Modeling Protocol

Modeling done by ADEQ, Air Division Permit Branch staff in review of permit applications is generally limited to screening models to determine if additional refined modeling by the facility is necessary. This document is to outline the general procedure for such a screening analysis. In addition, general instructions for running AERMOD are attached that clarify some other issues. This is not to be used for PSD permits or other complex modeling situations.

In order for ADEQ to conduct this screening analysis, it is incumbent upon the facility to provide necessary information. Emission Rate Tables (ERTs) may not be a sufficient means of providing this information in that some sources and source types require additional information not provided by an ERT. Without this information, ADEQ review will be delayed and issuance of a permit decision affected. Such additional information should be submitted upon request or in advance if possible.

Scope

Title V Permits

- All initial Title V permits are to be modeled for PM_{10} (regardless of emission rate), Lead (regardless of emission rate, though it may be screened out based on the RT), and any criteria pollutant permitted at or over 100 tons per year. For VOC (Ozone), no modeling is necessary.
- All initial Title V permits are to be evaluated for all HAPs and other Non Criteria Air Pollutants greater than De Minimis levels, or modeled to develop TLV vs. wt % table (or equivalent). The procedures of the Non Criteria Pollutant Control Strategy should be followed.
- Renewals and modifications are evaluated for issues, but modeling is done only:
    - if there are changes in the permit which increase or significantly change the nature of the emissions (only those pollutants that are changing need be modeled). This could include any changes in short term (lb/hr) emission or long term (12 month) depending upon previous modeling assumptions used. This could also include new sources with no permitted emission increases.
    - if there is a new or revised standard (NAAQS). If necessary, existing facilities may include a compliance schedule in the permit that outlines a timeframe for compliance with any new standard when issues are discovered. Generally, this would only be an option if there are no changes in the emissions or nature of the emissions subject to the new standard.
    - if there are substantial changes to the modeling methodology (i.e. a new model).
- Issues in renewals or resulting from a new or revised standard only (i.e. no change in emissions) should be routed through the Permit Branch Manager.
- Permits for which a public hearing will be held are usually to be modeled, regardless of emissions or changes. These permits should be discussed with the Permit Branch Manager.

Minor Source Permits

- Generally, Minor Source permits are not modeled for criteria pollutants except in that they are modeled for all pollutants if the permit is a result of complaints and modeled before a public hearing is held.
- All initial Minor Source permits are to be evaluated for all HAPs and other Non Criteria Air Pollutants greater than De Minimis levels, or modeled to develop TLV vs. wt % table (or equivalent). The procedures of the Non Criteria Pollutant Control Strategy should be followed.
- Modifications are evaluated for issues, but modeling is done only if there are changes in the permit which increase or significantly change the nature of the emissions (only those pollutants that are changing need be modeled). This could include any changes in short term (lb/hr) emission or long term (12 month) depending upon previous modeling assumptions used. This could also include new sources with no permitted emission increases.
- Since lead compounds are HAPs, lead will always be modeled but the NAAQS (not TLV/100) must be used, though it still may be screened out based on the RT.

- Permits for which a public hearing will be held are usually to be modeled, regardless of emissions or changes. These permits should be discussed with the Permit Branch Manager.

Screening Procedures

- Model concentrations starting at the facility fence line, if the fence line information has been provided. Otherwise model without consideration of a fence line. Receptors should be spaced every 50 meters along the fence line and receptors located outside the fence line should be spaced 50 m out to 1.0 km and 100 m thereafter (or keep the 50 m spacing).
    - If fence line concentrations indicate a potential issue with non criteria pollutant impacts, consideration of (unfenced) property lines and areas where there will be no impact on human health can be considered. Generally, all facility property can be excluded from the model if there is no general access by the public. Other impacted areas, such as roads, rivers and other uninhabited property can be excluded as on a case by case basis.
- Include all terrain. The preferred terrain data is data from the National Elevation Dataset (NED). Other non-preferred sources of terrain data may include the Shuttle Radar Topography Mission (SRTM) and Digital Elevation Models (DEM). Use of non-preferred terrain requires Air Division approval and is on a case-by-case basis when such use can be demonstrated to be necessary.
- Model with no downwash.
- Model all sources, including facilities with significant unpaved/paved roads at paper mills, wood products facilities, power plants and quarries/mining or other facilities, as appropriate.
- For criteria pollutants:
  If using one year of met data, use highest results.
  For averaging periods of 24-hours or less; if using 5 years of met data, use 2nd high (highest of 2nd highest values) except for PM_{10} which can be 6th high (highest of 6th highest values).
  All annual averages must use first high values.
- If criteria pollutant screening results are less than 50% of the standard, no further modeling is necessary. Depending on the type of sources and the predicted impact, refined modeling may be necessary at any emissions rate. This is left to a case by case basis. *Once any screening has indicated values over 50% or PM_{10} issues, refined modeling is necessary*.
- Use of ambient ratios to estimate impact of NOx sources on annual NO_2 concentrations (i.e. the 0.75 factor) may be used.
- For Non-Criteria Pollutants:
  If using one year of met data, use highest results.
  If using 5 years of met data, use 2nd high (highest of 2nd highest values).
- There are no background levels to consider for non-criteria pollutants.
- Concentration results flagged as containing calm or missing hours should not be excluded from the results. AERMOD accounts for calm and missing hours.

Meteorological Data

Currently we have Little Rock, Fort Smith, and Shreveport, LA data. Other meteorological data may be used, subject to approval by ADEQ.

Effective 12-1-2012, for 5 year meteorological data sets use 2007-2011. For one year data, use 2011. This data range will be updated every 5 years and announced 3 months in advance of the effective date to use the data. Any applications received after the effective date should use the new data set. Pending applications will use the data in effect at the time of application receipt unless otherwise approved by ADEQ.

ADEQ Meteorological Data

Meteorological data sets are available online from ADEQ. Use of ADEQ data is not required, but the effective time periods must be met.

Land Use Parameters are obtained by using USGS land use maps, 30 degree sectors, the location of the surface observation station and are generated by AERSURFACE.

Refined Modeling

If these screening procedures indicate a possible problem, i.e. if the predicted concentrations are above established thresholds, a refined analysis may be needed. This is usually to be conducted by the permittee.

Though not specifically addressed in this protocol, refined modeling should:

- Include all downwash
- Include background. Background values should be determined on a case by case basis depending on the pollutant and the location and the history of monitoring data (not only the latest year).
- Not use the 20-D rule to exclude sources.