Description of Modeling Files

AERMOD Modeling

Two additional AERMOD model runs were made in support of comments submitted on the proposed remedy.

No SODAR Sigma-w

An AERMOD model run was made using the same meteorological data used by EPA in their AERMOD modeling except for the removal of all the SODAR sigma-w data in the profile data. No other changes to the meteorological dataset used by EPA were made. The AERMOD output list file, the GRF plot file of the 1st highest maximum daily 1-hour values for each receptor, and an Excel file with the ranked 4th highest daily 1-hour SO_2 concentration at each receptor. The following files have been submitted:

Surface Meteorological File:
PGS_NEW_ADJ-HTS-2_no_sigma-2.sfc
Profile Meteorological File:
PGS_NEW_ADJ-HTS-2_no_sigma-2.pfl
AERMOD Output File:
Portland_EPA_NJDEP_finegrid_no_sigma_1993_SO2.LST
AERMOD GRF File:
Portland_EPA_NJDEP_finegrid_no_sigma_1993_SO2.GRF
Excel File of 4th High 1-Hour Concentrations:
Portland_EPA_NJDEP_finegrid_no_sigma_1993_SO2.xls

AERSURFACE version 80009 and No SODAR Sigma-w

Another AERMOD model run was made by NJDEP to compare AERMOD's predictions using the surface roughness, Bowen ratio, and albedo generated using the beta version of AERSURFACE to AERMOD's predictions using the current version of AERSURFACE (version 08009) on the EPA SCRAM website and a 1 km surface roughness radius of influence. Snow cover in the winter months was also assumed.

With the recalculated surface roughness, Bowen ratio, and albedo values AERMET was run again. All meteorological data input by EPA into their AERMET model run was used except for the removal of the SODAR sigma-w data. The AERMOD output list file, the GRF plot file of the 1st highest maximum daily 1-hour values for each receptor, and an Excel file with the ranked 4th highest daily 1-hour SO_2 concentration at each receptor. The following files have been submitted:

Surface Meteorological File:
NJDEP_PGS_NEW_ADJ-HTS-2_TEMP-PROF_SIGT-05_SIGW-05-19_10M-REF.SFC
Profile Meteorological File:
NJDEP_PGS_NEW_ADJ-HTS-2_TEMP-PROF_SIGT-05_SIGW-05-19_10M-REF.PFL
AERMOD Output File:
Portland_EPA_NJDEP_finegrid_sigma_100only.LST

AERMOD GRF File:
Portland_EPA_NJDEP_finegrid_ sigma_100only.GRF
Excel File of 4th High 1-Hour Concentrations:
Portland_EPA_NJDEP_finegrid_ sigma_100only.xls

In addition, the AERMET files used to create the surface and profile meteorological files have been included.

CALPUFF Modeling

Modeling of the Portland Generating Plant to evaluate allowable emissions of SO2 for the 1992 -1993 year was performed with the latest EPA approved version of the CALPUFF modeling suite; CALMET/CALPUFF Version 5.8, Level 07063 and CALPOST Version 5.6394, Level 070622. A complete description of the modeling methodologies and results can be found in the following Exhibits of the Section 126 Petition:

- "CALPUFF 1992-1993 Modeling Analysis of the Sulfur Dioxide Impacts due to Emissions from the Portland Generating Station" (dated February 25, 2010).

1-Hour SO_2 Post Processing

The new SO2 standard requires a post-processor that can calculate the design concentrations based on the form of the new 1-hour SO_2 NAAQS (99th percentile of the annual distribution of maximum daily 1-hour concentrations, averaged over the number of modeled years). The current version of the CALPOST post-processor for the CALPUFF model is not capable of handling the format of the new standard to determine violations.

For this analysis, manual processing of the CALPUFF model concentration output files was required. To determine the design concentrations at each receptor in the modeling domain, CALPOST was setup to calculate the maximum 1-hour impact at each receptor for each day. This required CALPOST to be run for each day of the year to generate a years worth of daily maximum 1-hour concentrations. Each output file was entered into a spreadsheet. A design concentration in the form of the 99th percentile of the daily maximum 1-hour concentrations at each receptor in the domain was calculated using the spreadsheet.

BTS, June 10, 2011