Pennsylvania
Department of
Environmental Protection

MEMO

TO Justin Haley
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DATE August 11, 2025

RE Air Quality Analyses for Prevention of Significant Deterioration
Homer City Generation, L.P.
Application for Plan Approval 32-00457A
Homer City Generation Project
Homer City Generating Station Site
Black Lick Township and Center Township, Indiana County

MESSAGE:
The Pennsylvania Department of Environmental Protection's (DEP) Air Quality Modeling and Risk Assessment Section has completed its technical review of the air quality analyses included in Homer City Generation, L.P.'s (Homer City) plan approval application for its proposed Homer City Generation Project, an electric power generation facility at the Homer City Generating Station site in Black Lick Township and Center Township, Indiana County.

Homer City's proposed project is to construct and operate up to seven (7) combined-cycle combustion turbines, ten (10) simple-cycle aeroderivative gas turbines, three (3) auxiliary boilers, ten (10) emergency generators rated at approximately 2,500 electrical kilowatts (kWe), two (2) emergency generators rated at approximately 1,000 kWe, one (1) emergency fire water

pump engine, seven (7) fuel gas heaters, and seven (7) cooling towers (each with eight (8) cells). The project would be a major modification to an existing major stationary source and therefore subject to the Prevention of Significant Deterioration (PSD) regulations.

The DEP's technical review concludes that Homer City's air quality analyses satisfy the requirements of the PSD regulations. The DEP's summary of Homer City's air quality analyses for PSD is attached.

If you have any questions regarding Homer City's air quality analyses for PSD, you may contact me (droble@pa.gov, 717.705.7689) or Andrew Fleck (afleck@pa.gov, 717.783.9243).

Attachment

cc: Lori McNabb, NWRO/Air Quality
David Balog, NWRO/Air Quality/New Source Review
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DEP Summary of Air Quality Analyses for Prevention of Significant Deterioration
Homer City Generation, L.P.
Application for Plan Approval 32-00457A
Homer City Generation Project
Homer City Generating Station Site
Black Lick Township and Center Township, Indiana County
August 11, 2025

I. Background

The Pennsylvania Department of Environmental Protection (DEP) received a plan approval application on April 4, 2025, from Homer City Generation, L.P. (Homer City) for its proposed Homer City Generation Project, an electric power generation facility at the Homer City Generating Station site in Black Lick Township and Center Township, Indiana County.[1] The plan approval application was prepared by AECOM, on behalf of Homer City. On May 8, 2025, the DEP's Northwest Regional Office (NWRO) notified Homer City that its plan approval application was administratively complete.[2] The DEP received a revised plan approval application from Homer City on July 22, 2025,[3] and August 4, 2025.[4]

II. PSD Requirements

Homer City's proposed project would be a major modification[5] to an existing major stationary source[6] and therefore subject to the Prevention of Significant Deterioration (PSD) regulations codified in 40 CFR § 52.21. These federal PSD regulations are adopted and incorporated by reference in their entirety in 25 *Pa. Code* § 127.83 and the Commonwealth's State Implementation Plan (SIP) codified in 40 CFR § 52.2020.

For PSD applicability purposes, Homer City calculated a net emissions increase[7] of particulate matter (PM), particulate matter less than or equal to 10 micrometers in diameter (PM-10), particulate matter less than or equal to 2.5 micrometers in diameter (PM-2.5), lead (Pb), and sulfuric acid mist (H_2SO_4). Homer City's net emissions increase from the proposed major modification equals or exceeds the PSD significant emission rates (SER)[8] for PM, PM-10, PM-2.5, and H_2SO_4. Homer City is required to conduct air quality analyses for PM-10 and PM-2.5. Homer City's net emissions increase for the proposed major modification is summarized in Table 1.

[1] Letter with enclosure (Homer City Generation Prevention of Significant Deterioration Permit Application (April 2025)) from Jeffrey Connors, AECOM to Lori McNabb, DEP/NWRO/Air Quality. April 3, 2025.
[2] Letter from David G. Balog, DEP/NWRO/Air Quality/New Source Review to Mark Wroten, Homer City. May 8, 2025.
[3] E-mail with attachment (Homer City Generation Prevention of Significant Deterioration Permit Application (Revised July 2025)) from Jeffrey Connors, AECOM to Justin Haley and David Balog, DEP/NWRO/Air Quality/New Source Review. July 22, 2025.
[4] E-mail with attachment (Homer City Generation Prevention of Significant Deterioration Permit Application (Revised July 2025)) from Jeffrey Connors, AECOM to Justin Haley and David Balog, DEP/NWRO/Air Quality/New Source Review. August 4, 2025.
[5] *Code of Federal Regulations*. 40 CFR § 52.21(b)(2). Definition of "major modification."
[6] *Code of Federal Regulations*. 40 CFR § 52.21(b)(1). Definition of "major stationary source."
[7] *Code of Federal Regulations*. 40 CFR § 52.21(b)(3). Definition of "net emissions increase."
[8] *Code of Federal Regulations*. 40 CFR § 52.21(b)(23). Definition of "significant."

Table 1: Homer City's Net Emissions Increase for Proposed Major Modification

Pollutant	Proposed Major Modification Net Emissions Increase	PSD Significant Emission Rate
	tpy	tpy
PM	623.0	25
PM-10	622.0	15
PM-2.5	619.8	10 of direct PM-2.5, 40 of SO_2, or 40 of NO_X
Pb	0.0722	0.6
H_2SO_4	137.3	7

Relevant to 40 CFR § 52.21(k) through (p) of the PSD regulations, Homer City's plan approval application included the following air quality analyses:

- Source impact analyses of the net emissions increase of PM-10 and PM-2.5 due to Homer City's major modification;

- Additional impact analyses of the impairment to visibility, soils, and vegetation due to Homer City's major modification and associated growth; and

- Initial screening calculations to determine whether the net emissions increase due to Homer City's major modification would have negligible impacts on air quality related values (AQRV) and visibility in nearby federal Class I areas.

III. Air Dispersion Modeling

A. Model Selection

Homer City's air dispersion modeling utilized the American Meteorological Society (AMS) / U.S. Environmental Protection Agency's (EPA) Regulatory Model (AERMOD) v24142. AERMOD is the EPA's required near-field air dispersion model for a wide range of regulatory applications in all types of terrain and for aerodynamic building downwash.[9]

B. Model Input

1. Control Pathway

AERMOD was executed with regulatory default options to calculate concentrations for each applicable pollutant and averaging time.

[9] *Code of Federal Regulations*. 40 CFR Part 51, Appendix W (Guideline on Air Quality Models). Subsection 4.2.2.1(a).

AERMOD was executed with rural dispersion, by default, based on the EPA's recommended Land Use Procedure.[10,11] The EPA's Land Use Procedure was conducted by evaluating annual National Land Cover Database (NLCD) v1.0 land cover data for 2023 from the U.S. Geological Survey (USGS) Multi-Resolution Land Characteristics Consortium (MRLC). NLCD land cover code 23 (Developed, Medium Intensity) and land cover code 24 (Developed, High Intensity) were considered to be equivalent to Auer[12] land use types that are classified as urban by the EPA's Land Use Procedure, whereas the remaining NLCD land cover codes were considered to be equivalent to Auer land use types that are classified as rural. The land cover within three (3) kilometers of Homer City's proposed project is overwhelmingly rural and would not significantly contribute to an urban heat island effect. Homer City provided a detailed description that justifies the use of rural dispersion in subsection 6.5.1 (Land Use Analysis) of the plan approval application.

2. Source Pathway

a. Source Characterization

Homer City's emissions of PM-10 and PM-2.5 would be released to the atmosphere via typical unobstructed vertical stacks that were characterized in AERMOD as point sources. Homer City's proposed emission sources included in the analyses for both PM-10 and PM-2.5 and associated model source IDs are listed in Table 2.

Table 2: Homer City's Proposed Emission Sources and Model Source IDs

Proposed Emission Source(s)	Model Source ID(s)
Combined-Cycle Combustion Turbines (7 units)	UNIT1 – UNIT7
Simple-Cycle Aeroderivative Gas Turbines (10 units)	FT8_01 – FT8_10
Auxiliary Boilers (3 units)	AUX_2, AUX_4, AUX_6
Emergency Generators (~2,500 kWe) (10 units)	G01_25MW – G10_25MW
Emergency Generators (~1,000 kWe) (2 units)	G01_1MW & G02_1MW
Fire-Water Pump Engine (1 unit)	FWP_1
Fuel Gas Heaters (7 units)	HTR_1 – HTR_7
Cooling Towers (7 units – 8 cells each)	CT1_1 – CT1_8 to CT7_1 – CT7_8

b. Emission Data

The emission rates and associated parameters entered in AERMOD for each of the project's sources are consistent with those provided in Homer City's plan approval application.

[10] *Code of Federal Regulations*. 40 CFR Part 51, Appendix W (Guideline on Air Quality Models). Subsection 7.2.1.1(b)(i).
[11] AERMOD Implementation Guide (EPA-454/B-24-009, November 2024). Subsection 5.1.
[12] Auer, Jr., A.H., 1978. Correlation of Land Use and Cover with Meteorological Anomalies. *Journal of Applied Meteorology*, 17(5): 636–643.

Emission rates entered in AERMOD that represent Homer City's net emissions increase of PM-10 and PM-2.5 are summarized in Table 3.

Table 3: Homer City's Modeled Emission Rates of PM-10 and PM-2.5

Model Source ID(s)	PM-10 Modeled Emission Rate		PM-2.5 Modeled Emission Rate	
	24-hour	Annual	24-hour	Annual
	lb/hr	lb/hr	lb/hr	lb/hr
UNIT1 – UNIT7[a]	24.0996	24.0996	24.1274	24.1274
FT8_01 – FT8_10	3.0001	3.0001	3.0001	3.0001
AUX_2, AUX_4, AUX_6	0.4992	0.0246[b]	0.4992	0.0250[b]
G01_25MW – G10_25MW	0.1659	0.0095[c]	0.1603	0.0092[c]
G01_1MW & G02_1MW	0.0675	0.0040[c]	0.0656	0.0037[c]
FWP_1	0.1222	0.0071[c]	0.1183	0.0068[c]
HTR_1 – HTR_7	0.0516	0.0516	0.0518	0.0518
CT1_1 – CT7_8[d]	0.0087	0.0087	2.88E-05	2.88E-05

[a] Emission rates for base (100%) load with duct firing operating scenario.
[b] Adjusted by an operating factor of 438 hours per year.
[c] Adjusted by an operating factor of 500 hours per year.
[d] Emission rates for each of the 56 cells.

Homer City conducted operating scenario analyses with AERMOD to determine the worst-case impacts from various load scenarios for the combined-cycle combustion turbines and the simple-cycle aeroderivative gas turbines. The results of these operating scenario analyses determined the source data entered in AERMOD for the subsequent significant impact level (SIL), National Ambient Air Quality Standards (NAAQS), and PSD increment analyses. Since emission rates vary due to type of operating load and ambient temperature, several operating scenarios were assessed for the combined-cycle combustion turbines and the simple-cycle aeroderivative gas turbines. For the combined-cycle combustion turbines, operating scenarios evaluated included combinations of operating loads (i.e., base load (100% load) with and without duct firing, intermediate load (75% load), minimum emission compliance load (~35-45% load)) and ambient temperatures (-20˚F to 105˚F), startup (2 turbines starting up simultaneously with remaining turbines at base load), and shutdown. For the simple-cycle aeroderivative turbines, operating scenarios evaluated included combinations of operating loads (i.e., base load (100% load), intermediate load (75% load), minimum emission compliance load (~50% load)) and ambient temperatures (-18.4˚F to 120˚F), startup (2 turbines starting up simultaneously twice per hour with remaining turbines at base load), and shutdown.

Homer City provided a detailed description of the emission rates and associated parameters in subsection 6.2 (Modeling Source Approach and Configurations) of the plan approval application.

c. Good Engineering Practice Stack Height and Downwash

Homer City's buildings and structures affecting downwash and stacks were entered in the EPA's Building Profile Input Program for Plume Rise Model Enhancements (BPIPPRM) v04274. The height of each stack was fully creditable for entry in AERMOD since none exceeded Good Engineering Practice (GEP) stack height,[13] i.e., the greater of 65 meters or the GEP formula stack height calculated by BPIPPRM. Homer City's GEP stack heights based on the GEP formula stack heights calculated by BPIPPRM and modeled stack heights entered in AERMOD are summarized in Table 4.

Table 4: Homer City's GEP Stack Heights and Modeled Stack Heights

Model Source ID(s)	GEP Formula Stack Height(s)	GEP Stack Height(s)	Modeled Stack Height(s)
	m	m	m
UNIT1 – UNIT7	88.75 – 89.05 (varies by stack)	88.75 – 89.05 (varies by stack)	57.91
FT8_01 – FT8_10	36.70	65.00	27.43
AUX_2, AUX_4, AUX_6	88.76 – 89.07 (varies by stack)	88.76 – 89.07 (varies by stack)	16.76
G01_25MW – G10_25MW	9.15 – 87.75 (varies by stack)	65.00 – 87.75 (varies by stack)	6.10
G01_1MW & G02_1MW	36.70	65.00	6.10
FWP_1	85.96	85.96	3.66
HTR_1 – HTR_7	88.76 – 89.04 (varies by stack)	88.76 – 89.04 (varies by stack)	4.57
CT1_1 – CT1_8 to CT7_1 – CT7_8	86.48 – 89.08 (varies by cell)	86.48 – 89.08 (varies by cell)	16.76

Additionally, direction-specific downwash parameters, calculated by BPIPPRM, were entered in AERMOD for each stack.

Homer City provided a detailed description of GEP stack height and downwash in subsection 6.4 (Building Downwash and GEP Height Analysis) of the plan approval application.

d. Nearby Emission Sources and Modeled Component of Background Concentrations

In the 24-hour PM-10, 24-hour PM-2.5, and annual PM-2.5 NAAQS analyses, the modeled components of the PM-10 and PM-2.5 background concentrations were calculated by the inclusion in AERMOD of source data that represent emission sources from existing nearby facilities. These facilities include Keystone Generating Station (Armstrong County), Conemaugh Generating Station (Indiana County), Seward Generating Station (Indiana County), and Armstrong Power (Armstrong County).

[13] *Code of Federal Regulations*. 40 CFR § 51.100(ii). Definition of "good engineering practice stack height."

e. PSD Increment Affecting Sources

The PM-10 major source baseline date is January 6, 1975[14] and the PM-10 trigger date is August 7, 1977.[15] In the 24-hour PM-10 Class II Area PSD increment analysis, source data identical to those used in the 24-hour PM-10 NAAQS analysis to represent emission sources for existing nearby facilities were included in AERMOD to conservatively represent potential PM-10 increment-consuming emissions.

The PM-2.5 major source baseline date is October 20, 2010[16] and the PM-2.5 trigger date is October 20, 2011.[17] Homer City's plan approval application is the first administratively complete application for a proposed project in Indiana County that is subject to the PSD regulations with significant emissions of direct PM-2.5 or PM-2.5 precursors, i.e., nitrogen oxides (NO_X) and/or sulfur dioxide (SO_2), after the PM-2.5 trigger date. Homer City's plan approval application therefore establishes the PM-2.5 minor source baseline date[18] as May 2, 2025,[19] for the PM-2.5 baseline area[20] that includes all of Indiana County. No actual emissions[21] were identified from any other major stationary source on which construction commenced after the PM-2.5 major source baseline date that would affect PM-2.5 Class II Area PSD increment in the area impacted by Homer City's net emissions increase of direct PM-2.5.

3. Receptor Pathway

a. Receptors

Receptors were entered in AERMOD at locations defined to be ambient air.[22,23] The extent and density of Homer City's receptor domain in AERMOD were adequate to determine the location and magnitude of the maximum concentrations in the Class II Area and Class I Area SIL analyses and the design concentrations in the NAAQS and Class II Area PSD increment analyses.

In the Class II Area SIL analyses and Class II Area PSD increment analyses, receptors were entered in AERMOD within a 45- by 44-kilometer Cartesian grid centered on Homer City's proposed facility. Receptor density decreased with distance from the proposed location of the Homer City facility. Homer City provided a detailed description of AERMOD's Class II Area receptor domain in subsection 6.7 (Receptor Processing with AERMAP) of the plan approval application.

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[14] *Code of Federal Regulations*. 40 CFR § 52.21(b)(14)(i)(a). Definition of "major source baseline date."
[15] *Code of Federal Regulations*. 40 CFR § 52.21(b)(14)(ii)(a). Definition of "trigger date."
[16] *Code of Federal Regulations*. 40 CFR § 52.21(b)(14)(i)(c). Definition of "major source baseline date."
[17] *Code of Federal Regulations*. 40 CFR § 52.21(b)(14)(ii)(c). Definition of "trigger date."
[18] *Code of Federal Regulations*. 40 CFR § 52.21(b)(14)(ii). Definition of "minor source baseline date."
[19] Letter from David G. Balog, DEP/NWRO/Air Quality/New Source Review to Mark Wroten, Homer City. May 8, 2025.
[20] *Code of Federal Regulations*. 40 CFR § 52.21(b)(15)(i). Definition of "baseline area."
[21] *Code of Federal Regulations*. 40 CFR § 52.21(b)(21). Definition of "actual emissions."
[22] *Code of Federal Regulations*. 40 CFR § 50.1(e). Definition of "ambient air."
[23] Revised Policy on Exclusions from "Ambient Air." EPA memorandum from Andrew R. Wheeler, Administrator to Regional Administrators. December 2, 2019.

In the NAAQS and Class II Area PSD increment analyses, only receptors with modeled impacts greater than each pollutant's respective SIL(s) were included in AERMOD. In the annual PM-2.5 NAAQS and Class II Area PSD increment analyses, additional receptors with greater density were entered in AERMOD to determine the maximum impacts.

In the Class I Area SIL analyses, receptors were first entered in AERMOD spaced one degree apart in an arc at a distance of 50 kilometers in the direction of the nearby federal Class I areas, i.e., Dolly Sods Wilderness and Otter Creek Wilderness, both in West Virginia, and Shenandoah National Park in Virginia. If the initial set of receptors had modeled impacts greater than a pollutant's respective Class I Area SIL(s), then receptors were entered in AERMOD spaced one degree apart in multiple arcs at distances from 1 to 50 kilometers in the direction of the nearby federal Class I areas. The modeled concentrations at the receptors along the multiple arcs were used to establish formulae for estimating concentrations by extrapolation at the distances of the nearby federal Class I areas. Homer City provided a detailed description of the receptors and formulae used in the Class I Area SIL analyses in subsection 9.1.2 (Class I Increment and SIL Analysis) of the plan approval application.

b. Terrain Preprocessing

In all the analyses, receptor elevations and hill height scales were calculated by the AERMOD terrain preprocessor (AERMAP) v24142 using elevation data from the USGS 3-Dimensional Elevation Program (3DEP) with a resolution of one-third arc-second.

4. Meteorology Pathway

Homer City's air dispersion modeling utilized a 5-year meteorological dataset consisting of hourly records from January 1, 2020, through December 31, 2024, derived from surface data measured at Johnstown – Cambria County Airport (KJST) and upper air data measured at Pittsburgh International Airport (KPIT).

a. Meteorological Dataset Preprocessing

The meteorological dataset was processed by the DEP with the AERMOD meteorological preprocessor (AERMET) v24142 and its associated AERMINUTE v15272 preprocessor and AERSURFACE v24142 tool.

The KJST and KPIT data provide the minimum meteorological measurements necessary for AERMET to produce the two output files, i.e., the surface and profile files, necessary for AERMOD input. The KJST surface data included single-level measurements of wind direction and wind speed at 7.92 meters, as well as measurements of station pressure, cloud cover, dry bulb temperature, dew point temperature, and relative humidity. The KPIT upper air data included multi-level morning measurements of atmospheric pressure, dry bulb temperature, dew point temperature, wind direction, and wind speed from the surface to the first level above 5,000 meters.

AERMET Stage 1 extracted KJST surface data, downloaded from the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) in the Integrated Surface Data (ISD) format, and KPIT upper air data, downloaded from NCEI in the Integrated Global Radiosonde Archive (IGRA) format. Before processing with AERMET Stage 1, a Line 21 with missing data codes was added to the KPIT upper air 12Z measurements with a missing Line 11 or 21. This allowed AERMET to process the available upper air 12Z measurements. Additionally, AERMET Stage 1 utilized the MODIFY option to check for and correct problems with the upper air data.

AERMET Stage 2 utilized output data from AERMINUTE, which processed KJST 1-minute and 5-minute wind speed and wind direction measurements downloaded from NCEI.

AERMET Stage 2 utilized the surface friction velocity adjustment option, which is intended to address potential concerns regarding AERMOD's performance relevant to the overprediction of concentrations during stable low wind speed meteorological conditions by adjusting the surface friction velocity based on Qian, W., and A. Venkatram, 2011.[24]

AERMET Stage 2 utilized options for substitutions of missing temperature and cloud cover measurements, an anemometer height of 7.92 meters, a minimum wind speed threshold of 0.5 meter per second, and a 3-hour before to 1-hour after 12Z window for determining upper air measurements for use.

AERMET Stage 2 utilized output data from AERSURFACE, which processed annual NLCD v1.0 land cover and fractional impervious surface data for 2020 and 2021 along with tree canopy cover data for the same years, downloaded from the USGS MRLC, to estimate noontime albedo, daytime Bowen ratio, and surface roughness length (z_0) for the KJST meteorological site. AERSURFACE utilized options for a default 1-kilometer z_0 study area with seven user-defined sectors with low z_0 and high z_0 designations, non-arid condition, and monthly frequency with month-to-season assignments as follows: winter (November, December, January, February, and March), Spring (April and May), Summer (June, July, and August), and Autumn (September and October). Surface moisture condition (wet, dry, or average) for the KJST meteorological site was based on average precipitation data for Pennsylvania Climate Division 08, downloaded from NCEI, and derived in accordance with the EPA's guidance[25] to determine the surface moisture condition thresholds using a 30-year (1991-2020) climatological dataset. Snow cover condition (non-continuous or continuous) was based on observational data, downloaded from NCEI, for the "Belmont 0.1 NE" and "Johnstown 3.6 SE" Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) sites.

[24] Qian, W., and A. Venkatram, 2011. Performance of Steady-State Dispersion Models Under Low Wind-Speed Conditions. *Boundary Layer Meteorology*, 138, 475-491.
[25] User's Guide for AERSURFACE Tool (EPA-454/B-24-003, November 2024). Subsection 2.3.3.

b. Meteorological Dataset Representativeness

The fully processed meteorological dataset satisfies the EPA's recommendations for use in AERMOD,[26] and was appropriate for AERMOD to construct realistic boundary layer profiles to adequately represent plume transport and dispersion under both convective and stable conditions within the modeling domain. Additionally, the fully processed meteorological dataset satisfies the DEP's data completeness recommendation for use in air dispersion modeling.

The KJST meteorological site, located approximately 38 kilometers southeast of Homer City, is the nearest site with Automated Surface Observing System (ASOS) instrumentation, which provided 1-minute and 5-minute wind measurements that, when processed, increased the hourly meteorological data records available to AERMOD for calculating concentrations by keeping reported calm and variable winds to a minimum. The KJST meteorological site is on a wide open, flat plain with no major obstacles to the meteorological instrumentation. Other than a few peaks along the Laurel Ridge, there is no significant terrain between the KJST meteorological site and Homer City's modeled plume heights. As recommended by the EPA's guidance,[27] the estimated values of the surface characteristics, i.e., noontime albedo, daytime Bowen ratio, and surface roughness length, for the KJST meteorological site were compared to those of Homer City. The sites have similar estimated values.

The KPIT meteorological site, located approximately 85 kilometers west of Homer City, is the nearest upper air data site. There is no significant terrain between the KPIT meteorological site and Homer City.

Homer City provided a detailed description that justifies the use of the KJST surface meteorological data and KPIT upper air data in subsection 6.6 (Meteorological Data) of the plan approval application.

5. Output Pathway

In each analysis, AERMOD's output pathway includes options to calculate and format the appropriate design concentrations at the model receptors.

C. Secondary PM-2.5 Formation

In the Class II Area and Class I Area SIL analyses, Homer City did not account for secondary PM-2.5 formation due to Homer City's emissions of PM-2.5 precursors, i.e., NO_X and SO_2, since the Homer City project will result in a net emissions decrease of these precursors.

In the 24-hour PM-2.5 and annual PM-2.5 NAAQS and Class II Area PSD increment analyses, the AERMOD results were appropriately adjusted upward to account for secondary PM-2.5 formation due to Homer City's emissions of PM-2.5 precursors, i.e., NO_X and SO_2, based on the

[26] *Code of Federal Regulations*. 40 CFR Part 51, Appendix W (Guideline on Air Quality Models). Subsections 8.4.3.2 and A.1(b)(2).
[27] AERMOD Implementation Guide (EPA-454/B-24-009, November 2024). Subsection 3.1.1.

EPA's guidance.[28,29,30] Homer City's estimated secondary PM-2.5 impacts in Class II areas were based on the EPA's photochemical grid modeling results for the Allegheny County, PA hypothetical source with a 90-meter stack and 1,000 tons per year of emissions of each precursor. Homer City's estimated secondary PM-2.5 impacts are summarized in Table 5.

Table 5: Homer City's Estimated Secondary PM-2.5 Impacts

Averaging Time	Secondary PM-2.5 Impact Due to NO_X	Secondary PM-2.5 Impact Due to SO_2	Total Secondary PM-2.5 Impact
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
24-hour	0.09088	0.05325	0.14413
Annual	0.00701	0.00184	0.00885

Homer City provided a detailed description that justifies the use of the Allegheny County, PA hypothetical source and calculations for the estimated secondary PM-2.5 impacts in subsection 6.8 (Secondary $PM_{2.5}$) of the plan approval application.

D. Existing Ambient Air Quality and Monitored Component of Background Concentrations

Existing ambient air quality was established for the area that Homer City's net emissions increase due to the major modification would affect by utilizing representative PM-10 and PM-2.5 data measured from January 1, 2022, through December 31, 2024, at the DEP-operated ambient monitors listed in Table 6.

Table 6: Monitors for Establishing Existing Ambient Air Quality

Pollutant	Monitor Site Name	Monitor Site ID	Distance/Direction from Proposed Location of Homer City's Project
PM-10	Johnstown	42-021-0011	32 km / Southeast
PM-2.5	Strongstown	42-063-0004	24 km / Northeast

Since the impact of Homer City's net emissions increase due to the major modification were calculated by AERMOD to be greater than each pollutant's NAAQS SIL(s), as described later, Homer City utilized 2022-2024 monitored design values to characterize the monitored component of the background concentrations in a cumulative impact analysis. The PM-10 and PM-2.5 monitored design values are listed in Table 7.

[28] Guidance for Ozone and Fine Particulate Matter Permit Modeling (EPA-454/R-22-005, July 2022).
[29] Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (EPA-454/R-19-003, April 2019).
[30] Clarification on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program. EPA memorandum from Tyler Fox, OAQPS to Regional Office Modeling Contacts. April 30, 2024.

Table 7: PM-10 and PM-2.5 Monitored Design Values

Pollutant	Averaging Time	2022-2024 Monitored Design Value $\mu g/m^3$
PM-10	24-hour	54[a]
PM-2.5	24-hour	19
	Annual	6.8

[a] Third-highest 24-hour value over three-year period selected based on assessment of impacts due to wildfire smoke.

Homer city provided a detailed description that justifies the use of PM-10 and PM-2.5 data from the Johnstown and Strongstown monitors, respectively, to establish existing ambient air quality and the monitored component of the background concentrations in subsection 6.9.2 (PM_{10} Background Monitor Selection) and subsection 6.9.1 ($PM_{2.5}$ Background Monitor Selection) of the plan approval application.

Additionally, Homer City should be exempted from the PSD pre-application ambient monitoring requirements[31] for PM and H_2SO_4 since the EPA has not established a significant monitoring concentration (SMC) for these pollutants.[32]

E. Modeling Results

1. Operating Scenario Analyses

The operating scenario analyses for the 24-hour averaging time determined that the worst-case operating scenario consisted of the seven (7) combined-cycle combustion turbines at base (100%) load with duct firing and the ten (10) simple-cycle aeroderivative gas turbines at 50% load. The operating scenario analyses for the annual averaging time determined that the worst-case operating scenario consisted of the seven (7) combined-cycle combustion turbines at base (100%) load with duct firing and the ten (10) simple-cycle aeroderivative gas turbines at base (100%) load. Homer City provided a detailed description of the operating scenario analyses in subsection 7.1 (Operating Scenario Analysis) of the plan approval application.

2. SIL Analyses

a. SIL Analyses for NAAQS and Class II Area PSD Increments

The impacts of Homer City's net emissions increase due to the major modification were calculated by AERMOD to be less than the following:

- The EPA's annual PM-10 SIL for the Class II Area PSD increment.[33]

[31] *Code of Federal Regulations*. 40 CFR § 52.21(m).
[32] *Code of Federal Regulations*. 40 CFR § 52.21(i)(5).
[33] *Code of Federal Regulations*. 40 CFR § 51.165(b)(2). Based on long-standing EPA policy and guidance, these NAAQS SILs have also been applied to Class II Area PSD increments.

A cumulative impact analysis was therefore not necessary for the annual PM-10 Class II Area PSD increment.

The impacts of Homer City's net emissions increase due to the major modification were calculated by AERMOD to be greater than the following:

- The EPA's 24-hour PM-10 SIL for the NAAQS;[34]
- The EPA's 24-hour PM-2.5 and annual PM-2.5 SILs for the NAAQS;[35,36,37,38]
- The EPA's 24-hour PM-10 SIL for the Class II Area PSD increment;[39] and
- The EPA's 24-hour PM-2.5 and annual PM-2.5 SILs for the Class II Area PSD increments.[40,41,42,43]

Cumulative impact analyses were therefore necessary for the 24-hour PM-10, 24-hour PM-2.5, and annual PM-2.5 NAAQS, as well as the 24-hour PM-10 Class II Area PSD increment. Cumulative impact analyses were not necessary, however, for the 24-hour PM-2.5 and annual PM-2.5 Class II Area PSD increments since, as mentioned earlier, Homer City's plan approval application establishes the PM-2.5 minor source baseline date for Indiana County and no actual emissions of direct PM-2.5 or PM-2.5 precursors were identified from any major stationary source on which construction commenced after the major source baseline date.

The results of Homer City's SIL analyses for the NAAQS and Class II Area PSD increments are summarized in Table 8.

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[34] *Code of Federal Regulations*. 40 CFR § 51.165(b)(2).
[35] Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program. EPA memorandum from Peter Tsirigotis, OAQPS to Regional Air Division Directors. April 17, 2018. Pages 15-16.
[36] Technical Basis for the EPA's Development of the Significant Impact Thresholds for $PM_{2.5}$ and Ozone (EPA-454/R-18-001, April 2018).
[37] Legal Memorandum: Application of Significant Impact Levels in the Air Quality Demonstration for Prevention of Significant Deterioration Permitting under the Clean Air Act. April 2018.
[38] Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program. EPA memorandum from Richard Wayland and Scott Mathias, OAQPS to Regional Air Division Directors. April 30, 2024. Pages 6-7.
[39] *Code of Federal Regulations*. 40 CFR § 51.165(b)(2). Based on long-standing EPA policy and guidance, these NAAQS SILs have also been applied to Class II Area PSD increments.
[40] Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program. EPA memorandum from Peter Tsirigotis, OAQPS to Regional Air Division Directors. April 17, 2018. Pages 16-17.
[41] Technical Basis for the EPA's Development of the Significant Impact Thresholds for $PM_{2.5}$ and Ozone (EPA-454/R-18-001, April 2018).
[42] Legal Memorandum: Application of Significant Impact Levels in the Air Quality Demonstration for Prevention of Significant Deterioration Permitting under the Clean Air Act. April 2018.
[43] Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program. EPA memorandum from Richard Wayland and Scott Mathias, OAQPS to Regional Air Division Directors. April 30, 2024. Pages 7-8.

Table 8: Results of Homer City's SIL Analyses for NAAQS and Class II Area PSD Increments

Pollutant	Averaging Time	Modeled Maximum Concentration		SIL for NAAQS & Class II Area PSD Increment
		Base-Case Scenario	Worst-Case Scenario	
		$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
PM-10	24-hour	6.42775	6.84342	5
	Annual	0.39310	0.39310[a]	1.0
PM-2.5[b]	24-hour	4.94630	5.00112	1.2
	Annual	0.36849	0.36849[a]	0.13
PM-2.5[c]	24-hour	6.37529	6.79097	1.2
	Annual	0.39156	0.39156[a]	0.13

[a] Worst-case scenario is the base-case scenario from operating scenario analyses.
[b] Based on the forms of the SILs for the NAAQS.
[c] Based on the forms of the SILs for the PSD increments.

Homer City provided a detailed description of the SIL analyses for the NAAQS and Class II Area PSD increments in subsection 7.2 (SIL Analysis) of the plan approval application.

b. SIL Analyses for Class I Area PSD Increments

The impacts of Homer City's net emissions increase due to the major modification were calculated by AERMOD to be less than the following:

- The EPA's 24-hour and annual PM-10 proposed SILs for the Class I Area PSD increments;[44] and
- The EPA's 24-hour PM-2.5 and annual PM-2.5 SILs for the Class I Area PSD increments.[45,46,47,48]

Cumulative impact analyses were therefore not necessary for the 24-hour PM-10, annual PM-10, 24-hour PM-2.5, and annual PM-2.5 Class I Area PSD increments.

The results of Homer City's SIL analyses for the Class I Area PSD increments are summarized in Table 9.

[44] *Federal Register*. 61 FR 38249. Prevention of Significant Deterioration and Nonattainment New Source Review; Proposed Rule. July 23, 1996.
[45] Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program. EPA memorandum from Peter Tsirigotis, OAQPS to Regional Air Division Directors. April 17, 2018. Pages 16-17.
[46] Technical Basis for the EPA's Development of the Significant Impact Thresholds for $PM_{2.5}$ and Ozone (EPA-454/R-18-001, April 2018).
[47] Legal Memorandum: Application of Significant Impact Levels in the Air Quality Demonstration for Prevention of Significant Deterioration Permitting under the Clean Air Act. April 2018.
[48] Supplement to the Guidance on Significant Impact Levels for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program. EPA memorandum from Richard Wayland and Scott Mathias, OAQPS to Regional Air Division Directors. April 30, 2024. Pages 7-8.

Table 9: Results of Homer City's SIL Analyses for Class I Area PSD Increments

Pollutant	Averaging Time	Modeled Maximum Concentration		SIL for Class I Area PSD Increment
		Base-Case Scenario	Worst-Case Scenario	
		µg/m^3	µg/m^3	µg/m^3
PM-10	24-Hour	0.01474[a]	0.01474[a],[b]	0.3
	Annual	0.01400	0.01400[b]	0.2
PM-2.5[c]	24-hour	0.01735[a]	0.01735[a],[b]	0.27
	Annual	0.01398	0.01398[b]	0.03

[a] Extrapolated concentration based on distance to Dolly Sods Wilderness Area.
[b] Worst-case scenario is the base-case scenario from operating scenario analyses.
[c] Based on the forms of the SILs for the PSD increments.

Homer City provided a detailed description of the SIL analyses for the Class I Area PSD increments in subsection 9.1.2 (Class I Increment and SIL Analysis) of the plan approval application.

3. NAAQS Analyses

As stated previously, cumulative impact analyses for the 24-hour PM-10, 24-hour PM-2.5, and annual PM-2.5 NAAQS were necessary. The impacts of Homer City's net emissions increase due to the major modification, in conjunction with emissions that represent existing nearby sources, were calculated by AERMOD to be less than the 24-hour PM-10, 24-hour PM-2.5, and annual PM-2.5 NAAQS. The results of Homer City's NAAQS analyses are summarized in Table 10.

Table 10: Results of Homer City's Analyses for NAAQS

Pollutant	Averaging Time	Modeled Maximum Design Concentration		Monitored Design Value 2022-2024	Total Concentration	NAAQS
		Base-Case Scenario	Worst-Case Scenario			
		µg/m^3	µg/m^3	µg/m^3	µg/m^3	µg/m^3
PM-10	24-hour	6.47534[a]	6.53450[a]	54	60.53450[B]	150
PM-2.5	24-hour	4.52001[c],[d]	4.55140[c],[d]	19	23.55140[B]	35
	Annual	0.85602[d],[e]	0.85602[d],[e],[f]	6.8	7.65602[B]	9.0

[a] Design concentration is the highest, 6th-highest 24-hour concentration over the 5-year meteorological dataset.
[b] Total concentration is the highest modeled maximum design concentration between base-case and worst-case scenarios added to monitored design value.
[c] Design concentration is the highest, 8th-highest 24-hour concentration averaged over the 5-year meteorological dataset.
[d] AERMOD results were adjusted upward to account for secondary PM-2.5 formation. See Table 5.
[e] Design concentration is the highest annual concentration averaged over the 5-year meteorological dataset.
[f] Worst-case scenario is the base-case scenario from operating scenario analyses.

Homer City provided a detailed description of the NAAQS analyses in subsections 8.1 (Class II Area Air Quality Standards and PSD Increments), 8.2 (Nearby Source Inventory), and 8.3 (NAAQS Analysis Results) of the plan approval application.

4. PSD Increment Analyses

As stated previously, a cumulative impact analysis for the 24-hour PM-10 Class II Area PSD increment was necessary. The impacts of Homer City's net emissions increase due to the major modification, in conjunction with emissions that represent potential increment consuming sources, were calculated by AERMOD to be less than the 24-hour PM-10 Class II Area PSD increment. As stated previously, cumulative impact analyses were not necessary for the 24-hour PM-2.5 and annual PM-2.5 Class II Area PSD increments. The impacts of Homer City's net emissions increase due to the major modification were calculated by AERMOD to be less than the 24-hour PM-2.5 and annual PM-2.5 Class II Area PSD increments. The results of Homer City's Class II Area PSD increment analyses are summarized in Table 11.

Table 11: Results of Homer City's Class II Area PSD Increment Analyses

Pollutant	Averaging Time	Modeled Maximum Design Concentration		Class II Area PSD Increment
		Base-Case Scenario	Worst-Case Scenario	
		$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
PM-10	24-hour	6.59915[a]	6.78410[a]	30
PM-2.5	24-hour	6.44338[a],[b]	6.84192[a],[b]	9
	Annual	0.43532[b],[c]	0.43532[b],[c],[d]	4

[a] Design concentration is the highest, 2nd-highest 24-hour concentration for each year of the 5-year meteorological dataset.
[b] AERMOD results were adjusted upward to account for secondary PM-2.5 formation. See Table 5.
[c] Design concentration is the highest annual concentration for each year of the 5-year meteorological dataset.
[d] Worst-case scenario is the base-case scenario from operating scenario analyses.

Homer City provided a detailed description of the Class II Area PSD increment analyses in subsections 8.1 (Class II Area Air Quality Standards and PSD Increments), 8.2 (Nearby Source Inventory), and 8.4 (PSD Increment Analysis Results) of the plan approval application.

In accordance with 25 *Pa. Code* § 127.45(b)(4), the DEP's notice of proposed plan approval issuance in the *Pennsylvania Bulletin* must include, for sources subject to the PSD regulations, "the degree of increment consumption expected to result from the operation of the source or facility." To this end, the degree of Class II Area and Class I Area PSD increment consumption expected to result from Homer City's major modification is provided in Table 12a and Table 12b, respectively.

Table 12a: Degree of Class II Area PSD Increment Consumption from Homer City's Major Modification

Pollutant	Averaging Time	Degree of Class II Area PSD Increment Consumption		Class II Area PSD Increment
		$\mu g/m^3$	Percent of Class II Area PSD Increment	$\mu g/m^3$
PM-10	24-hour	6.78410	22.61 %	30
	Annual	0.39310	2.31 %	17
PM-2.5	24-hour	6.84192	76.02 %	9
	Annual	0.43532	10.88 %	4

Table 12b: Degree of Class I Area PSD Increment Consumption from Homer City's Major Modification

Pollutant	Averaging Time	Degree of Class I Area PSD Increment Consumption		Class I Area PSD Increment
		$\mu g/m^3$	Percent of Class I Area PSD Increment	$\mu g/m^3$
PM-10	24-hour	0.01474	0.18 %	8
	Annual	0.01400	0.35 %	4
PM-2.5	24-hour	0.01735	0.86 %	2
	Annual	0.01398	1.40 %	1

5. Confirmation of Air Dispersion Modeling Results

The DEP confirmed the overall results of Homer City's air dispersion modeling by executing AERMOD upon reviewing the appropriateness of all model input, i.e., model options, emission data, downwash data, terrain data, and meteorological data.

IV. Additional Impact Analyses

A. Associated Growth

General residential growth associated with Homer City's major modification is expected to be negligible. Homer City's major modification is expected to potentially provide electric power to new data centers in the same general area that would be considered commercial, industrial, or other growth, depending on the characteristics of the data centers. However, secondary emissions[49] associated with this associated growth are currently not specific, well-defined, and quantifiable. Secondary emissions were therefore not included in the additional impact analyses of the impairment to visibility, soils, and vegetation, described below, and the cumulative NAAQS and PSD increment analyses, described previously. Homer City provided a detailed description of the associated growth analysis in subsection 9.3 (Growth-Related Impacts) of the plan approval application.

[49] *Code of Federal Regulations*. 40 CFR § 52.21(b)(18). Definition of "secondary emissions."

B. Visibility Impairment

Impairment to visibility due to Homer City's net emissions increase due to the major modification is expected to be negligible based on a Level-2 plume visual impact screening analysis for Yellow Creek State Park using VISCREEN v13190 in accordance with the EPA's guidance.[50] Homer City provided a detailed description of the visibility impairment analysis in subsection 9.4 (Visibility Impairment) of the plan approval application.

C. Soils and Vegetation

No adverse impacts to soils and vegetation are expected from Homer City's net emissions increase due to the major modification. The impacts of Homer City's net emissions increase of criteria pollutants subject to PSD review are calculated by AERMOD to be less than the EPA's ambient screening concentrations.[51] Homer City's net emissions increase of non-criteria pollutants are less than the EPA's SERs.[52] Homer City provided a detailed description of the soils and vegetation analysis in subsection 9.2 (Soils and Vegetation) of the plan approval application.

D. Secondary NAAQS

The DEP notes that the EPA established secondary NAAQS to protect visibility and vegetation, among other things. The impacts of Homer City's net emissions increase due to the major modification are calculated by AERMOD to be less than the secondary NAAQS for the criteria pollutants subject to PSD review.

V. Class I Area Analyses for AQRVs and Visibility

Homer City provided written notice of its proposed major modification to the Federal Land Managers (FLM) of the following nearby federal Class I areas: Dolly Sods Wilderness and Otter Creek Wilderness, both in West Virginia, and Shenandoah National Park in Virginia.[53] The notice included initial screening calculations, which account for Homer City's net emissions increase (Q) due to the major modification and distances (D) to these nearby federal Class I areas, to demonstrate that Homer City's net emissions increase would have negligible impacts on AQRVs and visibility in these nearby federal Class I areas.[54] The FLM of each nearby federal Class I area stated that no analyses for AQRVs and visibility would be necessary.[55,56] Homer City's initial screening Q/D calculations are summarized in Table 13.

[50] Workbook for Plume Visual Impact Screening and Analysis (Revised) (EPA-454/R-92-023, October 1992).
[51] A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals (EPA 450/2-81-078, December 12, 1980). Table 5.3.
[52] Ibid. Table 5.6 and Table 5.7.
[53] E-mail with attachment from Jeffrey Connors, AECOM to U.S. Forest Service and National Park Service representatives. February 20, 2025.
[54] U.S. Forest Service, National Park Service, and U.S. Fish and Wildlife Service, 2010. Federal Land Managers' Air Quality Related Values Work Group (FLAG): Phase I Report – Revised (2010). Natural Resource Report NPS/NRPC/NRR – 2010/232. National Park Service, Denver, CO. Subsection 3.2.
[55] E-mail from Andrea Stacy, National Park Service to Jeffrey Connors, AECOM. February27, 2025.
[56] E-mail from Alexia Prosperi, U.S. Forest Service to Jeffrey Connors, AECOM. March 6, 2025.

Table 13: Homer City Initial Screening Q/D Calculations for Nearby Federal Class I Areas

Class I Area	Distance (D) from Homer City	Homer City Emissions(Q)[a]/ Distance (D) Ratio	FLM Q/D Threshold
	km		
Dolly Sods Wilderness, WV	165	6.2	10
Otter Creek Wilderness, WV	166	6.2	
Shenandoah National Park, VA	197	5.2	

[a] Emissions (Q) equals the total SO_2, NO_X, PM-10, and H_2SO_4 annual emissions (in tpy) based on 24-hour maximum allowable emissions. Q for Homer City = 1027.1 tpy, based on net emissions increase of PM-10 and H_2SO_4 (net emissions decrease of SO_2 and NO_X were assumed to be zero).

Homer City provided a detailed description of the Class I area analyses in subsection 9.1 (Class I Area Impact Analysis) of the plan approval application.

VI. Conclusions

The DEP's technical review concludes that Homer City's air quality analyses satisfy the requirements of the PSD regulations.

In accordance with 40 CFR § 52.21(k), Homer City's source impact analyses demonstrate that the net emissions increase due to the major modification would not cause or contribute to air pollution in violation of the NAAQS for PM-10 or PM-2.5. Additionally, Homer City's source impact analyses demonstrate that the net emissions increase due to the major modification would not cause or contribute to air pollution in violation of the Class II Area or Class I Area PSD increments for PM-10 or PM-2.5.

In accordance with 40 CFR § 52.21(l), Homer City's estimates of ambient concentrations are based on applicable air quality models, databases, and other requirements specified in the EPA's *Guideline on Air Quality Models*[57] as well as the EPA's relevant air quality modeling policy and guidance.

In accordance with 40 CFR § 52.21(m), Homer City provided an analysis of existing ambient air quality in the area that the net emissions increase due to the major modification would affect that included existing representative ambient monitoring data for PM-10 and PM-2.5. Homer City should be exempted from the requirements of 40 CFR § 52.21(m) for PM and H_2SO_4.

In accordance with 40 CFR § 52.21(n), Homer City provided all information necessary to perform the air quality analyses required by the PSD regulations, including all air dispersion modeling data necessary to estimate the air quality impacts of the net emissions increase due to the major modification.

In accordance with 40 CFR § 52.21(o), Homer City provided additional impact analyses of the impairment to visibility, soils, and vegetation that would occur as a result of the major

[57] *Code of Federal Regulations*. 40 CFR Part 51, Appendix W (Guideline on Air Quality Models).

modification. Secondary emissions due to growth associated with Homer City's major modification are not specific, well-defined, and quantifiable.

In accordance with 40 CFR § 52.21(p), written notice of Homer City's proposed major modification has been provided to the FLMs of nearby federal Class I areas. The notice included initial screening calculations which demonstrate that Homer City's net emissions increase due to the major modification would have negligible impacts on AQRVs and visibility in nearby federal Class I areas.

All input, output, and data files associated with Homer City's air dispersion modeling for the PSD air quality analyses are available upon request.