has higher uncertainty. Modeling atmospheric ratios when the air quality standard is being met are axiomatically not of value to determining offset requirements intended to assist in achieving compliance with the air quality standard. However, for consistency of analysis between sites, days when the standard was being met during the fourth quarter were not excluded from the interpollutant ratio analysis. Bakersfield fourth quarter modeled data included only eight days that were at or below the standard. Fresno and Visalia sites averaged twelve days; northern sites 24 days and the County of Kings 38 days.

Modeling output provided data for both 2005 and 2014. While there is substantial emissions change projected for this period, the regional modeling evaluation does not project much change in the atmospheric ratios of directly emitted pollutants and secondary pollutants from precursor gases. This indicates that the equilibrium processes are not expected to encounter dramatic change due to limitation of reactions by scarcity of one of the reactants. This further justifies using the receptor evaluation determining the interpollutant ratio for 2009 through the year 2014 without further adjustment. If observed air quality data demonstrates a radical shift in chemistry or components during the next few years, such a change could indicate that a limiting reaction has been reached that was not projected by the model and such radical changes might require reassessment of the conclusion that the ratio should remain unchanged through 2014.

Extension by additional analysis

Regional modeling results prepared for the 2008 PM2.5 Plan were analyzed to extract fourth quarter data for all sites. The atmospheric chemistry for all counties was analyzed for consistency and variation. This analysis provided a determination that the secondary formation chemistry and component sources contributing to concentrations observed in the north fell within the range of values similarly determined for the southern four counties. Based upon examination of the components and chemistry, the northern counties would be expected to have an interpollutant ratio value less than the

ratio determined for Kern County but greater than the one for Tulare County. This establishes that the interpollutant ratio determined by receptor analysis of the southern four counties provides a value that is also sufficiently protective for the north.

Strengths

Regional models provide equilibrium based evaluations of particulate formed from precursor gases and provide a regional assessment that covers the entire Valley. The projection of particulate formed in future years is more reliable than linear methods used for receptor modeling projections.

Limitations

The regional model does not provide an ability to focus on industrial organic carbon emissions separate from other carbon sources such as motor vehicles, residential wood smoke, cooking and vegetative burning. Regional modeling does not provide an assessment method for determination of sources contributing at each site or the area of influence of contributing emissions. Receptor analysis provides a more focused tool for this aspect of the evaluation.

Results and Documentation

SJVAPCD Interpollutant Ratio Results

SOx for PM ratio: 1.000 ton of SOx per ton of PM

NOx for PM ratio: 2.629 tons of NOx per ton of PM

These ratios do not include adjustments for other regulatory requirements specified in provisions of District Rule 2201.

The results of the modeling analysis developed an atmospheric interpollutant ratio for NOx to PM of 2.629 tons of NOx per ton of PM. This result was the most stringent ratio from the assessment industrial carbon emissions to secondary particulates at Kern County; with Fresno, Tulare and Kings counties having a lower ratio. The assessment of chemistry from the regional model required comparison of total carbon to secondary particulates and is therefore not directly useful to establish a ratio. However, the regional model does provide an ability to compare the general atmospheric similarity and compare changes in chemistry due to Plan reductions. Evaluation revealed that the atmospheric chemistry of San Joaquin, Stanislaus and Merced counties falls within the range of urban characteristics evaluated for the southern four counties; therefore the ratio established should be sufficiently protective of the northern four counties. Additionally, comparison of future year chemistry showed minimal change in pollutant ratio due to the projected changes in the emission inventory from implementation of the Plan. The SOx ratio as modeled indicates a value of less than one to one due to the increase in mass for conversion of SOx to a particulate by combination with other atmospheric compounds; however, the District has set guidelines that require at least one ton of an alternative pollutant for each required ton of reduction in accordance with District Rule 2201 Section 4.13.3. Therefore the SOx interpollutant ratio is established as 1.000 ton of SOx per ton of PM. These ratios do not include adjustments for other regulatory considerations, such as other provisions of District Rule 2201.

A guide to the key technical topics and the reference material relevant to that topic is found on the next page. References from the 2008 PM2.5 Plan may be obtained by requesting a copy of that document and its appendices or by downloading the document from http://www.valleyair.org/Air_Quality_Plans/AQ_Final_Adopted_PM25_2008.htm. References in Italics are spreadsheets included in the interpollutant analysis file "09 Interpollutant Ratio Final 032909.xls" which includes 36 worksheets of receptor modeling information from the 2008 PM2.5 Plan, 11 modified and additional spreadsheets for this analysis and two spreadsheets of regional model daily output. This file is generally formatted for printing with the exception of the two spreadsheets containing the regional model output "*Model-Daily Annual*" and "*Model-Daily Q4*" which are over 300 pages of raw unformatted model output files. The remainder of the file is formatted to print at approximately 100 pages. This file will be made available on request but is not currently posted for download.

Interpollutant Ratio Issues & Documentation

	TOPIC	Reference
1	**Reason for using PM2.5 for establishing the substitution relationship between direct emitted carbon PM and secondary nitrate and sulfate PM:** consistency of relationship between secondary particulates and industrial direct carbon combustion emissions.	2008 PM2.5 Plan, Sections 3.3.2 through 3.4.2
2	**Reason for using 4th Quarter analysis:** Highest PM2.5 for all sites.	*DV Qtrs*
3	**Reason for using analysis of southern SJV sites to apply to regional interpollutant ratio:** Northern site chemistry ratios are within the range of southern SJV ratios. Peak ratio will be protective for all SJV counties.	*Q4 Model Pivot, Model-site chem, Model-Daily Q4*
4	**Reason for using combined results of receptor and regional model:** Receptor model provides breakdown of different carbon sources to isolate connection between industrial emissions and secondary PM.	2008 PM2.5 Plan, Appendix F
	Regional model provides atmospheric information concerning the northern SJV not available from receptor analysis.	2008 PM2.5 Plan, Appendix G
5	**Most significant contributions of receptor evaluation:** Separation of industrial emissions from other source types. Area of influence evaluation for contributing sources.	2008 PM2.5 Plan, Appendix F
6	**Most significant contributions of regional model:** Scientific equilibrium methods for atmospheric chemistry projections for 2014. Receptor technique is limited to linear methods.	2008 PM2.5 Plan, Appendix G
7	**Common area of influence adjustments used for all receptor evaluations:**	
	Geologic & Construction, Tire and Brake Wear, Vegetative Burning - contribution extends from more than just the urban area (L2)	Modeling evaluation by J. W. Sweet February 2009 Reflected in *IPR* County *2000-2009* worksheets
	Mobile exhaust (primary), Organic Carbon (Industrial) primary, Unassigned - contribution extends from more than larger area, subregional (L3)	
	Secondary particulates from carbon sources are dominated by the local area with some contribution from the surrounding area (average of L1 and L2)	
	Marine emissions not found present in CMB modeling for this analysis.	
8	**Variations to reflect secondary area of influence specific to location:**	
	Fresno: Evaluation shows extremely strong urban signature (L1) for secondary sources Kern: Evaluation shows a strong urban signature mixed with emissions from the surrounding industrial areas (average L1 and L2) for both carbon and secondary sources Kings and Tulare: Prior evaluation has show a shared metropolitan contribution area (L2)	Modeling evaluation by J. W. Sweet February 2009 Reflected in *IPR* County *2000-2009* worksheets
9	**Reasons for using 2009 Interpollutant Ratio Projection:**	
	2009 Interpollutant ratio is consistent with current emissions inventories	2008 PM2.5 Plan
	Regional modeling does not show a significant change in chemical relationships through 2014.	*Q4 Model Pivot*
10	**Reason for using SOx Interpollutant Ratio at 1.000:** A minimum offset ratio is established as 1.000 to 1.000 consistent with prior District policy and procedure for interpollutant offsets.	District Rule 2201 Section 4.13.3

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION
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APPLICATION FOR CERTIFICATION
For the AVENAL ENERGY PROJECT

Docket No. 08-AFC-1
PROOF OF SERVICE
(Revised 5/27/2009)

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DECLARATION OF SERVICE

I, Teraja` Golston, declare that on June 02,2009, I served and filed copies of the attached Avenal Energy (08-AFC-1) Inter Pollutant Offset Ratio. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[www.energy.ca.gov/sitingcases/avenal]. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

✓ sent electronically to all email addresses on the Proof of Service list;

✓ by personal delivery or by depositing in the United States mail at _____with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

✓ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-1
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original signed by
Teraja` Golston