Pennsylvania
Department of
Environmental Protection

MEMO

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THROUGH Andrew W. Fleck AWF
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DATE November 17, 2025

RE Air Dispersion Modeling for Inhalation Risk Assessment
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 dispersion modeling in Homer City Generation, L.P.'s (Homer City) inhalation risk assessment 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 DEP's technical review concludes that Homer City's air dispersion modeling for the inhalation risk assessment is consistent with the EPA's relevant air dispersion modeling policy and guidance. The DEP's summary of Homer City's air dispersion modeling for the inhalation risk assessment is attached.

If you have any questions regarding Homer City's air dispersion modeling for the inhalation risk assessment, you may contact me (hbonifacio@pa.gov, 717.772.5968) or Andrew Fleck (afleck@pa.gov, 717.783.9243).

Attachment

cc: Lori McNabb, NWRO/Air Quality
David Balog, NWRO/Air Quality/New Source Review
Nicholas Lazor, BAQ/Director
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Sean Wenrich, BAQ/Permits/New Source Review
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DEP Summary of Air Dispersion Modeling for Inhalation Risk Assessment
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
November 17, 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 DEP received a revised plan approval application from Homer City on July 22, 2025,[2] and August 4, 2025.[3]

On July 10, 2025, the DEP received the inhalation risk assessment protocol from Homer City for evaluating the potential for risks associated with chemicals of potential concern (COPC) that will be emitted from Homer City's sources.[4] On July 15, 2025, the DEP received the corresponding inhalation risk assessment report.[5] On August 1, 2025, the DEP received a revised inhalation risk assessment report.[6]

The plan approval application and the inhalation risk assessment protocol and report were prepared by AECOM, on behalf of Homer City.

II. Regulatory Applicability

Homer City's inhalation risk assessment was conducted in support of the application for Plan Approval 32-00457A at the request of the DEP in accordance with 25 *Pa. Code* § 127.12(a)(2).

III. Air Dispersion Modeling

As part of the inhalation risk assessment, air dispersion modeling was performed by Homer City to calculate short- and long-term average air concentrations for estimating acute and chronic risks, respectively, due to its emissions of COPCs. As stated in subsection 5.1 (Overview of

[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] 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.
[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. August 4, 2025.
[4] E-mail with attachment (Inhalation Risk Assessment Modeling Protocol Homer City (July 10, 2025)) from Jeffrey Connors, AECOM to Stephen Steirer, DEP/BAQ/Permits/Air Quality Modeling and Risk Assessment. July 10, 2025.
[5] E-mail with attachment (Inhalation Risk Assessment Report Homer City (July 15, 2025)) from Jeffrey Connors, AECOM to Stephen Steirer, DEP/BAQ/Permits/Air Quality Modeling and Risk Assessment. July 15, 2025.
[6] E-mail with attachment (Inhalation Risk Assessment Report Homer City (August 1, 2025)) from Jeffrey Connors, AECOM to Stephen Steirer, DEP/BAQ/Permits/Air Quality Modeling and Risk Assessment. August 1, 2025.

Modeling Methodology) of Homer City's inhalation risk assessment report, Homer City generally followed its air dispersion modeling methodology for the air quality analyses for Prevention of Significant Deterioration (PSD), which is fully described in section 6 (Class II Area Air Quality Modeling Analysis Procedures) of the plan approval application and summarized in the DEP's memorandum dated November 17, 2025[7], for the inhalation risk assessment.

Homer City conducted a single air dispersion modeling run for estimating both acute and chronic risk, as described below.

A. Model Selection

Homer City's air dispersion modeling for the inhalation risk assessment utilized the American Meteorological Society (AMS) / U.S. Environmental Protection Agency (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.[8]

B. Model Input

1. Control Pathway

AERMOD was executed with regulatory default options. AERMOD was executed with rural dispersion, by default, based on the EPA's recommended Land Use Procedure.[9,10] The land cover within three (3) kilometers of Homer City's proposed project is overwhelmingly rural.

For estimating acute risk, the option to calculate 1-hour average concentrations was selected in AERMOD. For estimating chronic risk, the option to calculate concentrations averaged over the entire meteorological data period, i.e., five (5) years, was selected in AERMOD.

2. Source Pathway

a. Source Characterization

Emissions of COPCs from Homer City's proposed sources would be emitted to the atmosphere via typical unobstructed vertical stacks, which were characterized in AERMOD as point sources. COPC-emitting sources proposed at Homer City are seven (7) combined-cycle combustion turbines, ten (10) simple-cycle aeroderivative gas turbines, three (3) auxiliary boilers, seven (7)

[7] Air Quality Analyses for Prevention of Significant Deterioration. Homer City Generation, L.P. Application for Plan Approval 32-00457A. Memorandum from Daniel J. Roble, DEP/BAQ/Permits/Air Quality Modeling and Risk Assessment to Justin Haley, DEP/NWRO/Air Quality/New Source Review. November 17, 2025.
[8] *Code of Federal Regulations*. 40 CFR Part 51, Appendix W (Guideline on Air Quality Models). Subsection 4.2.2.1(a).
[9] *Code of Federal Regulations*. 40 CFR Part 51, Appendix W (Guideline on Air Quality Models). Subsection 7.2.1.1(b)(i).
[10] AERMOD Implementation Guide (EPA-454/B-24-009, November 2024). Subsection 5.1.

fuel gas heaters, one (1) fire-water pump engine, ten (10) ~2,500-electrical kilowatt (kWe) emergency generators, and two (2) ~1,000-kWe emergency generators.[11]

b. Emission Data

A unitized emission rate of one (1) gram per second (g/sec) was entered in AERMOD to calculate the maximum 1-hour average unitized concentration and the 5-year average unitized concentration for each source at each receptor entered in AERMOD.[12]

The location and stack parameters, i.e., stack height, stack diameter, stack temperature, and exit velocity, entered in AERMOD for each COPC-emitting source are consistent with those provided in Homer City's plan approval application.

c. Good Engineering Practice Stack Height and Downwash

The stack height for each proposed source 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. Additionally, direction-specific building downwash parameters were entered in AERMOD for each stack. The GEP formula stack height and direction-specific building downwash parameters for each stack were calculated using the EPA's Building Profile Input Program for the Plume Rise Model Enhancements algorithm (BPIPPRM) v04274.

3. Receptor Pathway

a. Receptors

Receptors were entered in AERMOD at locations defined to be ambient air[14,15] 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. This receptor domain, based on its extent and receptor density, was adequate to determine the locations and magnitudes of the maximum acute and chronic risks.

b. Terrain Preprocessing

Receptor elevations and hill height scales were calculated by the AERMOD terrain preprocessor (AERMAP) v24142 utilizing the U.S. Geological Survey's (USGS) 3D Elevation Program (3DEP) data with a one-third arc-second resolution.

[11] The seven (7) cooling towers will not emit any COPCs.
[12] To be conservative in the acute risk calculations, the maximum 1-hour unitized concentration from each source was used regardless of whether these maximum 1-hour unitized concentrations from all sources occur during the same hour or not.
[13] *Code of Federal Regulations*. 40 CFR § 51.100(ii). Definition of "good engineering practice stack height."
[14] *Code of Federal Regulations*. 40 CFR § 50.1(e). Definition of "ambient air."
[15] Revised Policy on Exclusions from "Ambient Air." EPA memorandum from Andrew R. Wheeler, Administrator to Regional Administrators. December 2, 2019.

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).

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 fully processed meteorological dataset satisfies the EPA's recommendations for use in AERMOD,[16] 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.

5. Output Pathway

AERMOD's output pathway included options to calculate and format the short-term, i.e., 1-hour maximum, and long-term period, i.e., 5-year, concentrations for each source at the model receptors.

The modeled maximum 1-hour unitized concentrations and 5-year unitized concentrations were used in calculating the COPC air concentrations needed in the inhalation risk assessment. For estimating acute risk, the maximum 1-hour concentration at a given receptor for a COPC emitted from a specific source was calculated by multiplying the modeled, source-specific maximum 1-hour unitized concentration at that receptor by the source's maximum 1-hour average emission rate for the COPC. Likewise, for estimating chronic risk, the 5-year average concentration at a given receptor for a COPC emitted from a specific source was calculated by multiplying the modeled, source-specific 5-year average unitized concentration at that receptor by the source's annual average emission rate for the COPC.

C. Confirmation of Air Dispersion Modeling

The DEP confirmed Homer City's air dispersion modeling for the inhalation risk assessment by executing AERMOD, upon reviewing the appropriateness of all model inputs, i.e., model control options, source emission data, building downwash data, terrain data, meteorological data, and output options, to generate the maximum 1-hour unitized concentrations and 5-year unitized concentrations that were used in the DEP's confirmation of Homer City's inhalation risk assessment.

[16] *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).

IV. Conclusions

The DEP's technical review concludes that Homer City's air dispersion modeling for the inhalation risk assessment is consistent with the EPA's relevant air dispersion modeling policy and guidance. Additionally, Homer City's air dispersion modeling is consistent with the methods and procedures described in section 5 (Exposure Assessment) of the Inhalation Risk Assessment Modeling Protocol.

All input, output, and data files associated with Homer City's air dispersion modeling for the inhalation risk assessment are available upon request.