Pennsylvania
Department of
Environmental Protection

MEMO

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DATE November 17, 2025

RE 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 inhalation risk assessment included with Homer City Generation, L.P.'s (Homer City) plan approval application for 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 of Homer City inhalation risk assessment concludes that the excess lifetime cancer risk, chronic noncancer risk, and acute noncancer risk due to inhalation of the chemicals of potential concern (COPC) would not exceed the DEP's benchmarks. The DEP's summary of Homer City's inhalation risk assessment is attached.

If you have any questions regarding Homer City's inhalation risk assessment, you may contact me (ssteirer@pa.gov, 717.772.5620) 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 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. Inhalation Risk Assessment

Homer City's inhalation risk assessment serves as an important tool for protecting human health by identifying and evaluating the risks associated with inhalation exposure. Homer City used the U.S. Environmental Protection Agency's (EPA) four-step risk assessment process to evaluate the

[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.

potential inhalation health effects from exposure to COPCs that will be emitted from the electric power generation facility as described below.[7]

A. Inhalation Risk Assessment Process

The EPA's risk assessment process includes four steps: hazard identification, dose-response assessment, exposure assessment, and risk characterization. Hazard identification and dose-response are referred together as the toxicity assessment. The toxicity assessment identifies the COPCs and the relationship between the amount of exposure to the COPCs and the probability of adverse health effects. The exposure assessment is the mathematical modeling of transport and dispersion of the COPCs over a defined area beyond the facility fenceline. Risk characterization integrates the toxicity assessment and exposure assessment to measure the potential risks. For cancer, the risk is expressed as the excess lifetime cancer risk (ELCR). For noncancer effects, the risks are expressed as the chronic noncancer hazard quotient (HQ)/hazard index (HI) and acute noncancer HQ.

1. Toxicity Assessment (Hazard Identification and Dose-Response Assessment)

Homer City's inhalation risk assessment evaluated emissions of COPCs from seven (7) combined-cycle combustion turbines, ten (10) simple-cycle aeroderivative gas turbines, three (3) auxiliary boilers, seven (7) 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.[8] The COPCs that will be emitted from the air emission sources were identified from EPA's AP-42 Compilation of Air Pollutant Emission Factors. Each source's heat input value (MMBtu/hr) was applied to the relevant AP-42 emission factors to calculate the maximum annual and maximum hourly emission rates. The calculated emission rates were used in the risk characterization calculations.

In an inhalation risk assessment, reference values are used as key metrics to evaluate potential health risks associated with inhalation exposures. These reference values include the inhalation unit risk (IUR) and reference concentration (RfC). The IUR is used to estimate potential increased cancer risk from a lifetime of continuous exposure (24 hours/day for 70 years) to a COPC and is expressed as the risk per unit concentration in micrograms per cubic meter $(\mu g/m^3)^{-1}$. The chronic RfC is used to assess the potential noncancer effects from long-term exposure to a COPC and is expressed in milligrams per cubic meter (mg/m^3). The acute RfC is used to assess the potential noncancer effects from short-term exposure to a COPC and is expressed in mg/m^3.

COPCs that are determined to be a carcinogen by a mutagenic mode of action by the EPA were identified. Children are more susceptible to cancer and tumor development if exposed to carcinogens with a mutagenic mode of action. To account for this increased susceptibility, the age-dependent adjustment factors (ADAF) in Table 1 are summed and applied to the IUR.

[7] EPA website: https://www.epa.gov/risk/conducting-human-health-risk-assessment.
[8] The seven (7) cooling towers will not emit any COPCs.

Table 1: Age-Dependent Adjustment Factors for Mutagenic Mode of Action

Age (years)	Age-Dependent Adjustment Factor
0 - 2	10 x (2 / 70)
2 - 16	3 x (14 / 70)
16 - 70	1 x (54 / 70)

COPCs with associated chronic and acute reference values are listed in Table 2a and Table 2b, respectively.

Table 2a: Chemicals of Potential Concern and Chronic Reference Values

COPC[a]	IUR[b] $(\mu g/m^3)^{-1}$	Source[c]	Chronic RfC[b] (mg/m^3)	Source[c]
Acenaphthene	-----	-----	-----	-----
Acenaphthylene	-----	-----	-----	-----
Acetaldehyde	2.20E-06	EPA/IRIS	9.00E-03	EPA/IRIS
Acrolein	-----	-----	2.00E-05	EPA/IRIS
Ammonia[d]	-----	-----	2.00E-01	CalEPA
Anthracene	-----	-----	-----	-----
Arsenic	4.30E-03	EPA/IRIS	1.50E-05	CalEPA
Barium	-----	-----	5.00E-04	EPA/HEAST
Benzene[d]	7.80E-06	EPA/IRIS	3.00E-03	CalEPA
Benz(a)anthracene	6.00E-05	EPA/RPF	-----	-----
Benzo(a)pyrene[e]	1.00E-03	EPA/IRIS	2.00E-06	EPA/IRIS
Benzo(b)fluoranthene	6.00E-05	EPA/RPF	-----	-----
Benzo(g,h,i)perylene	-----	-----	-----	-----
Benzo(k)fluoranthene	6.00E-06	EPA/RPF	-----	-----
Beryllium[d]	2.40E-03	EPA/IRIS	7.00E-07	CalEPA
1,3-Butadiene	3.00E-05	EPA/IRIS	2.00E-03	EPA/IRIS
Butane	-----	-----	-----	-----
Cadmium	1.80E-03	EPA/IRIS	1.00E-05	ATSDR
Chromium (III)	-----	-----	6.00E-05	CalEPA
Chromium (VI)[e]	1.80E-02	EPA/IRIS	3.00E-05	EPA/IRIS
Chrysene	6.00E-07	EPA/RPF	-----	-----
Cobalt	9.00E-03	EPA/PPRTV	6.00E-06	EPA/PPRTV
Copper	-----	-----	-----	-----
Dibenz(a,h)anthracene	6.00E-04	EPA/RPF	-----	-----
Dichlorobenzene	1.10E-05	CalEPA	8.00E-01	EPA/IRIS
7,12-Dimethylbenz(a)anthracene	7.10E-02	CalEPA	-----	-----
Ethane	-----	-----	-----	-----
Ethylbenzene	2.50E-06	CalEPA	1.00E+00	EPA/IRIS
Fluoranthene	-----	-----	-----	-----
Fluorene	-----	-----	-----	-----
Formaldehyde[e]	1.10E-05	EPA/IRIS	7.00E-03	EPA/IRIS
n-Hexane	-----	-----	7.00E-01	EPA/IRIS
Indeno(1,2,3-cd)pyrene	6.00E-05	EPA/RPF	-----	-----

COPC[a]	IUR[b] $(\mu g/m^3)^{-1}$	Source[c]	Chronic RfC[b] (mg/m^3)	Source[c]
Lead	1.25E-05	CalEPA	-----	-----
Manganese	-----	-----	5.00E-05	EPA/IRIS
Mercury[d]	-----	-----	3.00E-05	CalEPA
3-Methylcholanthrene	6.30E-03	CalEPA	-----	-----
2-Methylnapthalene	-----	-----	-----	-----
Molybdenum	-----	-----	2.00E-03	ATSDR
Naphthalene	3.40E-05	CalEPA	3.00E-03	EPA/IRIS
Nickel[f]	2.60E-04	CalEPA	1.40E-05	CalEPA
n-Pentane	-----	-----	1.00E+00	EPA/PPRTV
Phenanthrene	-----	-----	-----	-----
Polycyclic aromatic hydrocarbon (PAH)[g]	1.00E-03	EPA/IRIS	-----	-----
Propane	-----	-----	-----	-----
Propylene	-----	-----	3.00E+00	CalEPA
Propylene oxide	3.70E-06	EPA/IRIS	3.00E-02	EPA/IRIS
Pyrene	-----	-----	-----	-----
Selenium	-----	-----	2.00E-02	CalEPA
Toluene[d]	-----	-----	4.20E-01	CalEPA
Vanadium	-----	-----	1.00E-04	ATSDR
Xylenes	-----	-----	1.00E-01	EPA/IRIS
Zinc	-----	-----	-----	-----

[a] Mutagenic COPCs indicated by bold print.
[b] Some COPCs do not have an IUR or chronic RfC.
[c] Source:
ATSDR (U.S. Department of Health and Human Services/Agency for Toxic Substances and Disease Registry)
CalEPA (California Environmental Protection Agency/Office of Environmental Health Hazard Assessment)
EPA/HEAST (EPA/Health Effects Assessment Summary Tables)
EPA/IRIS (EPA/Integrated Risk Information System)
EPA/PPRTV (EPA/Provisional Peer Reviewed Toxicity Values)
EPA/RPF (EPA/Regional Screening Levels Table Relative Potency Factor)
[d] Homer City used a chronic RfC from CalEPA that is more protective of human health than the chronic RfC from EPA/IRIS.
[e] IUR from EPA/IRIS includes ADAFs.
[f] Homer City used an IUR from CalEPA that is more protective of human health than the IUR from EPA/IRIS.
[g] Benzo(a)pyrene IUR used if PAH emissions were not speciated.

Table 2b: Chemicals of Potential Concern and Acute Reference Values

COPC	Acute RfC[a] (mg/m^3)	Source[b]
Acenaphthene	-----	-----
Acenaphthylene	-----	-----
Acetaldehyde	4.70E-01	CalEPA
Acrolein	2.50E-03	CalEPA
Ammonia[c]	6.75E-01	NIOSH
Anthracene	3.00E-02	ACGIH

COPC	Acute RfC[a] (mg/m^3)	Source[b]
Arsenic	2.00E-04	CalEPA
Barium	7.50E-02	OSHA
Benzene	2.70E-02	CalEPA
Benz(a)anthracene	3.00E-02	NIOSH
Benzo(a)pyrene	3.00E-02	OSHA
Benzo(b)fluoranthene	-----	-----
Benzo(g,h,i)perylene	-----	-----
Benzo(k)fluoranthene	-----	-----
Beryllium	7.50E-06	ACGIH
1,3-Butadiene	6.60E-01	CalEPA
Butane	3.57E+02	ACGIH
Cadmium[d]	3.00E-05	ATSDR
Chromium (III)	4.50E-04	ACGIH
Chromium (VI)	1.25E-05	ACGIH
Chrysene	3.00E-02	ACGIH
Cobalt	3.00E-03	ACGIH
Copper	1.00E-01	CalEPA
Dibenz(a,h)anthracene	-----	-----
Dichlorobenzene[e]	7.50E+00	CalEPA
7,12-Dimethylbenz(a)anthracene[f]	1.50E-02	NIOSH
Ethane	-----	-----
Ethylbenzene	1.30E+01	ACGIH
Fluoranthene	-----	-----
Fluorene	-----	-----
Formaldehyde[g]	4.90E-02	ATSDR
n-Hexane	2.64E+01	ACGIH
Indeno(1,2,3-cd)pyrene	-----	-----
Lead	7.50E-03	ACGIH
Manganese	3.00E-03	ACGIH
Mercury	6.00E-04	CalEPA
3-Methylcholanthrene	-----	-----
2-Methylnapthalene	4.37E-01	ACGIH
Molybdenum	4.50E-01	CalEPA
Naphthalene	1.88E+00	NIOSH
Nickel	2.00E-04	CalEPA
n-Pentane[c]	1.80E+02	NIOSH
Phenanthrene	3.00E-02	ACGIH
Polycyclic aromatic hydrocarbon (PAH)	-----	-----
Propane	2.71E+02	NIOSH
Propylene	1.29E+02	ACGIH
Propylene oxide	3.10E+00	CalEPA
Pyrene	3.00E-02	ACGIH
Selenium	3.00E-02	ACGIH

COPC	Acute RfC[a] (mg/m^3)	Source[b]
Toluene	5.00E+00	CalEPA
Vanadium[g]	8.00E-04	ATSDR
Xylenes[g]	8.68E+00	ATSDR
Zinc	-----	-----

[a] Some COPCs do not have an acute RfC.

[b] Source:

ACGIH (American Conference of Government Industrial Hygienists)
ATSDR (U.S. Department of Health and Human Services/Agency for Toxic Substances and Disease Registry)
CalEPA (California Environmental Protection Agency/Office of Environmental Health Hazard Assessment)
NIOSH (National Institute for Occupational Safety and Health)
OSHA (Occupational Safety and Health Administration)

[c] Homer City used an acute RfC from NIOSH that is more protective of human health than the acute RfC from CalEPA.

[d] Homer City used an acute RfC from ATSDR that is more protective of human health than the acute RfC from ACGIH.

[e] Incorrect acute RfC, but this value is more protective of human health.

[f] Acute RfC corrected by DEP.

[g] Homer City used an acute RfC from ATSDR that is more protective of human health than the acute RfC from CalEPA.

2. Exposure Assessment

Homer City utilized air dispersion modeling to calculate the maximum 1-hour and maximum 5-year unitized concentrations at defined receptors along and beyond the facility's fenceline. A detailed description of Homer City's air dispersion modeling methodology is included in subsection 5.1 (Overview of Modeling Methodology) of the inhalation risk assessment report and summarized in the DEP's memorandum dated November 17, 2025[9].

Additionally, for characterization of chronic risks, Homer City identified which of the defined receptors correspond to locations of sensitive populations and residences that are near the facility. Sensitive populations include persons that are at increased risk of adverse health effects such as infants and children, the elderly, and individuals with respiratory, cardiovascular, and certain other health conditions.

For estimating chronic risks, 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 from the exposure assessment by the source's annual average emission rate for the COPC from the toxicity assessment. Likewise, for estimating acute risks, 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.

[9] Air Dispersion Modeling for Inhalation Risk Assessment. Homer City Generation, L.P. Application for Plan Approval 32-00457A. Memorandum from Henry F. Bonifacio, DEP/BAQ/Permits/Air Quality Modeling and Risk Assessment to Justin Haley, DEP/NWRO/Air Quality/New Source Review and Stephen J. Steirer, DEP/BAQ/Permits/Air Quality Modeling and Risk Assessment. November 17, 2025.

3. Risk Characterization

Chronic and acute reference values were applied to the 5-year concentrations and maximum 1-hour concentrations to calculate both cancer and noncancer risks.

Benchmarks are threshold values indicating when there is a potential concern to public health. Assessing these values involves identifying and analyzing the risks and then evaluating the level of potential health effects. Risk management decisions may be required if the risk exceeds a benchmark.

a. Excess Lifetime Cancer Risk

The ELCR represents the increased possibility that a person may develop cancer due to long-term inhalation exposure to a carcinogenic COPC. The ELCR for each COPC was calculated by multiplying the 5-year concentration by the IUR. The cumulative ELCR was calculated by summing the ELCR for each COPC. According to Homer City's inhalation risk assessment, the top five (5) COPCs contributing to the highest cumulative ELCR are formaldehyde, cadmium, chromium (VI), arsenic, and benzo(a)pyrene. Homer City's cumulative ELCR would not exceed the DEP's benchmark of 10 in 1 million.[10] Homer City's cumulative ELCR for the maximum exposed individual (MEI) and sensitive populations/residences are listed in Table 3.

Table 3: Homer City's Excess Lifetime Cancer Risk

Location	Cumulative ELCR	DEP Benchmark
MEI (all locations)	0.54	10 in 1 million
Sensitive populations/residences	0.48	

b. Chronic Noncancer Risk

The chronic noncancer risk is the evaluation of potential noncancer health effects due to long-term exposure to a COPC and is expressed as an HQ. The chronic noncancer HQ for each COPC was calculated by dividing the modeled 5-year concentration by the chronic RfC. The cumulative chronic noncancer risk, expressed as an HI, was calculated by summing the HQ for each COPC. According to Homer City's inhalation risk assessment, the top five (5) COPCs contributing to the highest HI are acrolein, nickel, cadmium, ammonia, and formaldehyde. Homer City's HI would not exceed the DEP's benchmark of 0.25 for a single facility without accounting for background concentrations in the inhalation risk assessment.[11] A benchmark of 1.0 may be used when accounting for background concentrations. Homer City's chronic noncancer risk for the MEI and sensitive populations/residences are listed in Table 4.

Table 4: Homer City's Chronic Noncancer Risk

Location	HI	DEP Benchmark
MEI (all locations)	0.036	0.25 (or 1.0)
Sensitive populations/residences	0.032	

[10] U.S. EPA, 1998. Region 6 Risk Management Addendum – Draft Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities. EPA-R6-98-002. July 1998. Page ADD-3.
[11] Ibid. Page ADD-3.

c. Acute Noncancer Risk

The acute noncancer risk is the evaluation of potential noncancer health effects due to short-term exposure to a COPC and is expressed as an HQ. The acute noncancer risk for each COPC was calculated by dividing the modeled maximum 1-hour concentration by the acute RfC. Homer City's acute HQ for each COPC would not exceed the DEP's benchmark of 1.0.[12] Homer City's acute noncancer risk for the MEI are listed by COPC from the highest to lowest HQ in Table 5.

Table 5: Homer City's Acute Noncancer Risk

COPC	HQ[a]	COPC	HQ[a]
Cadmium	4.93E-01	Benz(a)anthracene	7.75E-05
Nickel	1.41E-01	Propylene oxide	6.39E-05
Ammonia	1.38E-01	n-Pentane	4.75E-05
Benzene	1.05E-01	Molybdenum	3.29E-05
Formaldehyde	6.13E-02	Benzo(a)pyrene	3.09E-05
Chromium (VI)	6.03E-02	Propane	1.95E-05
Chromium (III)	4.02E-02	Butane	1.94E-05
Vanadium	3.87E-02	Ethylbenzene	1.68E-05
Beryllium	2.15E-02	Selenium	1.08E-05
Acrolein	1.78E-02	1,3-Butadiene	6.08E-06
Arsenic	1.35E-02	7,12-Dimethylbenz(a)anthracene	3.51E-06[c]
Mercury	5.83E-03	Dichlorobenzene	5.27E-07
Phenanthrene	4.89E-03	2-Methylnapthalene	1.81E-07
Manganese	1.70E-03	Acenaphthene	-----[b]
Lead	8.97E-04	Acenaphthylene	-----[b]
Barium	7.89E-04	Benzo(b)fluoranthene	-----[b]
Acetaldehyde	5.87E-04	Benzo(g,h,i)perylene	-----[b]
Pyrene	4.50E-04	Benzo(k)fluoranthene	-----[b]
Cobalt	3.77E-04	Dibenzo(a,h)anthracene	-----[b]
Naphthalene	2.50E-04	Ethane	-----[b]
Toluene	2.45E-04	Fluoranthene	-----[b]
n-Hexane	2.24E-04	Fluorene	-----[b]
Chrysene	1.82E-04	Indeno(1,2,3-cd)pyrene	-----[b]
Anthracene	1.50E-04	3-Methylcholanthrene	-----[b]
Copper	1.14E-04	Polycyclic aromatic hydrocarbon (PAH)	-----[b]
Xylenes	9.18E-05		
Propylene	7.80E-05	Zinc	-----[b]

[a] DEP benchmark is 1.0.
[b] No HQ calculated since this COPC has no acute RfC.
[c] HQ corrected by DEP as a result of corrected acute RfC in Table 2b.

[12] Ibid. Page ADD-7.

B. Conclusions

The DEP's technical review of Homer City inhalation risk assessment concludes that the ELCR, chronic noncancer risk, and acute noncancer risk due to inhalation of the COPCs would not exceed the DEP's benchmarks.

Files associated with Homer City's risk calculations are available upon request.