UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

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OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: 2008 Lead (Pb) National Ambient Air Quality Standards (NAAQS) Implementation Questions and Answers

FROM: Scott L. Mathias
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TO: Regional Air Division Directors, Regions I-X

The attached 2008 Pb NAAQS Questions and Answers document addresses issues we have received from the Regional Offices, states and industry. The document provides guidance and additional clarification that will be helpful for the Attainment Demonstration State Implementation Plans (SIPs) that are due June 30, 2012, for the first round of designations and June 30, 2013, for the second round of designations. Please distribute to your states, local agencies and Tribal governments. Regional Office staff may contact Mia South at (919) 541-5550 or south.mia@epa.gov with any questions.

Attachment

2008 LEAD (Pb) NAAQS IMPLEMENTATION
Questions and Answers

INFRASTRUCTURE STATE IMPLEMENTATION PLANS (SIPs)

1 Q. Are states required to submit "infrastructure SIPs" for the revised Lead national ambient air quality standards (NAAQS)?

A. Yes. Under section 110 of the Clean Air Act (CAA), all states (including those without any nonattainment areas) are required to submit infrastructure SIPs within three years of the promulgation of a new or revised NAAQS. Since the Lead NAAQS was signed and widely disseminated on October 15, 2008, the infrastructure SIPs are due by October 15, 2011. Among the requirements for an infrastructure SIP is a permit program implementing prevention of significant deterioration (PSD).

PREVENTION OF SIGNIFICANT DETERIORATION (PSD) AND NONATTAINMENT NEW SOURCE REVIEW (NSR)

2 Q. What are the requirements under the Prevention of Significant Deterioration (PSD) and nonattainment New Source Review (NSR) permitting programs for Lead?

A. The PSD program and nonattainment NSR programs are often referred to as the major NSR program because these programs regulate only major stationary sources. The PSD program applies when a major stationary source of any pollutant, located in an area designated as attainment or unclassifiable for any criteria pollutant, is constructed, or undergoes a major modification. The nonattainment NSR program applies when a major source of a criteria pollutant that is located in an area that is designated as nonattainment for that pollutant is constructed or undergoes a major modification. The major source threshold under the PSD program is generally either 100 or 250 tons per year (tpy) of any regulated NSR pollutant, depending upon whether the source is included within one of the categories of sources listed in the applicable PSD regulations (40 CFR 51.166(b)(1)(i)(a) or 52.21(b)(1)(i)(a)). The major source threshold for Lead under the nonattainment NSR program is 100 tpy for all source categories. Accordingly, the nonattainment NSR program for Lead applies when any major source of Lead located in an area designated nonattainment for Lead is constructed, or undergoes a major modification. Under both programs, a major modification is a project at a major stationary source that results in a significant emissions increase and a significant net emissions increase, where "significant" for Lead emissions is defined as 0.6 tpy.

The PSD requirements include but are not limited to the following:

• Installation of Best Available Control Technology (BACT);
• Air quality monitoring and modeling analyses to ensure that a project's emissions will not cause or contribute to a violation of any NAAQS;
• Notification of Federal Land Manager of nearby Class I areas; and
• Public comment on a permit.

Nonattainment NSR requirements include but are not limited to:
• Installation of Lowest Achievable Emissions Rate (LAER) control technology;
• Offsetting new emissions with creditable emissions reductions;
• A certification that all major sources owned and operated in the state by the same owner are in compliance with all applicable requirements under the CAA;
• An alternatives analysis demonstrating that the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location, construction, or modification; and
• Public comment on a permit.

SIP DEVELOPMENT

3 Q. When are Lead attainment demonstration SIPs due?

A. Attainment demonstration SIPs are due eighteen months after the effective date of an area's designation. For the first round of designations the attainment SIPs are due June 30, 2012. For the second round of designations, the attainment SIPs are expected to be due June 30, 2013.

4 Q. When is the attainment date?

A. Areas are required to attain the revised Lead standard as expeditiously as practicable, but no later than 5 years from the date the nonattainment designation became effective. The attainment date for the first round is December 31, 2015, and the attainment date for the second round is expected to be December 31, 2016.

5 Q. How do you measure reasonable further progress (RFP) for Lead?

A. Demonstrating reasonable further progress requires adherence to an ambitious compliance schedule. The schedule is expected to provide for periodic yields in significant emissions reductions or linear progress when appropriate. The U. S. Environmental Protection Agency (EPA) recommends that SIPs for Lead nonattainment areas provide a detailed schedule for compliance of reasonably available control measures (RACM), including reasonably available control technology (RACT), and accurately indicate the corresponding annual emission reductions to be achieved. Expeditious implementation of RACM and RACT by the sources in the nonattainment areas helps to ensure attainment of the standard by the attainment date.

6 Q. How do you calculate the amount of emissions reduction necessary for contingency measures?

A. EPA thinks a reasonable guide to the amount of emissions reduction that a single measure or group of measures should achieve for contingency purposes would be equal to the amount represented by annual average RFP in the attainment plan. For example, if the attainment plan provides for 1 tpy of Lead reductions over a 5-year attainment horizon, the recommended target for contingency measures would be at least 0.2 tpy. Contingency measures should generally go into effect, when necessary, without significant action on the part of the state or EPA.

EPA recommends using the year of designation (either 2010 or 2011) as the base year for the contingency measure calculation. States may use another year if they show another year is more appropriate. For example, if complete emissions data for 2010 are not available, a state may wish to use emissions data from the 2008 periodic inventory. The basic formula is:

Annual average RFP = (Attainment level emissions – base year emissions (2010 or 2011)) ÷ 5,

where 5 is the number of years between the base year and attainment year (2015 or 2016).

Traditionally the amount of reductions required for contingency measures has been measured in terms of tpy reductions at a source. However, where a single source is responsible for nonattainment, it may be possible to identify the amount of reductions required by reference to reductions in ambient air concentrations (e.g., measures sufficient to reduce ambient air concentrations by 0.02 $\mu g/m^3$). EPA would need to evaluate the approvability of such an approach on a case-by-case basis based on the sources within the nonattainment area, the modeling used, and available control measures.

7 Q. Will the EPA approve a Lead SIP that contains triggers for early implementation of contingency measures?

A. Yes. If an attainment SIP relies on a specific set of control measures to demonstrate timely attainment of the NAAQS, then those control measures are considered necessary for attainment and are not contingency measures. A SIP must also contain additional control measures that must be implemented if an area fails to attain or fails to demonstrate RFP. (See General Preamble for the Implementation of Title I of the Clean Air Act Amendment of 1990, 57 FR 13498, April 16, 1992). If a state elects to implement contingency measures earlier than would be triggered by such a failure, EPA does not believe that the state needs to adopt additional contingency measures to backfill for the early activation of those contingency measures. Of course, if an area fails to attain or fails to demonstrate RFP then additional contingency measures are needed and must be adopted in accordance with previous guidance. (See "Early Implementation of Contingency Measures for Ozone and Carbon Monoxide (CO) Nonattainment Areas," G.T. Helms, August 13, 1993, available at http://www.epa.gov/ttn/oarpg/t1pgm.html.

8 Q. Are Lead nonattainment areas eligible for one-year attainment date extensions?

A. No. CAA, Subpart 1, Section 172(a)(2)(D) precludes the Administrator from granting attainment date extensions where the statute separately establishes a specific attainment date, such as the 5-year deadline established in section 192(a).

9 Q. In order to demonstrate attainment, when do control measures need to be operational?

A. Control measures for the 2008 NAAQS need to be in place as expeditiously as practicable. In order for control measures to result in three years of monitored clean data by the attainment date, areas designated in the first round of designations (effective December 31, 2010, and requiring attainment demonstrations that show that the area will attain the standard as expeditiously as practicable, but no later than December 31, 2015) would need to have all necessary controls in place no later than November 1, 2012, and the corresponding date for areas designated in the second round of designations is expected to be November 1, 2013.

EPA will consider on a case-by-case basis the approvability of attainment demonstration SIPs where control measures are scheduled to be operational after November 1, 2012 / November 1, 2013. An attainment SIP may be approvable even if the state does not anticipate having 3 full years of clean data by the attainment date. See EDF v. EPA, 369 F.3d 193 (2d Cir. 2004); Sierra Club v. EPA, 356 F3d 296 (D.C. Cir. 2004) amended 2004 WL 877850 (D.C. Cir. 2004); available at:

2d Circuit case--
http://www.ca2.uscourts.gov

DC Circuit case--
http://www.cadc.uscourts.gov

EMISSIONS INVENTORY

10 Q. For reporting emissions to the National Emissions Inventory (NEI), what are EPA's plans for the reporting threshold for Lead?

A. EPA recognizes the discrepancy between the 0.5 tpy Lead threshold for the Lead Monitoring Rule and the NEI reporting threshold of 5 tpy. To resolve this inconsistency, EPA is considering proposing changes to align the thresholds by changing the Air Emissions Reporting Rule (AERR) that governs the reporting requirements for the NEI. Given the long rule making timeline, which can last more from 1 to 2 years, EPA does not expect that any revision to the rule (if made) would occur in time to require the new threshold for the 2011 NEI (reporting for 2011 NEI is required by the end of 2012). However, given the discrepancy in the rules that currently exists, states are encouraged to voluntarily collect data on smaller Lead sources and report the data to

EPA for the 2011 NEI. Note 40 CFR 51.117(e) states: "The point source inventory on which the summary of the baseline for Lead emission inventory is based must contain all sources that emit 0.5 or more tons of Lead per year."

MODELING

11 Q. What is the appropriate emissions rate (peak seasonal, monthly, or annual rate) to use for the three-month rolling average?

A. Modeling analyses should conform with EPA's guidelines on air quality models contained in Appendix W to 40 CFR part 51. http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf. Modeling input data, including emission rates, are addressed in Section 8.0 of Appendix W. The averaging period for the 2008 Lead NAAQS is a rolling 3-month average evaluated over a 3-year period. Accordingly, emissions limits should be based on concentration estimates for this same period (3-month average) as described in Section 10.2.3 of Appendix W. The emissions rate to input into AERMOD for attainment demonstrations is based on the maximum allowable or permit limit emissions, often 1-hour limits. Table 8-1 of Appendix W (see below) gives the calculation methodology to use to calculate the emissions rate to input into AERMOD. The input emissions rate for a source subject to SIP limits is a product of the maximum allowable or permit limit emissions, operating level (actual or design capacity, whichever is greater, or federally enforceable permit condition) and operating factor. This same calculation is also used for nearby sources. For "other" sources, the operating level is the annual level when actually operating averaged over the most recent two years. For definitions of nearby and other sources, see Section 8.2.3 of Appendix W.

TABLE 8–1.—MODEL EMISSION INPUT DATA FOR POINT SOURCES [1]

Averaging time	Emission limit (#/MMBtu) [2]	×	Operating level (MMBtu/hr) [2]	×	Operating factor (e.g., hr/yr, hr/day)
Stationary Point Source(s) Subject to SIP Emission Limit(s) Evaluation for Compliance with Ambient Standards (Including Areawide Demonstrations)					
Annual & quarterly	Maximum allowable emission limit or federally enforceable permit limit.		Actual or design capacity (whichever is greater), or federally enforceable permit condition.		Actual operating factor averaged over most recent 2 years.[3]
Short term	Maximum allowable emission limit or federally enforceable permit limit.		Actual or design capacity (whichever is greater), or federally enforceable permit condition.[4]		Continuous operation, i.e., all hours of each time period under consideration (for all hours of the meteorological data base).[5]
Nearby Source(s) [6] [7] Same input requirements as for stationary point source(s) above.					
Other Source(s) [7] If modeled (subsection 8.2.3), input data requirements are defined below.					
Annual & quarterly	Maximum allowable emission limit or federally enforceable permit limit.[6]		Annual level when actually operating, averaged over the most recent 2 years.[3]		Actual operating factor averaged over the most recent 2 years.[3]
Short term	Maximum allowable emission limit or federally enforceable permit limit.[6]		Annual level when actually operating, averaged over the most recent 2 years.[3]		Continuous operation, i.e., all hours of each time period under consideration (for all hours of the meteorological data base).[5]

[1] The model input data requirements shown on this table apply to stationary source control strategies for STATE IMPLEMENTATION PLANS. For purposes of emissions trading, new source review, or prevention of significant deterioration, other model input criteria may apply. Refer to the policy and guidance for these programs to establish the input data.

[2] Terminology applicable to fuel burning sources; analogous terminology (e.g., #/throughput) may be used for other types of sources.

[3] Unless it is determined that this period is not representative.

[4] Operating levels such as 50 percent and 75 percent of capacity should also be modeled to determine the load causing the highest concentration.

[5] If operation does not occur for all hours of the time period of consideration (e.g., 3 or 24 hours) and the source operation is constrained by a federally enforceable permit condition, an appropriate adjustment to the modeled emission rate may be made (e.g., if operation is only 8 a.m. to 4 p.m. each day, only these hours will be modeled with emissions from the source. Modeled emissions should not be averaged across non-operating time periods.)

[6] See paragraph 8.2.3(c).

[7] See paragraph 8.2.3(d).

For the purpose of deriving permit limits for Lead based on modeling, we interpret the above procedures as follows. In general, the maximum hourly emission rate (PTE) should be used as the basis for establishing emission limits and for model input. This approach is appropriately conservative for emissions units that: 1) could be operated at a relatively high capacity factor (% of available capacity) over the applicable averaging period, 2) are associated with non-continuous compliance monitoring methods (e.g., periodic source testing), and 3) have emissions that are not well correlated with production or other measureable surrogate monitoring parameters. Additionally, where significant uncertainty exists with respect to estimated emissions, modeling peak hourly rates may be necessary to account for this uncertainty.

In certain cases, longer term average emission rates or emissions representative of actual operating schedules may be approved for use in modeling demonstrations and corresponding permit limitations. Consistent with Appendix W, where a source is willing to accept an enforceable limitation on operating schedule, emissions need only be modeled during allowable periods of operation. Longer-term average emission limits (e.g., monthly average, 3-month average, or 3-month total) may be approved for qualifying emissions units. To be approvable, such limitations must be enforceable as a practical matter. We emphasize that approval of model input data and proposed emissions limits must be granted by the reviewing authority on a case-by-case basis, taking into account source and emissions unit-specific factors. Modeled emission rates, including any proposed limitations on emissions or source operation, should be documented in the modeling protocol, and any associated permit application materials submitted to the reviewing agency for approval.

12 Q. What is the required for modeling for attainment demonstrations? When should allowable emissions be used and when should permits be used?

A. Modeling for attainment demonstrations is used to show that a nonattainment area will be in attainment by the attainment date. The modeling is used to show the effectiveness of control measures on the sources. For attainment modeling, maximum allowable or federally enforceable permit limits should be the basis of the model input emissions, as described in Section 8.1 and Table 8-1 of Appendix W and the *Guideline for Air Quality Models.* http://www.epa.gov/scram001/guidance/guide/appw_05.pdf

13 Q. What is EPA's policy on conducting model evaluations to avoid under or over predictions compared to monitoring results?

A. As part of the model promulgation process, AERMOD has been evaluated in several studies and showed excellent performance. For details about the AERMOD evaluation results see the AERMOD Evaluation Paper at
http://www.epa.gov/ttn/scram/7thconf/aermod/aermod_mep.pdf.
Any potential bias in modeled results versus monitored concentrations would most likely be introduced by the user (inaccurate characterization of emissions or use of non-representative meteorological data in the modeling) and if found should be explained by the user.

Depending on the level of emissions used (allowable versus actual) and the number of monitors being used in the evaluation, it may be possible to conduct a model evaluation for the specific case being modeled. In terms of the number of monitors, comparison to a single monitor is not considered sufficient to indicate a model bias. If maximum allowable emissions or permitted emissions are used as the model input emissions (either for the SIP modeling or use in designations modeling), it would be expected that modeled concentrations would not be comparable to monitored concentrations because of the nature of the emissions level.

For designations modeling using actual emissions, if emissions have been characterized accurately and input meteorological data is representative of the area being modeled, one way to measure the performance of the modeled results against monitored values is to use quantile-quantile plots (QQ plots) by plotting the observed and modeled values in ranked order, i.e. highest monitored value paired with highest modeled value at monitor receptor locations. This creates concentration pairs of monitored and modeled concentrations that are no longer paired in time space and is considered a pragmatic procedure to evaluate model performance as noted in the AERMOD Evaluation Paper.

14 Q. What is EPA's policy on modeling for contingency measures?

A. It is not necessary to model the effect of implementing contingency measures. However, modeling is one way to help gauge the potential effectiveness of backstop measures and may demonstrate that any contingency measures that are adopted in the SIP are sufficient to be approved by EPA. Modeling of contingency measures should follow the guidelines in Appendix W.

15 Q. When will the new AERMOD, AERMET, and AERMINUTE updates be released?

A. The latest updates to AERMET, and AERMINUTE, version 11059, were released on March 8, 2011. The latest updates to AERMOD and AERMAP were released on April 14, 2011 (version 11103).

16 Q. Will AERMOD calculate the Lead NAAQS design value?

A. AERMOD does not calculate the Lead NAAQS design value. A post-processor called LEADPOST will calculate the Lead NAAQS design values from monthly modeled output. LEADPOST is available on EPA's SCRAM website at: http://www.epa.gov/ttn/scram/models/aermod/leadpost.zip

17 Q. If the modeling uses 5 years of National Weather Service data do all years have to be modeled in one run or can individual years be modeled?

A. The modeled design value is calculated as the rolling 3-month average concentration at each receptor across the five years. AERMOD does not calculate the design value, so post-processing is required. The EPA post-processor, LEADPOST, can be used to calculate the design values. The five years of model output do not have to be in one AERMOD run. Each individual year can be run separately and the output for each year can be input into LEADPOST. LEADPOST will read the individual files and calculate the design values across the five years provided that each year's runs have the same receptors and source group contributions.

August 10, 2012
Addendum to the 2008 Lead NAAQS Implementation
Questions and Answers Signed on July 11, 2011, by Scott Mathias

(The following is a continuation of the Emissions Inventory Section, Question 10)

EMISSIONS INVENTORY

10a Q. What is the threshold for point sources for the 2011 base year inventory that will be used in the attainment demonstration SIP? Is it 0.5 tons per year (tpy)? Is this the same as in the Air Emissions Reporting Rule, 40 CFR Part 51 (AERR)? If it is different, is it mandatory for states to submit a more stringent threshold?

A: The threshold for point sources for the Pb SIP inventories is 0.5 tpy. This is in the Pb implementation rule and is not the same as the threshold in the AERR. That does not pose a particular problem because the AERR is a separate reporting requirement from the SIP inventory requirements in the CAA and implementation rules. Given that the 0.5 tpy threshold is in the Pb NAAQS implementation rule, it is mandatory for the SIP inventories.

10b Q. Are actual emissions required for the 2011 base year inventory for use in the Lead Attainment Demonstration SIPs?

A: Yes, for the base-year inventory, actual emissions are what should be provided. The inventory year is not necessarily 2011 (see Question 6 in the Pb Q&A memo, dated July 8, 2011). The EPA recommends using either 2010 or 2011 as the base year for the contingency measure calculations, but does provide flexibility for using other inventory years if states can show another year is more appropriate.

10c Q. Should 2011 base year point, area, nonroad, and on road mobile source emissions be submitted with this SIP?

A: Yes, the CAA requires for Pb SIPs that all sources of Pb emissions in the nonattainment area must be submitted with the base-year inventory. This is separate from the modeling requirements and the issue of which sources must be explicitly included in the modeling needed for Pb nonattainment SIPs.

10d Q. What is required for the attainment year inventory? Projected actual with controls or maximum allowable emissions? Are projection year point, area, nonroad, and on road mobile emissions required for the attainment year inventory?

A: Maximum allowable emissions should be included for the attainment year inventory, which includes only those sources within the modeling domain. The modeling guidance in *Guideline on Air Quality Models* (U.S. EPA, 2005) provides advice on which sources need to be included *explicitly* (i.e., as point sources) in the modeling and provides for including the impacts of smaller and diffuse sources through the use of background concentrations and other less specific techniques given the relatively lower significance of such sources to the SIP demonstration.

10e Q. Please provide an example of calculating Reasonable Further Progress (RFP) emissions reductions using the formula in 6 Q.

A: Annual average RFP = [Attainment level emissions (2015 or 2016, depending on the designations effective date) - Base year emissions (most likely 2010 or 2011)] ÷ 5 (or the number of years between the attainment year and the base year).
Assume that

Attainment level emissions = 0.4 tpy
Base year emissions = 1.0 tpy
Annual average RFP = [0.4 tpy - 1.0 tpy] ÷ 5 = - 0.60 tpy ÷ 5 = - 0.12 tpy.
The annual average RFP is - 0.12 tons per year.

(The following is a continuation of the modeling section, Questions 11 - 17)

MODELING

18 Q. How should model concentrations and background concentrations be properly accounted for in attainment demonstrations?

A: In order to properly account for cumulative effects, background concentrations should be added to modeled concentrations to calculate a design value. Background concentrations should reflect contributions from natural sources, nearby sources other than the one(s) being explicitly modeled, and unidentified sources. Beginning with version 11103, AERMOD can now include background concentrations in the model simulation. AERMOD can accept a variety of temporally varying background concentrations, from hourly background to an annual concentration. See Section 2.4 of the AERMOD User's Guide addendum (U.S. EPA, 2011a) for more details.

General guidance on background concentrations can be found in Section 8.2 of the *Guideline on Air Quality Models* (U.S. EPA, 2005). For isolated single sources, the *Guideline* discusses two options of determining background concentrations. The first, discussed in Section 8.2.2.b is the use of air quality data collected in the vicinity of the source to determine the background concentrations. Background concentrations are determined by excluding observations when the source being modeled is impacting the monitor. The guideline offers guidance that monitors inside a 90-degree sector downwind of the source may be used to determine the area of impact. Meteorological data used in the source contribution analysis should be representative of the monitored area. Because observed values often represent a 24-hour sample, it may be difficult to separate hours within a sample when modeled sources are impacting the monitor. In these cases, it may be necessary to exclude many 24-hour values entirely, such that the remaining observations are no longer robustly representative. This may necessitate the use of the second option, as discussed in Section 8.2.2.c. This option is to use a "regional site" when there are no monitors located in the vicinity of the source. As defined in the *Guideline*, a regional site is one that is located away from the area of interest but is impacted by similar natural and man-made sources.

For multi-source areas, section 8.2.3 of the *Guideline* offers guidance about two components of background, contributions of nearby sources and contributions of other sources. Nearby sources are those sources that are expected to cause a significant concentration gradient in the vicinity of the source(s) being modeled. These nearby sources should be explicitly modeled.

19 Q. How should fugitives be modeled in attainment demonstrations?

A: Fugitives can be characterized as volume sources or area type sources (rectangular, circular, or polygon). If the exact locations of fugitive emissions are unknown or are widespread over a particular area, such that their emissions can be combined into one representative source, the fugitives may be modeled as some type of area source. However, if the locations are known, it may be better to model them as volume sources, unless the placement of receptors would mean that receptors would be within the volume source exclusion zone (2.15 x Sigma Y + 1 meter). In those cases, smaller area sources may be used. Also, volume sources allow for meander under light wind conditions, whereas area sources do not. For details regarding source input parameters for volume or area type sources in AERMOD, see 3.3 of the AERMOD User's Guide (U.S. EPA, 2004a; U.S. EPA. 2011a).

If the reviewing authority has adequate technical data (i.e., soil samples) and additional information to support the inclusion of re-entrainment of lead from the soil, this can be simulated as an area of volume source type in the model.

20 Q. What is the level of capture efficiency that should be used in modeling of total enclosure emissions?

A: For modeling of secondary lead smelters, capture efficiency is needed for modeling of total enclosure emissions. At this time, 100% capture efficiency is not considered technically achievable in common practice. At this time, states that impose total enclosure controls in a manner consistent with the National Emission Standard for Hazardous Air Pollutants from Secondary Lead Smelting ,77 FR 555 (which includes requirements for enclosures and housekeeping), can assume a capture efficiency for total enclosures of no greater than 95%. A greater level of capture efficiency (up to 99%) may be demonstrated on a case-by-case basis taking into account site-specific factors and additional design or housekeeping provisions that go beyond what is assumed in the NESHAP. States should consult with their respective Regions for consideration of case-specific demonstrations claiming greater than 95% capture efficiency.

21 Q. What is the best way to model ambient air?

A: Ambient air is considered to be the air in those areas where the public generally has access. Non-ambient air generally includes property owned or controlled by the source to which access by the public is prohibited by a fence or other effective physical barrier.

Another issue with ambient air in modeling is the situation of multiple facilities in an area. As noted above, facility property is not ambient relative to its own emissions but is ambient relative to other sources' emissions. For example, there may be a situation with two sources, Source A and Source B. In this situation, the impacts of Source A on the air over Source A are not considered to be impacts on ambient air, but the impacts of Source A on the air over Source B are considered to be impacts on ambient air, and vice versa. This situation is discussed in the March 1985 memorandum "Applicability Determinations for Columbian Chemical Company[1]."

[1] http://www.epa.gov/region07/air/nsr/nsrmemos/ccc.pdf

In modeling these situations, there are two ways to handle ambient air over multiple facilities.

1. Divide the model runs into several modeling domains: A) a receptor network that is outside the property lines for all facilities for which all sources are modeled, and B) separate receptor networks and model runs over each facility for which that facility's emissions are not included. For this case, design values can be calculated for each receptor network using LEADPOST. LEADPOST results from all receptor networks can be concatenated together.

2. Create a receptor network that covers all ambient air and facilities. Include all emissions in the model runs and generate monthly POSTFILES by source group, with each source group representing a separate facility. After the model runs are finished, for receptors over a specific facility zero out the concentrations from that facility leaving the other facilities' contributions as they are. The new concentration files can be input into LEADPOST to calculate design values for cumulative concentrations.

22 Q. How should ASOS 1-minute data[2] be used in modeling?

A: In AERMOD, concentrations are not calculated for variable wind (i.e., missing wind direction) and calm conditions, resulting in zero concentrations for those hours. These light wind conditions may be the controlling meteorological circumstances in some cases because of the limited dilution that occurs under low wind speeds which can lead to higher concentrations. The exclusion of a greater number of instances of near-calm conditions from the modeled concentration distribution may therefore lead to underestimation of monthly average concentrations.

To address the issues of calm and variable winds associated with the use of NWS meteorological data, the EPA has developed a preprocessor to AERMET, called AERMINUTE (U.S. EPA, 2011b) that can read 2-minute ASOS winds and calculate an hourly average. Beginning with year 2000 data, NCDC has made the 2-minute average wind data, reported every minute from the ASOS network freely available. The AERMINUTE program reads these 1-minute winds and calculates an hourly average wind. In AERMET, these hourly averaged winds replace the standard observation time winds read from the archive of meteorological data. This results in a lower number of calm hours and missing wind direction hours and an increase in the number of hours used in averaging concentrations. For more details regarding the use of National Weather Service (NWS) data in regulatory applications see Section 8.3.2 of Appendix W (U.S. EPA, 2005) and for more information about the processing of NWS data in AERMET and AERMINUTE, see the AERMET (U.S. EPA, 2004b; U. S. EPA, 2011c) and AERMINUTE User's guides (U.S. EPA, 2011b).

Since the release of AERMINUTE in 2011, some permitting agencies have expressed concern that the inclusion of AERMINUTE output in AERMOD will lead to an increase in the conservatism of AERMOD output. This perceived increase in conservatism is due to an increase in hours with lower wind speeds input into AERMOD. The purpose of AERMINUTE is not to lead to more conservative concentration estimates, but to increase the data quality and representativeness of the meteorological inputs into AERMOD. Concentrations are not calculated for hours with reported calm winds or variable winds. These calm or variable winds are due to the METAR reporting code used to report ASOS

[2] The purpose of this section is to address the use of 1-minute data when using year 2000 and later ASOS airport data. This section does not address the use of pre-ASOS vs. post-ASOS data. The reviewing authority should use the meteorological data they consider most representative of the particular application.

observations. In the METAR coding used to report surface observations beginning July 1996, a calm wind is defined as a wind speed less than 3 knots and is assigned a value of 0 knots. The METAR code also introduced the variable wind observation that may include wind speeds up to 6 knots, but the wind direction is reported as missing, if the wind direction varies more than 60 degrees during the 2-minute averaging period for the observation. These are often hours of interest because these are light wind conditions and could lead to higher concentrations. With the use of AERMINUTE, hourly averages can be calculated for those hours with reported calm or missing winds, because the 2-minute average winds in the one-minute data files have not been subjected to the METAR coding. In effect, AERMINUTE is obtaining data that was unavailable because of METAR coding, making the meteorological data more representative of the area.

23 Q. What is the proper receptor spacing in modeling?

A: The model receptor grid is unique to the particular situation and depends on the size of the modeling domain, the number of modeled sources, and the complexity of the terrain. Emphasis should be placed on resolution and location, not the total number of receptors (Section 7.2.2 (U.S. EPA, 2005)). Receptors should be placed in areas that are considered ambient air (see ambient air discussion above) with respect to the source(s) being modeled and placed out to a distance such that all areas of violation can be detected from the model output. Receptor placement should be of sufficient density to provide resolution needed to detect significant gradients in the concentrations with receptors placed closer together near the source(s) to detect local gradients and placed farther apart away from the source(s). In addition, the user should place receptors at key locations such as around facility fence lines (which define the ambient air boundary for a particular source) or monitor locations (for comparison to monitored concentrations for model evaluation purposes). The receptor network should cover the modeling domain. If modeling indicates elevated levels of Pb (near the standard) near the edge of the receptor grid, consideration should be given to expanding the grid or conducting an additional modeling run centered on the area of concern. As noted above, terrain complexity should also be considered when setting up the receptor grid. If complex terrain is included in the model calculations, AERMOD requires that receptor elevations be included in the model inputs. In those cases, the AERMAP terrain processor (U.S. EPA, 2004c; U.S. EPA, 2011d) should be used to generate the receptor elevations and hill heights. The latest version of AERMAP (09040) can process either Digitized Elevation Model (DEM) or National Elevation Data (NED) data files. The AERMOD Implementation Guide recommends the use of NED data since it is more up to date than DEM data, which is no longer updated (Section 4.3 of the AERMOD Implementation Guide (U.S. EPA, 2009).

24 Q. How should haul roads for lead facilities be modeled?

A: Useful information regarding the modeling of haul roads in and around lead facilities can be found in the Final Report of the Haul Roads Workgroup, available on EPA's SCRAM website at Haul Road Workgroup Final Report Submission to EPA-OAQPS, March 12, 2012.

The report details the efforts of the Haul Roads Workgroup, which was a collaborative effort between the EPA and state/local modelers. The workgroup has recommended a methodology for modeling haul roads (pages 4-6 of the report). These recommendations are:

- Model all haul roads as adjacent volume sources, unless ambient air receptors are in the volume source exclusion zone (2.15 x Sigma Y + 1 meter)
- Top of plume height set to 1.7 x the vehicle height
- Release height of volume source set to half the plume height

- Width of the plume should be vehicle width + 6 m for single-lane roads or road width + 6 m for 2-lane roads
- The initial Sigma Z should be set to plume height/2.15
- Initial Sigma Y should be set to plume width/2.15
- Emission rate in grams/second

For cases where volume sources cannot be used due to ambient air receptors being located in the volume source exclusion zone, haul roads can be modeled as area sources with:

- Length set to length of link
- Top of plume, release height, plume width, and Sigma Z set to values listed above for volume sources.
- Emission rate in grams/second/m^2

For more details, users are strongly encouraged to review the Haul Road Workgroup Final Report Submission to EPA-OAQPS, March 12, 2012.

References

U.S. EPA, 2004a: User's Guide for the AMS/EPA Regulatory Model – AERMOD. EPA-454/B-03-001. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

U.S. EPA, 2004b: User's Guide for the AERMOD Meteorological Preprocessor (AERMET). EPA-454/B-03-002. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

U.S. EPA, 2004c: User's Guide for the AERMOD Terrain Preprocessor (AERMAP). EPA-454/B-03-003. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

U.S. EPA, 2005. *Guideline on Air Quality Models*. 40 CFR Part 51 Appendix W.

U.S. EPA, 2009: AERMOD Implementation Guide. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

U.S. EPA, 2011a: Addendum – User's Guide for the AMS/EPA Regulatory Model – AERMOD. EPA-454/B-03-001, Research Triangle Park, North Carolina 27711.

U.S EPA, 2011b: AERMINUTE User's Guide. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

U.S. EPA, 2011c: Addendum - User's Guide for the AERMOD Meteorological Preprocessor (AERMET). EPA-454/B-03-002. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711.

U.S. EPA, 2011d: Addendum - User's Guide for the AERMOD Terrain Preprocessor (AERMAP).

EPA-454/B-03-003. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.