

PADEP Comments on Air Quality Modeling Protocol
Erie Renewable Energy, LLC
Proposed Meadville Power Station, Greenwood Township, Crawford County

Section 2.0 – Plant Description

1. The protocol states, “[t]he facility is being proposed to operate 24 hours a day, 365 days a year with the exception of outages taken for maintenance purposes,” yet there is no discussion of including startup emissions from the circulating fluidized bed (CFB) steam generators in the air quality analysis to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS). According to the United States Environmental Protection Agency (USEPA) June 29, 2010 memorandum from Stephen D. Page, “Guidance Concerning the Implementation of the 1-hour NO₂ NAAQS for the Prevention of Significant Deterioration Program,” there are currently no provisions for exempting emissions occurring during equipment startups from the air quality analysis. Also, emissions from the operation of emergency equipment must be carefully considered in the air quality analysis.

Section 3.1 – AERMAP

2. Section 7.2.2(a) of the Guideline states, “[r]eceptor sites for refined modeling should be utilized in sufficient detail to estimate the highest concentrations” The proposed polar receptor grid may be insufficient to determine the maximum concentration. The PADEP recommends the use of a discrete Cartesian receptor grid that extends at least 10 kilometers from the proposed Erie Renewable Energy (ERE) site and has a receptor spacing no greater than 50 meters within 2 kilometers. The PADEP will provide the receptor grid that it intends to use in the technical review of this analysis, upon request, to address this comment.

Section 3.2 – AERSURFACE

3. In Table 2, the AERSURFACE output file for Port Meadville Airport (GKJ), the Universal Transverse Mercator (UTM) coordinates should be 565,616 meters East and 4,608,535 meters North.

4. In Table 3, the AERSURFACE output file for Youngstown – Warren Regional Airport (YNG), the UTM coordinates should be 527,345 meters East and 4,567,093 meters North.

5. The PADEP recommends that the surface moisture condition, used in selecting the appropriate seasonal Bowen ratio values, be based on climate division average precipitation data. The data are available from the Pennsylvania State Climatologist at the following link: <http://climate.met.psu.edu/data/state/pareg.php>. Since YNG is not within Pennsylvania, the PADEP recommends that the precipitation data for Climate Division 10 be considered representative of YNG. The PADEP will provide the data, upon request, for the most recent 30-year climatological period already sorted by the percentile categories suggested in Section 2.2 of the “AERSURFACE User’s Guide.”

Section 3.3 – AERMET

6. The protocol does not provide an adequate justification for the use of YNG meteorological data

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for this analysis. The basis for using YNG data should be enhanced by graphically comparing the nearby terrain and surface characteristics at the YNG site with those of the proposed ERE site. Also, to further argue against the use of GKJ meteorological data, the protocol should mention the apparent surface obstruction to the southeast of the GKJ site as indicated by the wind rose and aerial imagery.

7. The meteorological data completeness is not calculated correctly in Table 5 and Table 6. For a multiple year data period, the PADEP recommends a meteorological data "completeness test" that is based on the USEPA requirement provided in Section 5.3.2 of "Meteorological Monitoring Requirements for Regulatory Modeling Applications." Each meteorological variable must have valid data for at least 90 percent of the total hours in (1) each year and (2) all corresponding quarters over the multiple year period (i.e., all 1st quarters, all 2nd quarters, etc.) The completeness requirement applies to wind direction, wind speed, cloud cover, and temperature (determined by AERMET), and to the joint recovery of wind direction, wind speed, and cloud cover (determined by AERMOD). The PADEP will provide, upon request, a meteorological data completeness summary for YNG and GKJ.

8. In AERMET Stage 1, the YNG station elevation following the LOCATION keyword in the SURFACE pathway should be 359.7 meters.

9. In AERMET Stage 1, the Pittsburgh International Airport (PIT) latitude following the LOCATION keyword in UPPERAIR pathway should be 40.53N and the PIT station elevation should be 360 meters.

10. In AERMET Stage 1, the PADEP recommends that the MODIFY keyword be used in the UPPERAIR pathway to perform some preliminary quality control as the data are extracted. See Section 4.4.9 of the "User's Guide for the AERMOD Meteorological Preprocessor (AERMET)."

11. According to Section 4.7.3 of the "User's Guide for the AERMOD Meteorological Preprocessor (AERMET)," the coordinates and station elevation entered in AERMET Stage 3 following the LOCATION keyword should reflect the location of the proposed ERE facility, not the meteorological measurement site. According to the protocol's AERMOD input file, these values should be 80.24N, 41.53W, and 397.7 meters.

12. In AERMET Stage 3, the YNG wind measurement height following the NWS_HGT keyword should be 10.0 meters for the proposed meteorological data period (2003 – 2007). The Automated Surface Observing System (ASOS) commenced at YNG on September 1, 1995. The pre-ASOS wind measurement height of 6.1 meters was incorrectly entered.

Section 3.4 – AERMOD

13. The UTM coordinates of the cooling tower cells and the ash silo in the Building Profile Input Program (BPIP) input file do not match those entered in the AERMOD input file. Also, the release height of the H₂O Pump in the BPIP input file does not match that entered in the AERMOD input file.

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14. In the AERMOD input file, the value entered in the ME pathway following the PROFBASE keyword is incorrect. This value represents the base elevation of the gridded vertical profile of potential temperatures generated by AERMOD. According to Section 3.5.3 of the "User's Guide for the AMS/EPA Regulatory Model – AERMOD" (EPA-454/B-03-001, September 2004), this base elevation should correspond with the base elevation of the primary meteorological tower. According to the National Climatic Data Center (NCDC), the ground elevation is typically measured at the location of the temperature sensor at airports. At YNG, this elevation is 359.7 meters.

15. Since AERMOD incorporates the Plume Rise Model Enhancement (PRIME) algorithms, it is not necessary to perform a separate cavity analysis for any of the ERE emission sources using SCREEN3.

Section 4.0 – Preliminary Results

16. In this section of the protocol, the 24-hour SO₂ SIL should be 5 ug/m³, not 5.0; the 3-hour SO₂ SIL should be 25 ug/m³, not 25.0; and the 24-hour PM-10 SIL should be 5 ug/m³, not 5.0. In Table 7, the annual SILs for NO₂, PM-10, and SO₂ should be 1.0 ug/m³, not 1.

17. The PADEP is likely to soon recommend an interim 1-hour SO₂ SIL of 7.9 ug/m³. The recommended form of this interim SIL for analyses that utilize five years of National Weather Service (NWS) meteorological data is the highest of the 5-year averages of the maximum modeled 1-hour concentrations for each year at each receptor.

18. The PADEP is likely to soon recommend an interim 1-hour NO₂ SIL of 7.5 ug/m³. This is the same as the interim SIL recommended by the USEPA in the June 29, 2010 memorandum from Stephen D. Page, "Guidance Concerning the Implementation of the 1-hour NO₂ NAAQS for the Prevention of Significant Deterioration Program." The recommended form of this interim SIL for analyses that utilize five years of NWS meteorological data is the highest of the 5-year averages of the maximum modeled 1-hour concentrations for each year at each receptor.

19. The form of the 24-hour and annual PM-2.5 significant impact level (SIL) is incorrect. According to the USEPA March 23, 2010 memorandum from Stephen D. Page, "Modeling Procedures for Demonstrating Compliance with PM-2.5 NAAQS," the form of the 24-hour PM-2.5 SIL for analyses that utilize five years of NWS meteorological data is the highest of the 5-year averages of the maximum modeled 24-hour concentrations for each year at each receptor. Likewise, the form of the annual PM-2.5 SIL is the highest of the 5-year averages of the modeled annual mean concentrations for each year at each receptor.

20. Table 7 and Table 8 indicate that the PADEP's likely soon-to-be recommended 1-hour NO₂ SIL will still be exceeded after applying the default NO₂/NO_x ratio of 0.75 (Tier 2 method). ERE may propose to conduct a Tier 3 method, such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM), a cumulative multi-source analysis, or a combination of both in order to determine if the NO₂ emissions from the proposed ERE facility will cause or contribute to a violation

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of the 1-hour NO₂ NAAQS. The USEPA guidance contained in the June 29, 2010 memorandum from Stephen D. Page, "Guidance Concerning the Implementation of the 1-hour NO₂ NAAQS for the Prevention of Significant Deterioration Program," must be followed. ERE should note that the application of AERMOD with the OLM or PVMRM non-regulatory-default options requires justification and approval by the USEPA Regional Administrator according to Section 3.2.2(e) of the Guideline on Air Quality Models (Guideline), codified in Appendix W to 40 CFR Part 51.

Section 5.0 – Recommendations

21. The USEPA is expected to release a new version of AERMOD and an AERMOD post-processor that will have the capability of calculating the design concentrations for the new 1-hour NO₂ and 1-hour SO₂ NAAQS. It will be advantageous to ERE to use this new version of AERMOD, especially if a cumulative analysis for these new standards is necessary.

Additional Comments

22. The protocol should describe how the additional impact analyses pursuant to 40 CFR § 52.21(o) will be addressed. These analyses must demonstrate that ERE's emissions, in conjunction with emissions due to general commercial, residential, industrial, and other growth associated with the ERE project, will not impair visibility, soils, and vegetation. These analyses are required independent of the source impact analyses pursuant to 40 CFR § 52.21(k) for the NAAQS and Prevention of Significant Deterioration (PSD) increment standards.

23. The protocol should describe how the analyses pursuant to 40 CFR § 52.21(p), regarding the potential for adverse impacts on air quality related values (AQRV), including visibility, in Federal Class I areas will be addressed.

24. The PADEP has determined that an analysis for the Class I PSD increment standards is not necessary for the ERE project. This determination is based on an extrapolation of SCREEN3-estimated impacts to the distance of the nearest Federal Class I area. The impacts are estimated to not exceed the USEPA proposed Class I SILs.

25. The protocol should describe how the air quality modeling will be conducted to support the inhalation pathway risk assessment requested by the PADEP for the various hazardous air pollutants emissions associated with tire-derived fuel (TDF) combustion.