



***Commonwealth of Pennsylvania
Department of Environmental Protection
Air Quality Program
Northcentral Regional Office***

***Renovo Energy Center, LLC
Renovo Energy Center Generation Plant
Plan Approval 18-00033B***

Comment Response Document

April 29, 2021

Comment and Response to *Pennsylvania Bulletin* Publication
for the Renovo Energy Center

Department of Environmental Protection

www.dep.pa.gov

The Department received a PSD Plan Approval application identified as 18-00033A from Renovo Energy Center, LLC (at times hereafter “REC”), and entered it into its eFACTS environmental database on August 15, 2015. The Department published a notice of the receipt of this application in the *Pennsylvania Bulletin* on September 26, 2015 in order to notify the public of the receipt of a major source application. The project was identified as a peak rated 950 megawatt (MW) dual fuel-fired (natural gas and ultra-low sulfur diesel fuel) combined cycle electric generating plant to be located in the Borough of Renovo, Clinton County. Air contaminant sources in the proposed project were two (2) power block configurations which include a combustion turbine and an inline steam turbine to produce the nominally rated 950 MW to provide power to both the Pennsylvania, New Jersey, Maryland (PJM) Grid and the New York ISO (NYISO) Grid. Air contaminant emissions from each power block turbine were to be controlled by a Selective Catalytic Reduction (SCR) system and an oxidation catalyst. Renovo Energy Center proposed that each power block would operate on ultra-low sulfur diesel fuel as a backup in the event of a natural gas curtailment with diesel firing not to exceed 720 hours in any twelve consecutive month period. Renovo Energy Center proposed three options for the main turbines in the powerblocks consisting of either: two (2) General Electric (GE) model 7HA.02 natural gas/diesel fired turbines, or two (2) Siemens model SGT6-8000H natural gas/diesel-fired turbines, or two (2) Mitsubishi model MHPSA M501J natural gas/diesel-fired turbines. The GE turbines were ultimately selected due to their overall lower emissions footprint. Other air contaminant sources at the facility that Renovo Energy Center proposed included two (2) 30 million Btu per hour, natural gas-fired auxiliary boilers, one (1) 2,206 brake horsepower (bhp) diesel-fired emergency generator engine, one (1) 250 brake horsepower diesel-fired fire pump engine, one (1) 18 million Btu per hour natural gas-fired fuel gas heater, one (1) 3.8 million gallon diesel storage tank, two (2) 15,000-gallon (each) aqueous ammonia storage tanks and two (2) 20,000-gallon (each) lube oil storage tanks.

After a thorough review of the application, which included supplemental information requested by the Department, a notice of intent to issue a plan approval was published in the *Pennsylvania Bulletin* on November 4, 2017, along with the proposed terms and conditions contained in the plan approval. The company also published a notice in the local newspaper of general circulation, the *Lock Haven Express*, for three consecutive days ending November 11, 2017 for soliciting comments from the general public. The notice, proposed plan approval, and the Department’s technical review memo were sent to the US EPA on November 6, 2017 for review. Comments were received from the EPA on November 27, 2017. There were no comments nor requests for a public hearing from the general public during the comment period. The company submitted several comments regarding the proposed plan approval on December 8, 2017.

Additionally, the Renovo residents have been engaged regarding this project numerous times through prior public meetings and written comment periods since the initial applications for DEP permits were made. At the project’s inception, all borough residents were invited to an open house/presentation via direct mailing. During that event, the project developers gave a presentation on the project to approximately 200 attendees, answered the public’s questions via

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interactive feedback, and engaged in various discussions at information stations staffed by the developers, vendors and providers of equipment, such as the GE turbine. During a subsequent public meeting, the developers again presented information on the project status and the Department gave an in-depth explanation of the permitting process. The applicant has also met with local community members appointed by the Renovo Borough Council. One of the results of those meetings was the development of a Benefits Agreement between the Borough and the developer, which resulted in certain design features in the project desired by the Borough. The applicant has also continued to provide project updates to the community through Borough Council meetings. The meetings described above were frequently covered by local media. DEP has also made information about the permit process available via the DEP website at <https://www.dep.pa.gov/About/Regional/North-central-Regional-Office/Community-Information/Pages/default.aspx>.

After reviewing and evaluating the EPA's and company's comments and responding accordingly, the Department issued Plan Approval 18-00033A on January 26, 2018, having an expiration date of July 25, 2019. A notice of the issuance was published in the *Pennsylvania Bulletin* on February 10, 2018.

On March 18, 2019, Renovo Energy Center submitted a request to extend the plan approval an additional 18 months as the project had not yet commenced construction. The Department reviewed the request and determined there was satisfactory justification to extend the plan approval an additional 18 months. On June 10, 2019, the Department extended the plan approval expiration date to January 25, 2021.

In September, 2019, Renovo Energy Center notified the Department that they intended to submit a modification to Plan Approval 18-00033A seeking approval to add duct burners to the project in order to enable a gain in efficiency and increase the maximum power output. The addition of duct burners would also lower some of the emission rates due to the efficiency gain. The Department determined that the proposed modification for increasing the power output would require updated dispersion modeling along with a regulatory review of the duct burner and its impact on emissions.

On December 30, 2019, Renovo Energy Center submitted a plan approval application to incorporate the duct burners in the existing project along with increasing in the facility peak electrical output from 950 to 1,240 megawatts. On January 18, 2020, the Department published a notice of the receipt of this project modification plan approval application 18-00033B in the *Pennsylvania Bulletin*.

On October 17, 2020, the Pennsylvania Department of Environmental Protection published in the *Pennsylvania Bulletin* its intent to issue 18-00033B for Renovo Energy Center to construct a natural gas/ultra-low sulfur diesel-fired combined-cycle power plant with a peak electrical output rating of 1,240 MW in Renovo Borough, Clinton County.

The project consists of the same powerblock turbines approved in the previous Plan Approval 18-00033A, those being the General Electric (GE) model 7HA.02 natural gas/diesel fired turbines. The proposed modification was the addition of natural gas-fired duct burners rated at a

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maximum heat input rating of 1,005 MMBtu/hr (HHV). The duct burners will not be used when the powerblocks are combusting diesel fuel. The air contaminants from each powerblock will be controlled by a selective catalytic reduction (SCR) system and an oxidation catalyst. Ancillary equipment for the facility was revised slightly. The two (2) 15,000-gallon aqueous ammonia storage tanks were increased to 26,000-gallon storage tanks. The proposed project is subject to the Prevention of Significant Deterioration (PSD) of Air Quality regulations of 40 CFR 52.21 including Best Available Control Technology (BACT) requirements, the Nonattainment New Source Review (NNSR) regulations of 25 Pa. Code §§ 127.201 - 127.218, including Lowest Achievable Emission Rate (LAER) requirements, and the Best Available Technology (BAT) requirements of 25 Pa. Code §§ 127.1 and 127.12. The facility's total particulate matter (PM) including PM₁₀ and PM_{2.5}, nitrogen oxides, carbon monoxide and volatile organic compounds emissions are subject to the PSD requirements. The facility's nitrogen oxides and volatile organic compounds emissions are also subject to the NNSR requirements.

The notice of intent to issue the modified project was published in the *Lock Haven Express* for three consecutive days ending October 21, 2020. Due to significant interest from the general public in having the opportunity to provide comments on this project, the Department extended the close of the public comment period to December 7, 2020. Several comments were received during the extended comment period following publication of the Department's intent to issue. The Department received many thoughtful comments, which covered a wide variety of aspects related to the proposed Renovo Energy Center project.

This document summarizes the comments received during the comment period which closed on December 7, 2020. The Department's responses to the comments are focused on concerns directed at the proposed project. The summaries of the comments are not intended to be a complete description of each individual's comment or comments, but rather provide the context for the Department's response. Each comment is available for electronic review in its entirety by contacting the DEP Northcentral Regional Office.

List of Commenters

1. Joe Scarnati, PA State Senator, 25th District
2. Stephanie Borowicz, PA State Representative, 76th District
3. Ernest Peterson, Community Trade Assoc, Renovo
4. Michael Flanagan, Clinton County Economic Partnership, Lock Haven
5. Jeffrey Rich, Clinton Co Housing Auth, Lock Haven
6. Miles Kessinger, Clinton County Commissioner
7. Jeffrey Snyder, Clinton County Commissioner
8. Angela Harding, Clinton County Commissioner
9. Ann Tarantella, Renovo Borough Council
10. Stanley Schenck, PA Citizen, Renovo
11. Steven Botsford, PA Citizen, Renovo
12. Diana Dakey, Protect Northern PA.org, Wyalusing
13. David Buck, Protect Northern PA.org, Wyalusing
14. Nancy Parks, Sierra Club Moshannon Group, Aaronsburg
15. Joseph Minott, Clean Air Council, Philadelphia

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16. David Masur, PennEnvironment, Philadelphia
17. Tom Torres, Sierra Club Pennsylvania Chapter, Harrisburg
18. Abigail Jones, PennFutures, Mt. Pocono
19. Adam Kron, Environmental Integrity Project, Washington, D.C.
20. Sandy Field, The Climate Reality Project Susquehanna Valley PA Chapter
21. Phoebe Reese, The Climate Reality Project Pittsburgh and Southwestern PA Chapters
22. Abha Saini, The Climate Reality Project Philadelphia and Southeastern PA Chapters
23. Braden Foley, PA Citizen, Renovo
24. Brock Dilling, PA Citizen, Alexandria
25. Candace Saltsman, PA Citizen, Renovo
26. Francis Campbell, PA Citizen, Renovo
27. Gael Moriarty, PA Citizen, Sharpsburg
28. Heidi Moyer, PA Citizen, Westport
29. James Curtis, PA Citizen, Port Matilda
30. James Mann, PA Citizen, Mill Hall
31. James Swenson, PA Citizen, State College
32. John Parana, PA Citizen, Johnsonburg
33. Karen Bunsick, PA Citizen, Renovo
34. Karen Kitchen, PA Citizen, Renovo
35. Kelley Cozzi, PA Citizen, Dubois
36. Linda Myers, PA Citizen, Petersburg
37. Marlene Hevner, PA Citizen, Renovo
38. Rebecca Cozzi, PA Citizen, Renovo
39. Shaquetta Alexander, PA Citizen, Renovo
40. Sheila Lunger, PA Citizen, Unityville
41. Stephan Armstrong, PA Citizen, Watsontown
42. Barbara Shaffer, PA Citizen, Renovo
43. Edward Cullen, PA Citizen, State College
44. M. Jackson, PA Citizen, Renovo
45. Maureen Ruhl, PA Citizen
46. Barbara Munger, PA Citizen, Renovo
47. Chris Moore, PA Citizen, Renovo
48. Dawn Adams, PA Citizen, Renovo
49. Denise Colvin, PA Citizen, Renovo
50. Elizabeth Kepler, PA Citizen, Renovo
51. Elizabeth Wildey, PA Citizen, Renovo
52. Gail Lutz, PA Citizen, Renovo
53. Glenn & Cindy Pierce, PA Citizens
54. Jacque Weaver, PA Citizen, Renovo
55. Jeanette Morton, PA Citizen, Renovo
56. Joseph Litz, PA Citizen, Renovo
57. Patricia Lacy, PA Citizen, Renovo
58. Ray Johnson, PA Citizen, Renovo
59. Susan Cannon, PA Citizen, Renovo

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Comment 1:

Commenters spoke in support of the project due to economic and jobs related benefits.
(10 comments)

Response:

The Department acknowledges the commenters' support of the proposed project. However, the decision of the Department to issue, or deny, a Plan Approval for the construction and operation of an air contaminant source, such as that found in the proposed project, is based on all applicable state and federal air quality regulatory requirements. The Department's decision is not predicated on non-air quality issues such as land values, job creation, economic benefit, energy independence, visual impact, grant eligibility, etc., regardless of the impacts of those factors.

Comment 2:

Commenters questioned whether the proposed project would be economically beneficial.
(23 comments)

Response:

The Department acknowledges the concerns regarding the proposed project. Despite the significant benefits claimed by the company, the decision of the Department to issue, or deny, a Plan Approval for the construction and operation of air-contamination sources, such as those found in the proposed project, is based on all applicable state and federal air quality regulatory requirements. The proposed sources will be constructed using the best available technology and best available control technology and operated and maintained in accordance with good air pollution control practices in order to minimize emissions to the maximum extent feasible. However, the Department's decision is not predicated on non-air quality issues such as land values, job creation, economic benefit, energy independence, visual impact, grant eligibility, etc., regardless of the impacts of those factors. Additionally, the state and federal air quality regulations do not relieve the facility owner or operator from the obligation to comply with all applicable local laws and regulations. For additional information, please see the Department's response to Comment 3 below.

Comment 3:

Commenter stated that the proposed plan approval is deficient because the proposal has not demonstrated that the benefits of the facility outweigh the environmental and social costs. (one comment)

Response:

The Department refers the commenter to the Response to Comment 4 below as part of the response to Comment 3.

Renovo Energy Center has performed an air quality analysis that adequately demonstrates that the facility's proposed emissions would not cause or contribute to air pollution in violation of the National Ambient Air Quality Standards (NAAQS). The Renovo Energy Center air quality

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analysis methodology is consistent with the “Guideline on Air Quality Models” codified in Appendix W to 40 CFR Part 51, and the EPA’s relevant air quality modeling policy and guidance. In addition, the analysis adequately demonstrates that Renovo Energy Center’s proposed emissions would not impair visibility, soils, and vegetation, and adequately determined that secondary emissions due to general commercial, residential, industrial, and other growth associated with the facility would be negligible. Furthermore, the analysis adequately demonstrates that Renovo Energy Center’s proposed emissions would have negligible impacts with respect to air quality related values (AQRVs) and visibility, in nearby federal Class I areas.

Additionally, the Department aggressively monitors air quality across the Commonwealth in order to comply with Federal and State laws and regulations concerning criteria pollutant monitoring, to gauge the effectiveness of the air quality program in meeting health-based National Ambient Air Quality Standards, including ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide. The cumulative effects of multiple sources are accounted for in air contaminant concentrations in the ambient atmosphere. The monitoring data has not alerted the Department to any changes in the attainment status for the counties located in the Northcentral region of the Commonwealth.

The applicant has demonstrated that by complying with the most stringent federal and state Air Regulations through BACT, LAER and BAT analyses, combined with dispersion modeling, the emissions’ cumulative impact has been assessed in order to ensure that the concentrations of criteria pollutants in the ambient air should not have an impact on human health. Also, Secondary Standards have been met to protect against air pollution that causes decreased visibility and damage to animals, crops, vegetation, and buildings.

The power plant project has been under consideration since 2014 and was first publicly announced in 2015. The project is expected to have hundreds of construction workers on site for more than two years. Renovo Energy Center’s proposed combined cycle project represents an approximate \$1.5 billion investment in the local community over the anticipated three to four-year construction period. The construction contractor will typically source a significant portion of goods and materials locally and/or regionally. REC expects most construction labor will be residents of the Commonwealth. It is anticipated that REC’s average construction work force will be in the range of 350-400 with up to 900 craft workers during peak period. In addition to the economic impact of the construction period, REC anticipates 25-30 full time employees to supporting plant operation. In addition, REC will also engage many other local and regional contractors to support operations on an ongoing, as-needed basis.

Additionally, REC is committed to produce clean, reliable base load electricity over its 20+ year operating period using regionally sourced Marcellus gas, thus providing a long-term, heavy volume customer to this important local industry. REC will be required to fund infrastructure improvements to the local electrical grid intended to enhance its reliability. REC has also committed to not apply for relief from Pennsylvania’s Local Economic Revitalization Tax Assistance (LERTA) program, and will pay its full share of taxes to the three local taxing authorities (Borough of Renovo, Clinton County and Keystone Central School District) throughout its operating life. Also, as a PA operated company, REC will be responsible for paying state and federal taxes on its profits as well as PA sales tax on its purchases.

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REC will repurpose an existing brownfield site that has essentially sat idle for decades, with its vacant buildings and exposed soils posing a potential threat to the surrounding community. In the course of assessing the site for construction of the project, a full environmental investigation of the site was completed to confirm its suitability for the project. Upon completion, the resultant property will be appropriately fenced to restrict access to the brownfield areas.

REC established and participated in a Focus Group with the Borough of Renovo, meeting regularly with community members appointed by the Borough Council, to solicit input on how to integrate the plant into the community. This process culminated in a Benefits Agreement between REC and the Borough wherein REC committed to include several features requested by the Focus Group into the plant's design, such as flag poles and decorative fencing, which are intended to create an improved viewshed for residents as compared to the current situation of unoccupied and abandoned buildings. REC also committed to provide financial support to the Borough with respect to several of its ongoing initiatives (e.g., Bucktail Medical Center, police/fire, etc.).

Given the mitigation of the emissions' impacts through the application of BACT, LAER, and BAT regulatory standards, to levels that should not impact human health, as demonstrated through the air quality modeling analysis, the Department believes that the benefits of the facility on the surrounding community will outweigh the costs imposed by the facility's emissions.

Comment 4:

Commenters requested the Department to evaluate utilizing renewable energy technologies to generate electricity as an alternative to the proposed natural gas combustion to satisfy 25 Pa. Code § 127.205(5) and the Pennsylvania Constitution. (22 comments)

Response:

The proposed change in the scope of the project runs counter to the interest of financial participants who are focused on a combined cycle natural gas fired power plant that will deliver power to the PJM electric grid. To require the applicant to propose a fundamentally different project is not within the purview of the Department's regulatory review of the proposed project. The Department's intent is to review the project as proposed and ensure it meets all applicable state and federal air quality regulatory requirements and ensure that the project will have no impact on human health or cause decreased visibility and damage to animals, crops, vegetation, and buildings as well as meet BACT, LAER and BAT requirements.

REC provided the justification that the wind farm technology directly impacts the land and environment by road construction, wind turbine installation and erection of structures that are constructed to house transmission equipment. Wind farm technology estimates on permanent direct land use impact (the area of land needed to generate a MW of electricity) vary from one survey or report to another. Permanent directly impacted land ranges from as low as 1 acre per MW in one report to up to 20 acres per MW in another. A 2009 report by the US DOE National Renewable Energy Laboratory shows a high sampling of wind projects using 5 to 10 acres per MW usage. This equates to 6,200 to 12,400 acres of land needed for a 1,240 MW rated wind

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farm. However, when a wind project's annual MWh output is compared to the permitted output capacity of the proposed Renovo project, a wind farm in Pennsylvania would need to be 3 to 4 times the nominal 1,240 MW rating to meet the annual output of a plant like the Renovo Energy Center. REC also stated that wind technology cannot produce equivalent amounts of electrical power on the same size parcel of land as a combined cycle gas turbine power plant like Renovo Energy Center. Wind farm technology cannot provide the equivalent availability as proposed from the Renovo project due to the natural intermittency of wind. The Renovo project's need to be able to operate as a base-load electric generating facility, along with the potential market for meeting demand load, cannot be met by wind technology alone and would require a large system of batteries which would further increase land requirements and costs, which is not economically viable for the project.

The direct impacts to the land and environment caused by the construction and operation of solar farm technology (resulting from road construction, site preparation, and construction of transmission equipment structures) would be relatively greater than those resulting from construction of the proposed project. Also, solar plants cover the landscape with solar cell/panels which will lead to habitat and vegetation destruction. Solar farm technology cannot produce equivalent amounts of electrical power on the same size parcel of land as Renovo. The Solar Energy Industries Association estimates that an industrial class solar farm could require anywhere from 5 to 10 acres per MW of installed capacity, which equates to as much as 12,400 acres of land for a 1,240 MW plant. Additionally, when a solar project's annual MWh output is compared to the permitted output capacity of the proposed Renovo project, a solar farm in Pennsylvania would need to be 6 times the nominal 1,240 MW rating (equating to at least 60,000 acres) to meet the annual output of a plant like the Renovo Energy Center. Solar farm technology cannot provide full-time availability due to the natural cyclic availability of sunlight, especially in Pennsylvania, and therefore solar could not meet demands for cooling or heating at all times. The Renovo project's need to be able to operate as a base-load electric generating facility, along with the potential market for meeting demand load, cannot be met by solar technology alone and would require a large system of batteries which would further increase land requirements and costs, which is not economically viable for the project.

Additionally, the proposed Renovo Energy Center project will replace lost capacity from the recent shutdown of coal-fired generating plants in the Commonwealth. The Renovo Energy Center project will help ensure and protect the reliability and capacity of the PJM grid. The loss of grid capacity puts the general public at great health risk. Intermittent power generators such as wind and solar cannot contribute to grid stabilization in the same manner as the proposed Renovo Energy Center, which can even be brought online immediately from a cold shutdown.

The Department determined that the modeling analyses confirmed that NO_x will not contribute to air pollution in violation of the NAAQS or present a harm to public health and the environment. The Department believes that clean air will be preserved due to the project's compliance with all applicable state and federal air quality regulatory requirements as well as the comprehensive permit conditions.

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Comment 5:

Commenters expressed concern regarding the impact of emissions from the proposed facility on human health in the local area and the ozone transport region. (35 comments)

Response:

The emissions from the proposed project, along with emissions from other sources in the area, were included in an air dispersion model to evaluate regional air quality impacts. Development of the air dispersion model included a year-long meteorological monitoring study at the site of the facility to determine weather patterns specific to the area. Renovo Energy Center has performed an air quality analysis that adequately demonstrates that the facility's proposed emissions would not cause or contribute to air pollution in violation of the National Ambient Air Quality Standards (NAAQS). The Renovo Energy Center air quality analysis methodology is consistent with the "Guideline on Air Quality Models," codified in Appendix W to 40 CFR Part 51, and the EPA's relevant air quality modeling policy and guidance. In addition, the analysis adequately demonstrates that Renovo Energy Center's proposed emissions would not impair visibility, soils, and vegetation, and adequately determined that secondary emissions due to general commercial, residential, industrial, and other growth associated with the facility would be negligible. Furthermore, the analysis adequately demonstrates that Renovo Energy Center's proposed emissions would have negligible impacts with respect to air quality related values (AQRVs) and visibility, in nearby federal Class I areas. The Department has completed its comprehensive review of the application and supplemental information from Renovo Energy Center and determined that the construction and operation of the proposed facility will not exceed the NAAQS limitations for any criteria pollutant.

In the proposed plan approval, the Department included conditions requiring Renovo Energy Center to continuously monitor the nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), and ammonia (NH₃) emissions through the use of a continuous emissions monitoring system (CEMS). The CEMS will provide continuous real-time emissions data of those air pollutants. With respect to the emission of sulfur oxides (SO₂), sulfuric acid mist, total PM, total PM₁₀, total PM_{2.5}, and hazardous air pollutants (HAPs), those pollutants will be minimized through the use of transmission pipeline quality natural gas as fuel for the combustion turbines. The Department has also included stringent limits on the amount of sulfur found in the natural gas supply as well as in the sulfur content of the diesel fuel. The Department has also added performance testing on the turbines to demonstrate compliance with the Department's established emissions limitations. Additionally, the Renovo Energy Center will continuously monitor the operation of the turbines and control devices to minimize emissions as well as comply with all recordkeeping, reporting, and work practice requirements specified in the plan approval.

Furthermore, Renovo Energy Center is required to purchase NO_x and VOC emission reduction credits (ERCs) at a rate of 1.15 tons for every one ton of NO_x or VOC emitted because the proposed project is subject to comply with New Source Review requirements and is located in the ozone transport region (See 25 Pa. Code Section 127.210 and nonattainment New Source Review regulations of 25 Pa. Code Sections 127.201 through 127.218). The quantity of ERCs to be purchased for this project satisfies the ozone transport region's requirements.

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The Department aggressively monitors air quality across the Commonwealth in order to comply with Federal and State laws and regulations concerning criteria pollutant monitoring, to gauge the effectiveness of the air quality program in meeting health-based National Ambient Air Quality Standards, including ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide. The cumulative effects of multiple sources are accounted for in air contaminant concentrations in the ambient atmosphere. The monitoring data has not alerted the Department to any changes in the attainment status for the counties located in the Northcentral region of the Commonwealth.

In the last few years, the Department installed ozone and nitrogen oxides air monitors in Bradford and Tioga counties, in addition to the other 64 existing air monitoring stations installed within the Commonwealth. These stations comprise the statewide system designed to ascertain whether the air quality in the Commonwealth is attaining and maintaining the NAAQS. The monitoring data has not alerted the Department to any changes in the attainment status for the counties located in the Northcentral region of the Commonwealth due to the construction of new sources. The Department believes that regular review of the data from these monitoring stations will confirm that the emissions from this power plant will not adversely impact the region's ambient air quality.

Comment 6:

Commenters expressed concern regarding emissions of greenhouse gas from the project and its impact on global warming and climate change. (24 comments)

Response:

The Department acknowledges the fact that in order to produce 1,240 MW of power from the Renovo Energy Center, the project will emit sizeable quantities of greenhouse gas emissions. The US EPA's greenhouse gas Tailoring Rule requires this project to evaluate BACT for greenhouse gas emissions. The Department evaluated the greenhouse gas (CO₂e) emissions through BACT analysis for the sources at the proposed facility which included an assessment of Carbon Capture and Storage (CCS), energy efficiency (lb CO₂e/MWh) and fuel type as part of the control for CO₂e emissions.

CCS is where the CO₂ emissions are captured in the exhaust stream gas utilizing a scrubber, adsorption process or cryogenic separation. In the "Report of the Interagency Task Force on Carbon Capture and Storage" in August 2010, several factors potentially make this technology unavailable at the present time. The report concluded that coal-fired power plant emissions would be the best potential for CO₂e emission control. Additionally, REC stated that CCS is not commercially available in the United States and that there is no known application of this technology. Other factors also included the availability and technical complexity of reservoirs for sequestering the captured carbon dioxide which is beyond the scope of the proposed project. Therefore, CCS technology is currently technically infeasible.

Energy efficiency and good operating practices will be utilized to control CO₂e emissions from the sources at the facility. The facility will utilize high efficiency combustion turbines (CT). Each combustion turbine will include a monitoring system that will ensure maximum efficiency

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of the combustion process. The Department determined that utilizing natural gas as the primary fuel in combination with utilizing high efficiency CTs will reduce CO₂e emissions generated on a lb/MWh basis. Reducing the amount of fuel to produce the same amount of electric power will result in lower CO₂e emissions which satisfies the requirements of BACT.

Greenhouse gas emissions from electric utility generating units are further regulated by the New Source Performance Standards codified in 40 CFR Part 60 Subpart TTTT in the form of a CO₂ emission limit. The standard included in the plan approval for CO₂ emissions satisfies the requirements of Subpart TTTT. The Department has established an efficiency standard of 894 pounds of CO₂ per Megawatt-hour of electricity produced for the combined-cycle process in order to assure that the plant is maintained and operated in an efficient manner to reduce the greenhouse gas emissions to the maximum extent feasible.

Additionally, each combustion source (boilers, engines, heaters and turbine engines) will utilize good combustion practices which will include proper air/fuel mixture, adequate residence time in the combustion zone and proper maintenance and operation of the burners. Also, utilizing pipeline quality natural gas, which has a lower carbon content, will significantly reduce CO₂e emissions.

Comment 7:

Commenter stated that greenhouse gas emissions should be adjusted based on the use of updated global warming potential factors for methane and NO_x. (one comment)

Response:

The global warming potential (GWP) values for methane and N₂O greenhouse gases reflect the current regulatory values specified in 40 CFR Part 98, Subpart A, Table A-1 and therefore are the appropriate factors for use by the Department. The facility is subject to comply with the above greenhouse gas reporting requirements.

Comment 8:

Commenters raised concerns regarding light and noise pollution from the proposed facility. (three comments)

Response:

The Renovo Energy Center project developers established the Renovo Site Enhancement Initiative, which was designed to be a collaborative effort between the developers and the local community to ensure that the community had a voice in the aesthetic outcome of the project. In support of this, the Borough of Renovo established a focus group consisting of several local Renovo residents as their representatives. As a result of this collaboration, the applicant has committed to include several significant design features into the plant. One of these features pertains to the design of the plant lighting. The Plant exterior lighting will be designed to reduce the light pollution to the extent practicable while meeting site and plant safety and code requirements. This will also include low-level plant lighting, downward directed lighting, or switchable lighting.

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Additionally, the power plant will be required to comply with all local laws and regulations including lighting ordinances related to the construction and operation of the proposed project. Moreover, the project planners have designed the facility lighting to minimize skyward light losses and have stated that all exterior locations will receive only the minimum amount of light necessary in an effort to limit light pollution.

The Department regulations require the facility to comply with all local, state and federal requirements. The combustion turbines for the proposed facility will be equipped with a silencing system to reduce noise and comply with the local Ordinance. Renovo Energy Center is also required to abide by the Noise Ordinance adopted by Renovo Borough in 2016. Further concerns regarding noise issues should be directed to the local and county zoning commissions.

Comment 9:

Commenters expressed concern that water withdrawals and discharges at the proposed facility will negatively impact the Susquehanna River. (two comments)

Response:

The facility does not use wet cooling towers in its steam condensing process, so water withdrawal from the Susquehanna River will not be required for that process. The facility currently is permitted by the Susquehanna River Basin Commission (SRBC) to withdraw boiler feedwater from the Susquehanna River. The SRBC manages all withdrawals from the Susquehanna Rivers and their tributaries to ensure that there is no harm to aquatic life in those water basins. Site runoff during construction and during normal plant operation will be managed according to the standards and requirements of the National Pollution Discharge Elimination System regulations. Additionally, all sewage and wastewater from the facility will be treated at the local wastewater treatment plant to strict limits before being discharged to the Susquehanna River. The company is subject to comply with the requirements of the Renovo Water Authority as well as the Department's water quality program to minimize the impact of the proposed facility on the Susquehanna River. Any further concerns regarding water quality issues should be directed to the Department's water quality program.

Comment 10:

Commenters stated the Department should determine whether the power plant is needed. (two comments)

Response:

The need for such a power plant is determined by the Federal Energy Regulatory Commission (FERC) filings made by the company in their request to build this facility. In concert with the regional electric grid operator, the Pennsylvania-New Jersey-Maryland (PJM) Independent System Operator, FERC determines if there is merit and need to support additional power generation assets. Questions regarding the necessity of additional electric power generation facilities should be directed to FERC and PJM. The Department's decision to issue, or deny, a Plan Approval for the construction and operation of an air contaminant source, such as that found

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in the proposed project, is based on all applicable state and federal air quality regulatory requirements. The Department's decision is not predicated on non-air quality issues such as land values, job creation, economic benefit, energy independence, visual impact, grant eligibility, etc., regardless of the impacts of those factors.

Comment 11:

Commenter urged that the Pennsylvania Department of Health should estimate the health effects of such a project. (one comment)

Response:

The Department has reviewed the Air Quality plan approval application and evaluated the air impacts of the proposed project. The United States Environmental Protection Agency (EPA) has developed the primary National Ambient Air Quality Standards (NAAQS), which delineate the maximum levels of concentrations of criteria pollutants in the ambient air that should not impact human health. Also, secondary NAAQS have been promulgated to protect against decreased visibility and damage to animals, crops, vegetation, and buildings. The Department has been operating an EPA approved network of monitors designed to ensure that the air quality in the Commonwealth is attaining and maintaining the NAAQS. The emissions from the proposed project, along with emissions from other sources in the area, were included in an air dispersion model to evaluate air quality impacts. The Department has reviewed the air quality analysis performed by Renovo Energy Center that adequately demonstrates that the facility's proposed emissions would not cause or contribute to air pollution in violation of the NAAQS. Additionally, the emissions from the sources associated with Renovo Energy Center are required to comply with the emission limitations, monitoring, recordkeeping, reporting, and work practice requirements specified in the plan approval to satisfy all applicable State and Federal air quality regulatory requirements. Any further concerns regarding health issues should be directed to the Pennsylvania Department of Health.

Comment 12:

Commenters requested an explanation of the type of emissions testing that would be required and the reason the proposed plan approval allows 180 days to conduct the test. (two comments)

Response:

Performance testing for the proposed project shall be conducted using EPA-approved reference test methods and in compliance with all applicable air quality regulations specified in 25 Pa. Code Chapter 139. Test protocols will be submitted to the Department at least 60 days prior to testing so the Department can review those protocols to ensure the testing will be conducted in compliance with all applicable requirements specified in the plan approval. Testing cannot commence without Department review and approval. Those documents, once filed by the applicant, will be available at the DEP Northcentral Regional Office, and can be accessed by scheduling a file review with the Department.

The 180 day time period allows adequate time for the permittee to schedule a performance test with a testing company, prepare a testing protocol, and for the Department to review and approve

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that protocol to ensure it is compliant with EPA reference test methods and 25 Pa. Code Chapter 139. However, Renovo Energy Center is required to comply with all applicable emissions limitations and all operating requirements established in the plan approval during and after the 180-day period.

Comment 13:

Commenter stated that, “Ambient concentrations of emission components should be assessed at the highest frequency possible, and the results should be made available to the public online.” (one comment)

Response:

In the proposed plan approval, the Department included conditions requiring Renovo Energy Center to continuously monitor the nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), and ammonia (NH₃) emissions through the use of a continuous emissions monitoring system (CEMS). The CEMS will provide a continuous real-time analysis of the emission of those air contaminants. With respect to the emission of sulfur oxides (SO₂), sulfuric acid mist, total PM, total PM₁₀, total PM_{2.5}, and hazardous air pollutants, those pollutants will be minimized through the use of transmission pipeline quality natural gas as fuel for the combustion turbines. The Department has also included stringent limits on the amount of sulfur found in the natural gas supply as well as the diesel fuel sulfur content. The Department has also included performance testing on the combustion turbines to demonstrate compliance with the emission limitations. Additionally, the Renovo Energy Center will comply with the monitoring, recordkeeping, reporting, and work practice requirements specified in the plan approval. Emission reports are available online at this DEP web page:

<https://www.dep.pa.gov/DataandTools/Reports/Pages/Air-Quality-Reports.aspx>

Additionally, the Department aggressively monitors air quality across the Commonwealth in order to comply with Federal and State laws and regulations concerning criteria pollutant monitoring, to gauge the effectiveness of the air quality program in meeting health-based National Ambient Air Quality Standards (NAAQS), including ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide. The Department operates an EPA approved network of monitors designed to ensure that the air quality in the Commonwealth is attaining and maintaining the NAAQS. The monitoring data is also available electronically on the Department’s website for review at

<https://www.dep.state.pa.us/dep/deputate/airwaste/aq/aqm/pollt.html>

For further information regarding the ambient air quality, please use the following web address for the national Air Now page, which shows the latest data from across the nation. The site can zoom in on a particular area by entering the Zip Code: AirNow.gov.

Comment 14:

Commenter stated, “The analytical methods for testing emissions should be validated before plant start-up.” (one comment)

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Response:

During the technical review period, the Department thoroughly reviews the proposed emissions from the sources at the facility. The Department's technical review assesses the technology to make sure that the proposed emissions can be minimized and achieved through the application of BAT, BACT, and LAER requirements. BAT, BACT, and LAER include a review of good operating practices, operation manuals, manufacturer guarantees and warranties that these emissions have already been achieved by similar projects in the United States and can be achieved by this project.

The air contaminant emissions from the Renovo Energy Center will be monitored by a combination of continuous emission monitoring systems (CEMS), EPA reference method stack testing, parametric monitoring as well as recordkeeping and reporting. Upon certification that the CEMS will operate in accordance with the methods and procedures acceptable to the Department and EPA, the emissions measured by the continuous emissions monitoring systems will be submitted electronically to the Department's Division of Source Testing and Monitoring in Harrisburg. The data received by the Division of Source Testing and Monitoring is used to generate quarterly reports that are reviewed by the Department for verification that each CEMS is operating properly and the emissions continue to comply with all applicable limitations as specified in the plan approval during each respective quarterly period. In addition, Renovo Energy Center will conduct periodic stack tests and the Department also typically observes testing of major sources to verify only test methods and procedures acceptable to the Department are utilized. Stack tests must also comply with existing EPA reference methods which have been promulgated in the Federal Register and codified in the Code of Federal Regulations (CFR). Emissions and test reports will be available at the DEP Northcentral Regional Office and can be accessed by scheduling a file review with the Department.

Comment 15:

Commenter inquired as to why the project was increased in size from 950 MW to 1240 MW.
(one comment)

Response:

The applicant's first application did not include duct burners. Renovo Energy Center's financing community indicated that these components should be added to the project in order to maximize the overall energy efficiency of the plant. The energy efficient design of the revised plant will decrease emissions on a lb/MWh basis and allow the plant to operate with greater economic efficiency as it will consume less fuel to produce a given amount of electricity. The addition of the duct burners increased the peak generation capacity of the plant by approximately 290 megawatts.

Comment 16:

Commenter asked if customers are being offered wind, solar, or renewable alternatives. (one comment)

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Response:

The review of this facet of the proposed project is outside the scope of requirements of the Department's Air quality regulations. However, the Renovo Energy Center will generate power for the Pennsylvania-New Jersey-Maryland (PJM) electric grid. Pennsylvania has created retail power purchase options for consumers in which the consumer can choose the mix of power (traditional or renewables) they wish to purchase in a market driven environment. For more information see the PA Public Utility Commission web page: www.papowerswitch.com

Comment 17:

Commenter asked if the project replaced a coal-fired power plant. (one comment)

Response:

Recently many coal-fired power plants have retired in the Commonwealth of Pennsylvania, which has coincided with the construction of several new natural gas-fired power plants. Recently two large coal-fired power plants have been shut down and one is only partially operating in the Northcentral Region of Pennsylvania. The concept of replacement capacity is handled in the applications considered by the Federal Energy Regulatory Commission and the Pennsylvania-New Jersey-Maryland Independent System Operator in their application review processes. Please contact the Federal Energy Regulatory Commission or PJM to find out if this proposed facility was designated as a replacement for any specific coal-fired power plant.

Comment 18:

Commenter asked who the project customers are. (one comment)

Response:

The electric power generated at this plant will be delivered to the grid system managed by the Pennsylvania-New Jersey-Maryland (PJM) regional transmission organization and the commercial, industrial, institutional and residential customers they serve.

Comment 19:

Commenter asked what the source of the feed gas is, how much gas the facility would consume, and if new pipelines would need to be built. (one comment)

Response:

The project developers are contracting with Eastern Gas Transmission and Storage, Inc. to construct a natural gas pipeline eight miles north of the proposed site to deliver the natural gas supply for the facility. Based on the ratings of the sources operating at their proposed maximum hours, the facility would consume approximately 68 billion cubic feet per year of natural gas. The Department is not aware of any new gas well or compressor station construction specifically due to this project.

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Comment 20:

Commenter asked who the financial backers are for the project and the likelihood that they would abandon the project. (one comment)

Response:

The review of this facet of the proposed project is outside the scope of requirements of the Department's Air quality regulations. The Department is not in a position to assess the likelihood of investor abandonment.

Comment 21:

Commenter asked what safeguards are in place to prevent the release of fuel oil from the storage tanks into the Susquehanna River. (one comment)

Response:

Storage tanks of the design and capacity proposed to be constructed are required to have monitoring and secondary containment features to prevent the release of fuel spills into the local water sources or soils. The fuel oil storage tanks are required to be registered with the Department's Storage Tanks Program and will be required to be periodically inspected for integrity and their compliance reported to the Department. Prior to the installation of the storage tanks the facility will also be required to get a Site Specific Installation Permit from the Department's Storage Tank Program. This permit does include a public comment period. Additionally, the Air Quality program also monitors the fuel oil storage tanks.

Comment 22:

Commenter stated that Prevention of Significant Deterioration PSD provisions should not be the baseline for this proposal. (one comment)

Response:

The Department's review of the application was not limited to a review under the Prevention of Significant Deterioration (PSD) of Air Quality regulations of 40 CFR 52.21. The proposed project is subject to the major plan approval review process and went through a rigorous review of several technical aspects and modeling analyses by the Department. Federal and State Air regulations mandated that the proposed project be subject to review under the provisions of the Prevention of Significant Deterioration (PSD) of Air Quality regulations of 40 CFR 52.21, the nonattainment New Source Review (NSR) regulations of 25 Pa. Code Sections 127.201 through 127.218, and the Best Available Technology (BAT) requirements of 25 Pa. Code Sections 127.1 and 127.12. Renovo Energy Center has performed an air quality analysis that adequately demonstrates that the facility's proposed emissions would not cause or contribute to air pollution in violation of the National Ambient Air Quality Standards. Additionally, the proposed sources will be constructed to meet the best available technology and best available control technology requirements and operated and maintained in accordance with good air pollution control practices in order to minimize emissions to the maximum extent feasible.

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The facility's total particulate matter (PM) including total PM10 and total PM2.5, nitrogen oxides, carbon monoxide, volatile organic compounds, and greenhouse gas emissions will meet the State and Federal BACT requirements. The facility's nitrogen oxides and volatile organic compounds emissions will also meet the NSR requirements. The dry low-NOx burners and selective catalytic reduction system (SCR) will also meet the LAER requirements. The Department considers SCR to be the most efficient, effective, and appropriate technology available today to reduce NOx emissions from combustion turbines. Reductions of greater than 90% are achieved through this technology, which has been demonstrated at numerous existing facilities across the country. At this time, there are no other control technologies that have been demonstrated to achieve the same or greater control as proposed by this project. The Department has also included stringent limits on the amount of sulfur found in the natural gas supply in order to minimize the emission of sulfur-containing compounds including SO₂, SO₃, and H₂SO₄ as well as inhibit the formation of certain types of particulate matter in order to satisfy BACT for these types of emissions.

Comment 23:

Commenters stated that the plan approval and Title V operating permit (TVOP) should not be issued together, and a separate public comment period should be held for the TVOP. (two comments)

Response:

A Title V operating permit will not be issued with the plan approval. A separate application for a Title V operating permit would be required after the proposed project is fully operational and all air contaminant sources have been determined to be in compliance with all applicable requirements contained in the plan approval. The Department will thoroughly review the operating permit application and include additional applicable monitoring, testing, and recordkeeping requirements related to operation of the sources. The Department will also comply with the public participation requirements, including soliciting comments, at the time a Title V operating permit is proposed.

Comment 24:

Commenters stated that the selection of air pollution control technologies falls short of what the Clean Air Act and Air Pollution Control Act require. (21 comments)

Response:

The Renovo Energy Center is subject to the Prevention of Significant Deterioration (PSD), New Source Review (NSR), Best Available Control Technology (BACT), Lowest Achievable Emission Rate (LAER) and Best Available Technology (BAT) requirements. The facility's total particulate matter (PM) including total PM10 and total PM2.5, nitrogen oxides, carbon monoxide, volatile organic compounds, and greenhouse gas emissions are subject to the PSD requirements. The facility's nitrogen oxides and volatile organic compounds emissions are also subject to the NSR requirements. The Department determined that the dry low-NOx burners and selective catalytic reduction system proposed to satisfy BACT also satisfied LAER. The Department considers selective catalytic reduction to be the most efficient, effective, and

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appropriate technology available today to reduce NO_x emissions from combustion turbines. Reductions of greater than 90% are achieved through this technology, which has been demonstrated at numerous existing facilities across the country. There are no other control technologies that have been demonstrated to achieve the same or greater control as selective catalytic reduction for NO_x emissions, and also be as technically feasible and readily adaptable to large gas-fired combustion turbines such as those proposed for this project.

Combustion controls, which will be fine-tuned to minimize emissions of un-combusted VOCs, in addition to the oxidation catalyst, were determined to satisfy LAER for VOCs and BACT for CO. The Department has also included stringent limits on the amount of sulfur found in the natural gas supply in order to minimize the emission of sulfur-containing compounds including SO₂, SO₃, and H₂SO₄ as well as inhibit the formation of certain types of particulate matter in order to satisfy BACT for these types of emissions.

Based on comments received regarding the proposed project, the Department re-evaluated the emission limits for the sources and revised certain emission limits in the plan approval to be more stringent. Examples of re-evaluations resulting in more stringent limits include ammonia slip, EPA Tier limits on the emergency engines, reduced PM limits on the auxiliary boilers and maintaining the powerblocks' CO₂ emission rate in spite of adding the duct burners. The Department is satisfied that the emission limits included in the plan approval will ensure that all sources proposed at this facility will meet or exceed the requirements of PSD, NSR and BAT regulations, including BACT and LAER.

Comment 25:

Commenter stated the Department's selection of sources in its initial LAER/BACT/BAT analysis may be unnecessarily limited. (one comment)

Response:

The Department reviewed various sources at other natural gas-fired combined cycle generating stations. As compared to the 1,240 MW Renovo Energy Center, the significant differences in the maximum output capacities of other power plants, such as the 538 MW Sewaren New Jersey plant are due to it having only one turbine versus two at the Renovo Energy Center. The turbines at the two plants are comparable from a technology standpoint because the turbines are the same model. The powerblock ratings between the two plants differ because the duct burners at Sewaren are only 70% the capacity of the Renovo duct burners. The slight variation between the two is the peak rating firing natural gas with Sewaren rated at 3,311 MMBtu/hr and Renovo rated at 3,541 MMBtu/hr, a 6.5 % difference. This difference is well within any bounds of tolerance in considering the project emission units as similar, especially given that both plants propose GE model 7HA.02 turbines. Additionally, the Renovo turbine emission rates are proposed at rates equal to or lower than the Sewaren turbine, indicating that improved LAER/BACT and BAT has been achieved with the Renovo turbines. This same approach to reviewing similar turbines under the LAER/BACT/BAT analysis holds true for the other turbines evaluated. The Department is satisfied that the analyses were consistent with the Federal and State guidance for comparing similar sources in order to meet the LAER, BACT and BAT requirements.

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Comment 26:

Commenter stated that the applicant must do an expanded control technology analysis in order to evaluate CO and VOC controls for the auxiliary boilers. (one comment)

Response:

The Department re-evaluated its control technology analysis including the cost effectiveness calculations for oxidation catalysts and is satisfied that the Renovo Energy Center has provided credible costs and applied appropriate cost factors that are consistent with the guidance of the EPA “Cost Manual”. The calculations provided by the applicant demonstrate a cost per ton of CO removal of \$9,110, which is significantly higher than that stated in the application review memo. Based on its additional review, the Department has determined that the cost of CO removal of \$5,686 per ton stated in the application review memo was an error. The Department considers that, at \$9,110 per ton of CO removal, the addition of CO oxidation catalysts to the auxiliary boilers is economically infeasible.

There are no economically feasible controls to reduce 0.15 tons of VOC emissions from the proposed auxiliary boilers. If the oxidation catalysts ruled out for CO reduction in the auxiliary boilers were employed (oxidation catalysts would be the most technically feasible for this source), the cost per ton of removal at 70% efficiency would equate to over \$100,000 per ton. However, with respect to the BAT limits proposed for the auxiliary boiler at the Hickory Run facility, the Department has established the same CO and VOC limits for Renovo Energy Center.

Comment 27:

Commenter stated that dismissal of proprietary control technologies was unclear and did not satisfy BACT. (one comment)

Response:

The Department believes that the review memo adequately discusses and explains why the other control technologies were not viable options. However, the Department includes the following additional information on the other technologies reviewed.

As noted in the memo, XONON™ and EMx™ technologies have not been widely implemented in the turbine industry in general, and those technologies have had little to no application at the scale and throughput capacities that are found in large combined cycle power plant turbines such as those proposed for the Renovo Energy Center.

XONON™ is a trademark technology that has not been demonstrated that it can meet the scale a CCGT power plant like Renovo requires. The Department’s review of the US EPA’s RACT/BACT/LAER Clearinghouse (RBLA) did not find any examples of XONON™ technology being applied to large combustion turbines. Additionally, SCR has reduced NOx to levels equal to or better than the smaller XONON™ systems have achieved. Most web-based articles and white papers on the technology that the Department reviewed are more than ten years old and the projected NOx emission rates range from just under 2 ppm to 5 ppm. The Department did not find any indications that it is a more advanced control technology than SCR. In fact, a 30 MW turbine in a proposed permit for the Haven Gas Plant in Kansas only proposed

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NO_x at 15 ppm, well above the proposed 2 ppm for the Renovo turbines. Also, a 2018 PSD CCGT power plant permit review by the Illinois EPA ruled out XONON™ as commercially unavailable on the turbine sizes that Renovo has proposed. As stated in the Department's review memo, the application of XONON™ to turbines has been limited to units rated at no more than 10% of the rating of the proposed GE turbines. Based on these factors the Department determined that XONON™ technology is technically infeasible due to its commercial unavailability in the scale required by Renovo.

EM_x™ technology, known also as SCONO_x, uses a single catalyst to control NO_x, along with CO and VOCs. EM_x™ has been identified as being susceptible to fouling from sulfur compounds in exhaust gas. While the Renovo turbines will emit relatively low sulfur concentrations due to the quantity of sulfur found in pipeline quality natural gas, the addition of a sulfur reduction catalyst prior to the EM_x™ catalysts would be necessary at Renovo because of the facility's need to be capable of combusting diesel fuel as a backup. Consequently, this additional catalyst poses a technical complication and economic drawback. The California Air Resources Board recognized this in their review of the 2009 Tesoro Refinery compliance project review and consequently concluded that SCR was the better alternative for NO_x reduction in exhaust gases with sulfur as SCR yields similar NO_x results as EM_x™. The Department has determined that EM_x™ does not offer any better NO_x reduction than currently proposed with SCR. Additionally, EM_x™ has inherent complications that make it less technically feasible than SCR for the Renovo Energy Center.

Comment 28:

Commenter insisted that the Department require better control technology for the emergency generator and fire pump engines. (one comment)

Response:

The Department requires the applicant to submit the lowest emitting engines available on the market at the time of application. The Department has required Renovo to construct EPA Tier 4 engines at the facility instead of the Tier 2 and Tier 3 engines that were initially proposed. In accordance with Tier 4 requirements, the proposed emergency generator will be required to meet emission rates of 0.5 g/bhp-hr NO_x, 2.6 g/bhp-hr CO, 0.14 g/bhp-hr NMHC and 0.022 g/bhp-hr PM. The emergency fire pump will be required to meet emission rates of 0.3 g/bhp-hr NO_x, 2.6 g/bhp-hr CO, 0.14 g/bhp-hr NMHC and 0.015 g/bhp-hr PM. The Department determined that compliance with the EPA Tier 4 emission standards satisfies the requirements of BAT, BACT, and LAER.

Comment 29:

Commenter stated that the equipment for continuous emissions monitoring is unreliable, citing a report in which it is claimed that the government network of monitoring devices nationwide routinely misses major toxic releases and day-to-day pollution dangers. (one comment)

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Response:

The Department included conditions in the plan approval requiring Renovo Energy Center to continuously monitor the nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide (CO₂), and ammonia (NH₃) emissions through the use of a continuous emissions monitoring system (CEMS). The CEMS will provide a continuous real-time emissions data of those air pollutants. With respect to the emission of sulfur oxides (SO₂), sulfuric acid mist, total PM, total PM₁₀, total PM_{2.5}, and hazardous air pollutants (HAPs), those pollutants will be minimized through the use of transmission pipeline quality natural gas as fuel for the combustion turbines. The Department has also included stringent limits on the amount of sulfur found in the natural gas supply. Additionally, the Department added periodic performance testing on the turbines to demonstrate compliance with the Department's established emissions limitations. Moreover, the Renovo Energy Center will continuously monitor the operation of the turbines and control devices to ensure emission limits are maintained as well as comply with all recordkeeping, reporting, and work practice requirements as specified in the plan approval.

The Department acknowledges that the sophistication of the continuous emissions monitoring systems (CEMS) demand that operators pay heightened scrutiny and attention to maintain the operability and reliability of those monitors. To that end, the Department Compliance regulations impose significant penalties on facilities who fail to keep these systems in good operating condition in order to accurately monitor emissions. The penalties for failure of the monitoring system are significantly high, therefore operators make it their highest priority to keep their CEMS operable at all times by hiring dedicated staff and/or contractors who monitor these systems.

Additionally, the Department aggressively monitors air quality across the Commonwealth in order to comply with Federal and State laws and regulations concerning criteria pollutant monitoring, to gauge the effectiveness of the air quality program in meeting health-based National Ambient Air Quality Standards, including ozone, particulate matter, carbon monoxide, lead, nitrogen dioxide, and sulfur dioxide. The cumulative effects of multiple sources are accounted for in air contaminant concentrations in the ambient atmosphere. At this time, the monitoring data has not alerted the Department to any changes in the attainment status for the counties located in the Northcentral region of the Commonwealth.

Comment 30:

Commenter stated, "Startup and shutdown emissions controls should be specified separately and not included within the plan approval." (one comment)

Response:

For the Air Quality program, a plan approval is the only regulatory mechanism which establishes the operating requirements for regulated facilities that allow them to construct and operate new air contaminant sources under all scenarios including startup and shutdown. The Department established emissions limits in the plan approval for the turbines during startup and shutdown operations which have been derived from manufacturer's test data. Additionally, the plan approval requires the permittee to operate and maintain the combustion turbine, control devices, and monitoring equipment in accordance with the manufacturer's specifications and in a manner

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consistent with good air pollution control practices for minimizing emissions at all times, including during startup and shutdown. Additionally, EPA Reference Test Methods have been developed which pertain specifically to performance testing during normal operation, rather than startups and shutdowns of air contaminant sources. However, the certified CEMS which are required to be installed for these sources will continue to monitor emissions during startup and shutdown. Moreover, the projected emissions from startup and shutdown of the turbines have been accounted for in the air dispersion modeling. The modeling analysis indicates that the emissions from startup and shutdown will not contribute to air pollution in violation of the NAAQS or present a harm to public health and the environment. Furthermore, in the plan approval, a condition has been included prohibiting REC from performing a cold start of a combustion turbine within one hour of the other combustion turbine in order to provide additional assurance that the NAAQS will be protected because REC did not include this scenario in its modeling.

Comment 31:

Commenter requested an extension of the public comment period on the proposed plan approval.
(one comment)

Response:

Based on the requests for further opportunity to comment on this project, the Department extended the public comment period by approximately three weeks.

Comment 32:

Commenters requested a public hearing. (24 comments)

Response:

The Department has reviewed all of the public comments submitted during the allotted 30-day comment period required by the Pa. Code (see 25 Pa. Code § 127.44(f)(2)) as well as those comments submitted during the comment extension through December 7, 2020. The Department extended the comment period in order to solicit as many relevant comments regarding the proposed project as possible. Additionally, while a new plan approval for the purposes of our evaluation, in reality this project is an amendment to the previous project. During that plan approval review the Department conducted a public meeting in the community proposed to inform the interested public and respond to any questions. At that time, the community was supportive of the project. The Department also received significant support for this project during the comment period extension. The Department received extensive comments regarding the project during the comment period similar to what would have been received at a public hearing. Additionally, with this response document, the Department is providing thorough responses to the comments submitted. The Department is allotted discretion in determining whether to hold a public hearing and the Department has determined that a public hearing is not warranted given the expanded public comment period it provided.

This project is subject to the Prevention of Significant Deterioration (PSD) of Air Quality regulations of 40 CFR 52.21, the nonattainment New Source Review (NSR) regulations of 25 Pa.

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Code Sections 127.201 through 127.218, and the Best Available Technology (BAT) requirements of 25 Pa. Code Sections 127.1 and 127.12. The Department has determined that the proposed levels of the air contaminants emissions satisfy best available control technology (BACT) and Lowest Achievable Emission Rate (LAER) requirements as well as the Department's BAT requirements.

Comment 33:

Commenter disagreed with the Department's conclusion that the GE turbine is the lowest emitting turbine and insists that the Department should weigh the relative harm of the pollutants. (one comment)

Response:

Table 1 on Page 2 of the application review memo notes that the emissions information on the Siemens and Mitsubishi turbine options did not include emissions from a duct burner. Consequently, the potential emissions values in Table 1 should not be directly compared. The technical data for the proposed duct burners indicates that steady state natural gas firing for 7,540 hours per year contributes the following tonnages of pollutants: NO_x - 52.8; CO - 65.6; VOC - 54.3; NH₃ - 48.3; SO_x - 9.8; Total PM - 76.9; H₂SO₄ - 7.5; CO₂ - 875,000. These additional emissions from the duct burners when added to the base emissions from the Siemens or Mitsubishi turbines listed in Table 1 would be comparable to or exceed the emissions from the proposed GE turbines when equipped with duct burners. Therefore, the Department has determined that the proposed GE turbine equipped with the duct burner is the lowest-emitting option and satisfies LAER, BACT, and BAT.

Comment 34:

Commenter stated that the turbine PM emissions limit is too high possibly due to incomplete data. (one comment)

Response:

The PM emissions from the combustion turbine is proposed to be 0.0032 lb/MMBtu. However, the PM emission limit established is 0.0050 lb/MMBtu which includes the PM emissions generated from the duct burner that will be exhausted from a single stack. The combined emission rate from the GE combustion turbine and the duct burner is consistent with similar contemporary sources in the RBLC database which has proven to be achievable and reasonable as demonstrated by stack testing for the Patriot and Liberty CCGT power plants in the DEP Northcentral region. The combined PM emission limit of 0.0050 lb/MMBtu from the combustion turbine and the duct burner was established to satisfy the BAT and BACT requirements.

Comment 35:

Commenters believe the PM limits for the auxiliary boilers and water batch heaters should be 0.0018 lb/MMBtu instead of 0.0019 lb/MMBtu. (one comment)

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Response:

Based on the commenter's concerns, the Department re-evaluated the emission limit and established 0.0018 lb/MMBtu. The revised emission limit is included in the plan approval.

Comment 36:

Commenter requested additional explanation on the 5 ppm ammonia and HAPs limits. (one comment)

Response:

The Department re-evaluated the SCR operating technology for controlling ammonia slip. The Department reached out to the Connecticut Department of Energy and Environmental Protection (DEEP) to obtain the current status of the CPV Towantic combined cycle power plant turbines. This facility uses a GE turbine base model. Stack testing reports from the CPV Towantic facility in 2018 demonstrated compliance with a 2 ppm ammonia limit. Connecticut DEEP indicates they have no reports suggesting that the facility is not able to meet this limit on an ongoing basis. The same results were reported by the Salem Harbor CCGT plant and the PSEG Bridgeport plant with the same GE turbine. As a result of this updated evaluation, the Department approached Renovo Energy Center. Renovo Energy Center discussed with the manufacturer and they agreed to propose a revised emission limit for ammonia slip of 2 ppm. The Department established the ammonia slip limit of 2 ppm in the plan approval.

Regarding hazardous air pollutants (HAPs), minimizing emissions of these compounds is achieved through effective combustion practices and use of efficient oxidation catalysts. Test data from the Panda Patriot turbines shows negligible emissions of carbon monoxide, which is an approximate surrogate for organic HAPs, as well as total hydrocarbons at well below the permit limit for VOCs. Proper control of HAPs from the proposed Renovo Energy Center will be determined by verifying that the combustion turbines and associated oxidation catalysts are operated in an efficient manner. Each combustion turbine will have a monitoring system that will ensure maximum efficiency of the combustion process. Additionally, the plan approval requires a CEMS for carbon monoxide emissions which will provide continuous assurance that the oxidation catalysts are operating properly.

Comment 37:

Commenter stated that the annual formaldehyde limits appear to be mistaken. (one comment)

Response:

The Department re-evaluated the formaldehyde emission limit of 2.19 tpy and determined that the emission limit proposed did not include all operating scenarios and was therefore in error. The information on pages 24 (Table 10) and page 227 of the plan approval application supports a formaldehyde limit of 2.53 tpy. The Department is in agreement with establishing a limit of 2.53 tpy of formaldehyde for each powerblock.

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Comment 38:

Commenter stated that the turbine sulfuric acid emissions and fugitive VOC controls require further analysis. (one comment)

Response:

The sulfuric acid emissions from the facility will be a by-product of the sulfur content in the natural gas. Limiting the fuel gas sulfur content is therefore the appropriate way to minimize emissions of sulfur-containing compounds, including SO₂, SO₃, and H₂SO₄. The potential sulfur emissions from the combustion turbines are low enough that any add-on controls such as scrubbers or other methods are readily determined as economically infeasible given the relatively low mass emission rate of sulfur containing compounds. Moreover, the transferability of wet scrubbing to the turbine exhaust is not technically feasible due to the exhaust temperature. While coal-fired plants have exhaust temperatures around 350°F, the CCGT exhaust will be less than 200°F, which is below the operating range of this control method due to reduced evaporative capacity of the exhaust stream. Additionally, the high flow rate of the exhaust and corresponding low sulfur concentration would require an extremely large amount of scrubber section area (hundreds of columns) in order to reduce flow rates to achieve effective capture. As a result, capital costs alone would render the sulfur removal as exceedingly economically infeasible. With regard to dry sorbent injection, another method of sulfur control, the cost of sulfur removal is excessive given the relatively low amount of sulfur and the high expense of this type of system. Accordingly, the Department determined that these technologies are not economically feasible for the Renovo Energy Center combustion turbines, and even less feasible for the smaller combustion sources included in the proposed project.

The Department has reviewed the technical data regarding the conversion of sulfur contained in the fuel into SO₂, SO₃, and H₂SO₄ and established appropriate limits on the emission of each of these compounds. The Department considers the limitations on the sulfur content of the natural gas and ULSD fuel combusted at the facility to be the Best Available Technology and Best Available Control Technology for emission of sulfur-containing compounds from the proposed project, including sulfuric acid.

Fugitive VOCs from the diesel storage tank will be controlled by using an internal floating roof tank design. Based on the EPA guidance, the Department believes the floating roof control technology is the best technology to minimize fugitive emissions to the maximum extent feasible. Therefore, the Department determined that the proposed internal floating roof tank design satisfies the requirements of BAT, BACT, and LAER for VOC emissions.

Comment 39:

Commenter insists the fuel restrictions in the proposed plan approval should include measures for monitoring the sulfur content in the fuel gas. (one comment)

Response:

The facility is subject to the monitoring requirements of Appendix D of 40 CFR Part 75 Section 2.3.1.4 as well as the New Source Performance Standards sulfur monitoring requirements specified in 40 CFR Sections 60.4360 through 60.4370 (Subpart KKKK). The Department

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believes these monitoring requirements and established procedures for measuring the sulfur content in the fuel are sufficient to ensure compliance with the fuel sulfur content limit. The fuel monitoring requirements for measuring the sulfur content which are referred to in these subparts have been included in the plan approval.

Comment 40:

Commenters stated that the “Associated Growth Analysis” is incomplete, citing the planned construction of an ammonia and urea plant approximately 40 miles from the Renovo site. (one comment)

Response:

The Department is not aware of any ammonia and/or urea plant in the area proposed for construction in support of the Renovo Energy Center. The Department concurs with REC’s determination that secondary emissions due to general commercial, residential, industrial, and other growth associated with the facility would be negligible. The air dispersion model performed for this facility included Renovo Energy Center’s proposed emissions as well as all existing and proposed sources of air emissions in the area of the proposed Renovo Energy Center.

The REC project is not anticipated to have significant impacts on secondary source growth in the Renovo Township area. Because the electricity produced at REC will be fed to the PJM grids, there is little to no risk of industrial growth in Clinton County associated with industries seeking lower electricity costs. There are no associated facilities planned in support of REC, and in particular the ammonia and/or urea plant is not being contemplated because of the Renovo Energy Center project. The ammonia and/or urea plant may be in the developmental planning stages only at this point and may not be constructed and operated.

Additionally, no Plan Approval application has been filed for this project. Therefore, this plant cannot be included in the dispersion modeling as it does not represent a secondary emission source associated with REC operations. Additionally, REC has not yet decided where it will obtain ammonia and approaching project developers to discuss potential commercial partnerships is not a viable option at this stage. Furthermore, the associated growth analysis is intended only to include general commercial, residential, industrial and other growth associated with the source. There are no additional facilities that will be associated with REC, and therefore, secondary emissions and air quality impacts due to associated growth would be negligible.

Comment 41:

Commenter stated that a permit condition barring a double-cold start scenario should be added to the proposed permit. (one comment)

Response:

The Department has re-evaluated the double-cold startup scenario for the combustion turbines. Based on the re-evaluation, a condition has been included in the plan approval prohibiting Renovo Energy Center from performing a cold start of a combustion turbine within one hour of

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the other turbine in order to apply good operating practices and because REC did not include this scenario in its modeling.

Comment 42:

Commenters noted that Renovo is an Environmental Justice area and the Department needs to abide by the Department policy on Environmental Justice. (one comment)

Response:

The Department has met and continues to meet its obligations under its policy on Environmental Justice in connection with this project. At the project's inception the developers took the initiative to host an open house in October 2015 where all borough residents were invited via a newsletter mailing to attend a presentation. During that open house the developers gave a presentation on the project, answered the public's questions via an interactive feedback and afterwards engaged in various discussions at information stations staffed by the developers, vendors and equipment providers such as the GE turbine. The event, attended by a significant portion of the local residents, received comprehensive newspaper coverage from two local newspapers of record.

In October 2016, the Department and the developers presented information again on the project status. The public was invited with a newsletter mailing. The developers presented an overview on the project and the Department gave an in-depth explanation of the permitting process. At the conclusion of the meeting, the public discussed the project informally with the representatives. This event also received newspaper coverage by a local newspaper of record.

Additionally, the developers met in 2015 and 2016 with local community members appointed by the Renovo Borough council. One result of those meetings was the development of a Benefits Agreement between the Borough and the developer which resulted in certain design features in the project desired by the Borough. The developer continues to regularly provide project updates to the Borough Council.

The Department published a notice in the *Pennsylvania Bulletin* on September 26, 2015, notifying that the plan approval application has been submitted to the Department. After the review was complete the Department published its intent to issue Plan Approval 18-00033A on November 4, 2017. Along with all of the proposed terms and conditions contained in the plan approval, the notice also offered the public an opportunity to request a public hearing. As required, the company published a notice in the local newspaper of general circulation, the *Lock Haven Express*, for three consecutive days ending November 11, 2017. The notice and proposed plan approval and application technical review memo were sent to the US EPA on November 6, 2017, with comments received from the EPA on November 27, 2017 and the company responded with comments on December 8, 2017. No comments were received from the public during that comment period.

In addition to the recent written comment period, multiple public meetings and comment opportunities were previously conducted in conjunction with the initial permit application review for this proposed project.

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The Department reviewed all of the public comments for the proposed Renovo Energy Center project that were submitted during the initially allotted 30-day comment period and the comment period extension through December 7, 2020. Based on the review of the comments we received, the Department has determined that a public hearing is not warranted at this time. In accordance with the Governor's guidance on COVID-19, in-person public hearings have been suspended until further notice, and DEP holds virtual public hearings only when determined to be necessary. It is important to note that when DEP accepts written comments on any matter, equal consideration is given to all comments, regardless of the manner in which they are received (i.e., written or presented verbally at a hearing). DEP believes the written comments received during the recent comment period, combined with the previous public meetings and other public outreach described above, have provided ample opportunities for the Department to receive and consider public comments for the current permit review.

Comment 43:

Commenter urged the Department to include a stack height in the proposed plan approval.
(one comment)

Response:

The Department has included a condition in the plan approval requiring the stack height to be 262 feet in accordance with specifications provided in the plan approval application and the parameters utilized in the dispersion model which showed that Renovo Energy Center's proposed emissions would not cause or contribute to air pollution in violation of the National Ambient Air Quality Standards.

Comment 44:

Commenter stated that the application is deficient due to the lack of emission guarantees from the equipment manufacturer. (one comment)

Response:

The Department researched emissions information from similar sources located in the Commonwealth, as well as those listed in the RBLC. The emission rates established in the plan approval are consistent with those for similar existing sources listed in the RBLC that have already demonstrated compliance with the emission limits. Additionally, the turbine manufacturer sent a letter to REC confirming that they will meet the emission limits established in the plan approval. Bechtel Infrastructure and Power Corporation also stated its commitment to provide equipment that will meet the emissions limitations established in the plan approval. Furthermore, the Department has included conditions in the plan approval requiring REC to conduct EPA reference method testing within 180 days of startup of the combustion turbines in order to demonstrate compliance with the established emissions limitations.

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Comment 45:

Commenters noted that there are documents included in Appendix S of the application which may have out of date subdivision, land use and municipal authority approvals. Additional concerns center around the construction-related fugitive dust from a contaminated site.
(one comment)

Response:

The Department received updated status reports on the subject agreements. The municipal authority approved updated agreements with REC on water consumption and the land use agreement. Any concerns related to the water consumption and land use agreements should be directed the municipal authority and the Department's Safe Drinking Water program.

REC has completed the necessary work to meet the Department's Act 2 environmental clean-up standards. REC will be required to continue site observations for any potential undiscovered problem areas. Should that occur, any contaminated soils and materials will be managed and disposed properly and handled in a manner that prevents airborne releases. Vehicles transporting waste from the site for disposal will be covered in accordance with Waste Management regulations to prevent fugitive releases. A condition has been included in the plan approval that the permittee shall take reasonable actions at all times, including but not limited to road sweeping and using water trucks to suppress fugitive dust during construction as well as normal operation, in order to prevent particulate matter from becoming airborne. The conditions in the plan approval also specify the various types of preventive measures that should be taken. Additionally, the fugitive emissions that are visible at the point where those emission pass outside the property is prohibited by the air quality regulations.

Comment 46:

Commenter stated the Department should require REC to source its emission reduction credits (ERCs) locally to the extent they are available. (one comment)

Response:

Pursuant to 25 Pa. Code § 127.208 the permittee must obtain ERCs for use as offsets from an ERC generating facility located within the same nonattainment area. For the purpose of emissions offset transfers at VOC or NO_x facilities, the areas included within an ozone transport region established under section 184 of the Clean Air Act (42 U.S.C.A. § 7511c), which are designated in 40 CFR 81.339 (relating to Pennsylvania) as attainment, nonattainment or unclassifiable areas for ozone, are treated as a single nonattainment area. ERCs may also be obtained from or traded in another state, which has reciprocity with the Commonwealth for the trading and use of ERCs. Currently, the states of New York and Maryland have reciprocity agreements with the Commonwealth for the inter-state trading of ERCs. The Department will ensure that the ERCs obtained by Renovo Energy Center comply with the regulatory requirements. Further information regarding ERCs can be viewed on the Department's Air Quality website. <https://www.dep.pa.gov/Business/Air/BAQ/Pages/default.aspx>

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Responses related to the Air Quality modeling analysis

Comment 47:

Commenter stated that REC improperly applies the EPA screening procedure for analyzing the impact of its emissions on natural features. (one comment)

Response:

To address the commenter's concern regarding the impact of the Renovo Energy Center's emissions on plants, soils, and animals, the DEP requested Renovo Energy Center, LLC (REC) to conduct additional dispersion modeling as a more detailed screening assessment. REC followed the screening procedure outlined in section 5 of the U.S. Environmental Protection Agency's (EPA) "A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals" (EPA 450/2-81-078, December 12, 1980). The DEP notes that REC used a lower, more conservative good engineering practice (GEP) formula height of 232.5 feet (70.87 meters), less than the 262 feet or 79.9 meters in the plan approval, for the combustion turbine stacks in its dispersion modeling for this assessment to address the concern raised in the commenter's December 7, 2020, comment 2b (Comment 48 in this document). REC used its dispersion modeling results to assess impacts due to direct exposure and impacts due to deposition. All concentrations of trace elements fall well below the screening concentration thresholds outlined in section 5 of the EPA's "A Screening Procedure for the Impact of Air Pollution Sources on Plants, Soils, and Animals" (EPA 450/2-81-078, December 12, 1980), which indicates that the Renovo Energy Center's emissions would not adversely impact plants, soils, and animals. The DEP reviewed REC's assessment and concurs with its methodology and results. The description of REC's assessment is included in its response to selected public comments which has been posted on the DEP's Northcentral Regional Office's community webpage at <https://www.dep.pa.gov/About/Regional/North-central-Regional-Office/Community-Information/Pages/default.aspx>. The electronic data associated with REC's dispersion modeling for assessing the Renovo Energy Center's impact on plants, soils, and animals are available upon request.

Comment 48:

Commenter stated that unless REC uses a stack height based on the HRSG, the Department should require a field study or fluid modeling demonstration to determine the proper stack height under Good Engineering Practice. (one comment)

Response:

The DEP disagrees with the commenter. The DEP believes Renovo Energy Center, LLC (REC) appropriately included the Air-Cooled Condenser (ACC) structures in the U.S. Environmental Protection Agency's (EPA) BPIPPRM program for calculating the good engineering practice (GEP) formula heights and the downwash parameters for the emission sources included in AERMOD. Moreover, the DEP believes that REC's proposed height of 262 feet (79.8576 meters) for its combustion turbine (CT) stacks should be fully "creditable" under the EPA's GEP regulations and guidance. While the lower two-thirds of ACC structures are mostly open lattice structuring to allow for ample air intake for the units to work efficiently, the DEP believes the top third of the ACC structures, which are block-shaped, to be tall enough to create downwash

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effects on Renovo Energy Center's emission sources, including the CT stacks. Nonetheless, in response to this comment, the DEP re-calculated the GEP formula height for the CT stacks using the BPIPFRM program without the ACC structures. The revised GEP formula height for the CT stacks was calculated to be 232.5 feet (70.87 meters) and matches that noted by the commenter. The DEP then revised the REC's Class II modeling analyses as described below with the revised GEP formula height for the CT stacks. For conservatism, however, the DEP continued to use the downwash parameters that were calculated by the BPIPFRM program with the ACC structures.

The DEP revised REC's load analyses to determine which load scenarios should be carried forward through the analyses for the Class II significant impact levels (SIL), National Ambient Air Quality Standards (NAAQS), and Class II Prevention of Significant Deterioration (PSD) increments. Based on the results of the revised load analyses, the DEP provides revisions below to tables 6, 7, 9, and 10 of REC's June 10, 2020, responses to the "DEP Comments on Air Quality Analyses for Prevention of Significant Deterioration."

The DEP revised REC's Class II SIL analyses to determine which pollutants and averaging times, as well as which receptors, should be carried forward through the analyses for the NAAQS and Class II PSD increments. Based on the results of the revised Class II SIL analyses, the DEP provides revisions below to Table 20 of REC's June 10, 2020, responses to the "DEP Comments on Air Quality Analyses for Prevention of Significant Deterioration."

The DEP revised the REC's NAAQS and Class II PSD increment analyses. In the NAAQS analyses, some nearby source parameters for the Mountain Gathering LLC – Dry Run and Columbia Gas – Renovo facilities were corrected in response to the EPA's comment 2 and the monitored portion of the background concentrations were updated in response to the commenter's December 7, 2020, comment 2d (Comment 50 in this document). Based on the results of the revised NAAQS and Class II PSD increment analyses, the DEP provides revisions below to Table 24 and Table 26, respectively, of REC's "Refined Air Dispersion Modeling Report for Plant Reconfiguration" (February 27, 2020).

Modeled violations of the 1-hour NO₂ NAAQS were identified at 4 receptors in the vicinity of the Columbia Gas – Renovo facility, approximately 7 kilometers northeast of the proposed location of the Renovo Energy Center. The impact of the Renovo Energy Center's NO_x emissions (in this case, during the operating scenario which assumes continuous warm start conditions for both CTs while firing ultra-low sulfur diesel (ULSD)) at the time of these modeled violations is below the established 1-hour NO₂ SIL; therefore, the Renovo Energy Center's emissions would not contribute to these modeled violations.

According to the EPA's longstanding policy, the issuance of a PSD permit for an individual project is not dependent on the permitting authority addressing modeled violations of the NAAQS. The EPA's July 5, 1988, memorandum from Gerald A. Emison, entitled "Air Quality Analysis for Prevention of Significant Deterioration (PSD)," states that "the proposed source may be issued a permit (even when a new violation would result from its insignificant impact), but the State must also take the appropriate steps to substantiate the NAAQS or increment violation and begin to correct it through the State implementation plan (SIP)." Moreover, the EPA Region III's April 25, 1990, letter from Marcia L. Spink states, "[t]he source seeking the

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PSD permit may be permitted, constructed, and allowed to operate at its permitted, enforceable allowable emission rate because at that emission rate, the source has no significant impact. Although the state "owes" EPA a revision to its SIP to correct the modeled violation(s) from the existing source(s), that SIP revision and the issuance of the PSD permit are independent events." The DEP intends to conduct a more in-depth review of the model input data for the Columbia Gas – Renovo facility and work to correct any modeled violations of the 1-hour NO₂ NAAQS, if confirmed, in a timely manner. The electronic data associated with the DEP's revised analyses are available upon request.

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Table 6 – Load Case Analysis for CT Steady State Operations, Natural Gas (Revised)

Pollutant	Averaging Period	Predicted Ambient Impacts from Each Operating Scenario ($\mu\text{g}/\text{m}^3$)											
		1 100% No DB	2 100% No DB	3 100% No DB	4 100% No DB	5 38% No DB	6 30% No DB	7 32% No DB	15 100% DB	16 100% DB	17 100% DB	18 100% DB	19 100% DB
SO ₂	1-hour	9.28855	8.75859	9.62796	8.82184	7.93869	7.52310	7.01464	12.89124	11.54331	12.56016	11.85287	12.32598
	3-hour	5.10730	4.72081	5.19661	4.98453	4.74024	4.52073	4.30551	6.96113	6.27006	6.70778	6.40988	6.61130
	24-hour	1.12978	1.08822	1.17913	1.06872	1.19100	1.12149	1.08489	1.59145	1.47129	1.54516	1.45226	1.49845
	Annual	0.14900	0.14006	0.15307	0.14236	0.12298	0.11320	0.10933	0.20443	0.18536	0.19905	0.18859	0.19633
PM-10	24-hour	2.71628	2.80912	2.83492	2.62533	4.96252	5.43922	5.26172	5.87009	5.53096	5.53681	5.28324	5.52705
	Annual	0.35823	0.36155	0.36802	0.34971	0.51241	0.54902	0.53023	0.75406	0.69683	0.71327	0.68607	0.72417
PM-2.5 ^a	24-hour	1.34393	1.37214	1.39247	1.31398	1.98640	2.13328	2.06383	2.86637	2.69785	2.67858	2.59479	2.71083
	Annual	0.35823	0.36155	0.36802	0.34971	0.51241	0.54902	0.53023	0.75406	0.69683	0.71327	0.68607	0.72417
NO ₂ ^b	1-hour	37.78457	35.94295	39.00082	35.01917	33.33457	30.66697	27.77535	51.02597	44.54309	50.94113	48.16457	49.35101
	Annual	1.16946	1.14003	1.20436	1.12836	1.34764	1.37651	1.31575	1.45853	1.38747	1.42655	1.37312	1.40071
CO	1-hour	23.24440	21.80268	24.63846	22.94329	22.63703	23.64300	19.82702	50.40158	45.96232	48.10706	44.18829	45.75280
	8-hour	5.61325	5.22621	5.74366	5.40936	5.22443	5.22820	4.73177	10.83097	9.70689	10.67512	10.35464	10.82792

^a Includes addition of secondary formation concentration of 0.11 $\mu\text{g}/\text{m}^3$ for the 24-hour averaging period and 0.0082 $\mu\text{g}/\text{m}^3$ for the annual averaging period.

^b ARM2 was not utilized for the NO₂ load analyses.

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Table 7 – Load Case Analysis for CT Steady State Operations, ULSD (Revised)

Pollutant	Averaging Period	Predicted Ambient Impacts from Each Operating Scenario ($\mu\text{g}/\text{m}^3$)								
		8 100% No DB	9 100% No DB	10 100 No DB	11 100% No DB	12 60% No DB	13 50% No DB	14 50% No DB	20 100% No DB	21 100% No DB
SO ₂	1-hour	8.73056	8.52508	8.74657	8.09419	8.62086	8.37389	7.89485	8.73623	8.41370
	3-hour	5.85212	5.98908	5.92342	5.51984	4.83802	4.44355	4.21619	6.00085	5.79014
	24-hour	1.14238	1.17218	1.17118	1.09729	1.03882	1.12845	1.06469	1.17971	1.12212
	Annual	0.14208	0.14819	0.15003	0.14055	0.13715	0.13685	0.12914	0.14986	0.14061
PM-10	24-hour	7.86612	8.07131	8.16434	8.21256	8.75257	11.05878	10.92707	8.12312	7.93733
	Annual	0.97830	1.02037	1.04588	1.05189	1.15556	1.34115	1.32536	1.03190	0.99459
PM-2.5 ^a	24-hour	3.86321	4.07658	4.20913	4.24792	4.79946	5.18316	5.10384	4.13494	3.94971
	Annual	0.98650	1.02857	1.05408	1.06009	1.16376	1.34935	1.33356	1.04010	1.00279
NO ₂ ^b	1-hour	53.45863	56.92775	58.17587	54.83849	52.65532	54.07429	50.69002	58.10508	53.77704
	Annual	--	--	--	--	--	--	--	--	--
CO	1-hour	26.37231	27.83202	28.72929	26.96634	27.19215	25.38490	23.43611	28.55166	26.28235
	8-hour	8.18128	8.29468	8.30714	7.76493	6.48192	5.88525	5.46975	8.39223	8.04073

^a Includes addition of secondary formation concentration of 0.11 $\mu\text{g}/\text{m}^3$ for the 24-hour averaging period and 0.0082 $\mu\text{g}/\text{m}^3$ for the annual averaging period.

^b ARM2 was not utilized for the NO₂ load analyses.

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Table 9 – Load Case Analysis for CT SUSD Operations, Natural Gas (Revised)

Pollutant	Averaging Period	Predicted Ambient Impacts from Each Operating Scenario ($\mu\text{g}/\text{m}^3$)					
		Cold Starts	CT1 Cold CT2 Warm	CT1 Warm CT2 Cold	Warm Starts	Hot Starts	Shut Downs
NO ₂ ^a	1-hour	--	335.88016	315.73605	258.29696	219.13483	92.74430
CO	1-hour	3565.34420	2547.47732	2320.76735	993.49639	1150.02020	1251.45492
	8-hour	75.39162	58.24114	50.29429	28.11460	31.96490	34.38858

^a ARM2 option was not utilized in the NO₂ load analyses.

Table 10 – Load Case Analysis for CT SUSD Operations, ULSD (Revised)

Pollutant	Averaging Period	Predicted Ambient Impacts from Each Operating Scenario ($\mu\text{g}/\text{m}^3$)			
		Cold Starts	Warm Starts	Hot Starts	Shut Downs
NO ₂ ^a	1-hour	--	343.86521	278.74844	185.59730
CO	1-hour	2166.60607	905.16126	1064.36539	311.20937
	8-hour	61.82824	30.20215	35.15213	15.75843

^a ARM2 option was not utilized in the NO₂ load analyses.

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Table 20 – SIA Analysis Results (Revised)

Pollutant	Averaging Period	SIL ($\mu\text{g}/\text{m}^3$)	Radius of Impact (kilometers)	
			Worst-Case Scenario	Design Scenario
SO ₂	1-hour	7.8	3.80	3.73
	3-hour	25	n/a ^a	n/a ^a
	24-hour	5	n/a ^a	n/a ^a
	Annual	1	n/a ^a	n/a ^a
PM-10	24-hour	5	3.24	2.11
	Annual	1	0.98	n/a ^a
PM-2.5	24-hour	1.2	19.01	9.52
	Annual	0.2	17.56	7.16
NO ₂	1-hour	7.5	42.43	19.55
	Annual	1	1.01	0.98
CO	1-hour	2,000	2.64	n/a ^a
	8-hour	500	n/a ^a	n/a ^a

^a Impact was below SIL.

Table 24 – NAAQS Analysis Results (Revised)

Pollutant	Averaging Period	Maximum Predicted Impact ($\mu\text{g}/\text{m}^3$)		Ambient Background Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Cumulative Ambient Impact ($\mu\text{g}/\text{m}^3$)	NAAQS ($\mu\text{g}/\text{m}^3$)
		Worst-Case Scenario	Design Scenario			
SO ₂	1-hour	12.89124	12.56016	20.9	33.79124	196.4
PM-10	24-hour	11.07189	5.55040	29.0	40.07189	150
PM-2.5	24-hour	10.59221 ^a	10.59196 ^a	16.0	26.59221	35
	Annual	3.02600 ^b	2.98859 ^b	7.1	10.12600	12.0
NO ₂	1-hour	651.86698	119.54844	^c	651.86698	188
	Annual	1.35413	1.32770	3.6	4.95413	100
CO	1-hour	3565.64881	n/a ^d	1485.7	5051.34881	40,000

^a Includes addition of secondary formation concentration of 0.11 $\mu\text{g}/\text{m}^3$ for the 24-hour averaging period.

^b Includes addition of secondary formation concentration of 0.0082 $\mu\text{g}/\text{m}^3$ for the annual averaging period.

^c Concentration varies by season and hour-of-day.

^d Impact was below SIL.

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Table 26 – Class II Increment Analysis Results (Revised)

Pollutant	Averaging Period	CT Load Cases Used in Analysis	Maximum Predicted Impact ($\mu\text{g}/\text{m}^3$)	Class II Increment Standard ($\mu\text{g}/\text{m}^3$)
PM-10	24-hour	17 (design)/11 (worst-case)	8.22169	30
	Annual	17 (design)/11 (worst-case)	1.05379	17
PM-2.5	24-hour	17 (design)/11 (worst-case)	8.33169 ^a	9
	Annual	17 (design)/11 (worst-case)	1.06199 ^b	4
NO ₂	Annual	17 (design)/15 (worst-case)	1.35413	25

^a Includes addition of secondary formation concentration of $0.11 \mu\text{g}/\text{m}^3$ for the 24-hour averaging period.

^b Includes addition of secondary formation concentration of $0.0082 \mu\text{g}/\text{m}^3$ for the annual averaging period.

Comment 49:

Commenter stated that the Associated Growth Analysis is incomplete. (one comment)

Response:

The DEP concurs with Renovo Energy Center, LLC’s (REC) assessment of “general commercial, residential, industrial and other growth” associated with the Renovo Energy Center, required by the Prevention of Significant Deterioration (PSD) regulations in 40 CFR § 52.21(o). Such growth would be negligible and “secondary emissions” associated with this growth, defined by the PSD regulations in 40 CFR § 52.21(b)(18), would also be negligible. According to Chapter A, subsection II.B.4 of the U.S. Environmental Protection Agency’s (EPA) New Source Review Workshop Manual (Draft, October 1990), “[i]n order to be considered [in the PSD analyses], however, secondary emissions must be specific, well-defined, quantifiable, and impact the same general area as the stationary source or modification undergoing review.” Secondary emissions associated with the Renovo Energy Center do not meet these criteria. Secondary emissions are therefore not included in the additional impact analyses required by the PSD regulations in 40 CFR § 52.21(o) for soils and vegetation and visibility impairment and in the cumulative analyses required by the PSD regulations in 40 CFR § 52.21(k) for the National Ambient Air Quality Standards (NAAQS) and PSD increments.

Comment 50:

Commenter stated that the Department should require better data for ambient NO₂ concentrations. (one comment)

Response:

The Department disagrees with the commenter. In the cumulative analyses for the National Ambient Air Quality Standards (NAAQS), Renovo Energy Center, LLC (REC) explicitly modeled all identifiable nearby sources within the vicinity of its project. According to subsection 8.3.1(ii) of the U.S. Environmental Protection Agency’s (EPA) “Guideline on Air Quality Models” (40 CFR Part 51, Appendix W), that portion of the background attributable to natural sources, other unidentified sources in the vicinity of the project, and regional transport contributions from more distant sources is typically accounted for in a cumulative NAAQS

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analysis through the use of ambient monitoring data. Furthermore, the commenter misinterprets the EPA's recommendations in subsection 8.3.2(b) of the "Guideline on Air Quality Models" by asserting that "using an upwind station would be more representative of the pollutant concentrations that the Renovo station would contribute to. And using a closer station would be more representative as well." These are the EPA's recommendations in cases where there are ambient monitors in the vicinity of the project source. There are no ambient monitors in the vicinity of the proposed location of the Renovo Energy Center. REC therefore used "regional sites" which are recommended by the EPA to determine background concentrations in such cases. A regional site is one that is located away from the area of interest but is impacted by similar or adequately representative sources.

Justification for the ambient monitors used to represent the monitored portion of the background concentration in REC's NAAQS analyses was included in section 10 (Representative Ambient Background Concentrations) of REC's "Final Air Dispersion Modeling Protocol for Plant Reconfiguration" (January 30, 2020). To help address this comment, the DEP requested REC to update this section of its protocol. REC assessed the most recent three years of quality assured ambient monitoring data, now 2017-2019. At the time of the submittal of REC's "Plan Approval Application" (December 27, 2019) and "Refined Air Dispersion Modeling Report for Plant Reconfiguration" (February 27, 2020), quality assured ambient monitoring data was not yet available for 2019. REC also updated a previous assessment of county-wide reported emissions from the EPA's 2014 National Emission Inventory (NEI) with the more recent data from the 2017 NEI. REC also revisited and enhanced its justification of representativeness for the monitors selected for each criteria pollutant for background ambient monitoring data to be used in the NAAQS analyses. This update was included with REC's response to selected public comments which has been posted on the DEP Northcentral Regional Office's community webpage at <https://www.dep.pa.gov/About/Regional/North-central-Regional-Office/Community-Information/Pages/default.aspx>.

In REC's update to section 10 of its "Final Air Dispersion Modeling Protocol for Plant Reconfiguration" (January 30, 2020), the Tioga County NO₂ monitor was selected as the regional site that best represented the monitored portion of NO₂ background concentration in the vicinity of the proposed location of the Renovo Energy Center. REC's evaluation of county-wide emissions data from the EPA's 2017 NEI shows comparable values between Tioga County and Clinton County. The primary NO_x emission sources in the vicinity of the Tioga County NO₂ monitor and the proposed location of the Renovo Energy Center are associated with natural gas drilling and production activities. Moreover, aerial imagery shows little development in the vicinity of the Tioga County NO₂ monitor and the proposed location of the Renovo Energy Center. On the other hand, aerial imagery shows that the State College NO₂ monitor is clearly located in a more urbanized area. The State College NO₂ monitor is influenced by higher NO_x emissions from various stationary and mobile sources. The DEP concurs with REC's conclusion that data from the Tioga County NO₂ monitor is adequate for representing the monitored portion of the NO₂ background concentration in its 1-hour and annual NO₂ NAAQS analyses. REC's air quality analyses described in "Refined Air Dispersion Modeling Report" (April 18, 2017) to support Plan Approval Application 18-00033A utilized data from the State College PM-2.5 monitor to represent the monitored portion of the PM-2.5 background concentration. At the time, three years of complete, quality-assured data did not exist from the Tioga County PM-2.5

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monitor, which commenced operation in October 2014. REC’s air quality analyses described in “Refined Air Dispersion Modeling Report for Plant Reconfiguration” (February 27, 2020) to support Plan Approval Application 18-00033B, i.e., the current application, continued to conservatively utilize data from the State College PM-2.5 monitor, even though three years of complete, quality-assured data now existed from the Tioga County PM-2.5 monitor.

In REC’s update to section 10 of its “Final Air Dispersion Modeling Protocol for Plant Reconfiguration” (January 30, 2020), for reasons similar to those stated above for selecting the Tioga County NO₂ monitor, REC selected the Tioga County PM-2.5 monitor as the regional site that best represented the monitored portion of PM-2.5 background concentration in the vicinity of the proposed location of the Renovo Energy Center. The DEP concurs with REC’s conclusion that data from the Tioga County PM-2.5 monitor is adequate for representing the monitored portion of the PM-2.5 background concentration in its 24-hour and annual PM-2.5 NAAQS analyses.

Based on REC’s update to section 10 of its “Final Air Dispersion Modeling Protocol for Plant Reconfiguration” (January 30, 2020), the DEP provides revisions to Table 15 and Table 16 of REC’s “Refined Air Dispersion Modeling Report for Plant Reconfiguration” (February 27, 2020) as follows:

Table 15 – Monitoring Sites (Revised)

Monitoring Site	County	Pollutants Monitored	Distance and Direction from Project Site
Altoona	Blair	SO ₂	~ 102 km SSW
Arendtsville	Adams	CO	~ 160 km SSE
Montoursville	Lycoming	PM-10	~ 71 km E
Tioga County	Tioga	PM-2.5	~ 77 km ENE
Tioga County	Tioga	NO ₂	~ 77 km ENE

Table 16 – Representative Ambient Background Data (Revised)

Pollutant	Average Period	Ambient Background Value (µg/m ³)
SO ₂	1-hour	20.9
PM-10	24-hour	29.0
PM-2.5	24-hour	16.0
	Annual	7.1
NO ₂	1-hour	18.8 ^a
	Annual	3.6
CO	1-hour	1,485.7

^a Temporally-varying concentrations by season and hour-of-day were used in the DEP’s revised 1-hour NO₂ NAAQS analyses in response to the commenter’s December 7, 2020, comment 2b (Comment 48 in this document).

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Comment 51:

Commenter stated that if REC persists in omitting a double-cold-start scenario from its modeling, the Department should require a permit condition barring a double cold start. (one comment)

Response:

The DEP added a condition in the final Plan Approval to prohibit cold startups of the combustion turbines within one hour of each other when firing either natural gas or ultra-low sulfur diesel (ULSD) since these scenarios were not included in Renovo Energy Center, LLC's (REC) dispersion modeling for the 1-hour NO₂ National Ambient Air Quality Standards (NAAQS).

Comment 52:

Commenter stated the Department should get clarity from REC on whether its modeling accounts for secondary chemistry effects from the control technologies. (one comment)

Response:

Renovo Energy Center, LLC's (REC) dispersion modeling utilized the Ambient Ratio Method 2 (ARM2) in all significant impact level (SIL), National Ambient Air Quality Standards (NAAQS), and Prevention of Significant Deterioration (PSD) increment analyses for NO₂. Subsection 4.2.3.4(d) of the U.S. Environmental Protection Agency's (EPA) "Guideline on Air quality Models" (40 CFR Part 51, Appendix W) lists ARM2 as a Tier 2 screening technique for NO₂ analyses. ARM2 is a regulatory option in AERMOD that was designed to predict more realistic ambient NO₂ concentrations by incorporating a variable ambient NO₂/NO_x ratio. In development of the ARM2 method, a ten-year record of ambient data from the EPA's Air Quality System (AQS) was analyzed which identified a pattern between ambient NO₂/NO_x ratios and the total amount of NO_x present. The pattern showed a decreasing NO₂/NO_x ratio with increasing total NO_x concentrations. In order to maintain a level of conservatism over Tier 3 screening techniques, the Ozone Limiting Method (OLM) and the Plume Volume Molar Ratio Method (PVMRM), the EPA set the national default ambient ratios for ARM2 to a minimum of 0.5 and a maximum of 0.9. An alternative minimum ambient ratio may be used, however, with proper justification. REC chose to keep its dispersion modeling as conservative as possible by using the default values. Appendix B of the REC's "Refined Air Dispersion Modeling Report for Plant Reconfiguration" (February 27, 2020) contains emissions data for both pre-control and post-control for multiple operating scenarios. In REC's dispersion modeling, the NO_x emission rates entered in AERMOD for the combustion turbines are based on what would be emitted to the atmosphere with the selective catalytic reduction and oxidation catalysts in operation.

REC is not required to account for ammonia emissions as a precursor to PM-2.5 formation in its air quality analyses for PSD. The EPA's May 16, 2008, Final Rule (73 FR 28321), "Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers (PM_{2.5})" and August 24, 2016, Final Rule (81 FR 58010), "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements" do not require the regulation of ammonia as a precursor to PM-2.5 for the PSD program. The federal PSD regulations, codified in 40 CFR § 52.21, are adopted and incorporated by reference in their entirety in 25 Pa. Code § 127.83 and the Commonwealth's State Implementation Plan

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(SIP) codified in 40 CFR § 52.2020. Pennsylvania, therefore, does not regulate ammonia as a precursor to PM-2.5 formation for the PSD program. Furthermore, the EPA has not published guidance for calculating secondary formation of PM-2.5 due to emissions of ammonia from a single source for the PSD program.

Comment 53:

Commenter stated the wind rose data may be off. (one comment)

Response:

Renovo Energy Center, LLC's (REC) dispersion modeling utilized a 1-year meteorological dataset consisting of hourly records from October 27, 2015, through October 26, 2016, which is consistent with the wind rose provided by the commenter. REC inadvertently included only a portion of the meteorological data, October 27, 2015, through December 31, 2015, when producing the wind rose in Figure 2 of subsection 9.1.1 of REC's "Refined Air Dispersion Modeling Report for Plant Reconfiguration" (February 27, 2020).

Responses related to EPA comments regarding the Air Quality modeling analysis

EPA Comment 1:

Modeled emission rates in the Renovo Energy Center (Renovo) modeling analysis were based on anticipated equipment types and operating assumptions. Ultimately, the assumptions made in the development of Renovo's modeled emission rates will need to be incorporated into the final plan approval application. Some of these potential restrictions, mainly in operations, are described in the February 2020 *Refined Air Dispersion Modeling Report for Plant Reconfiguration* report and an August 3, 2020 modeling summary memo (*Summary of Air Quality Analyses for Prevention of Significant Deterioration*) from PA DEP's Daniel Roble.

EPA has the following comments to language included in the Renovo modeling report:

Startup/Shutdown Operations (as described in section 6.2)

"[T]here are four main types of SUSD scenarios: hot starts, warm starts, cold starts, and shutdowns. The GE-provided SUSD emission characteristics and corresponding hourly calculations are shown in Appendix B." Continuing, Renovo's modeling analysis, *"...did not include simultaneous cold starts when firing natural gas in the 1-hour NO₂ load case or NAAQS analyses. REC did, however, include scenarios when one CT is undergoing a cold start on natural gas with the other unit undergoing a warm start..."*

Section D, condition # 007 (a)(2)(iii) of Renovo's Proposed Plan Approval establishes 1-hour nitrogen oxide source limits while firing ultra-low sulfur diesel (ULSD) of 221 lbs/cold start, which is the maximum permitted hourly emission rate. Renovo's worst-case 1-hour NO₂ modeling analysis utilized an emission rate of ~240 lbs/hr for both combustion turbines. Given that the modeling analysis showed no modeled 1-hr NO₂ violations, a restriction on bringing both combustion turbines up from a cold start, as

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described in the Renovo modeling report, would seem unwarranted. Please clarify the language included above as it pertains to cold starts for the main combined cycle units.

This section also suggests a restriction on the number of cold starts per year. *“[C]old starts when firing either fuel are expected to be a rare occurrence at REC. Each CT may undergo up to five cold starts firing ULSD each year (with the expectation that there would be zero ULSD cold starts).”* As noted previously, there does not appear to be the need for cold start restrictions based on the worst-case modeled emission rates. EPA would like a clarification of the previous statement from the Renovo modeling report and some additional description of how the proposed plan approval limits appropriately incorporate the startup/shutdown simulations in Renovo’s modeling analysis.

Response:

The worst-case modeled emission rates for startup and shutdown (SUSD) operation are based on information provided in Appendix B of the Renovo Energy Center, LLC’s (REC) “Refined Air Dispersion Modeling Report for Plant Reconfiguration” (February 27, 2020). These same tables are also provided in Appendix D of REC’s “Plan Approval Application” (December 27, 2019). The tables “Startup and Shutdown Operations Emissions Data” include a column with parameters based on the addition of a margin of 15-minutes for the SUSD operating scenarios. As noted in footnote 1 of these tables for this column, the margins would allow for operational flexibility in order to ensure that SUSD can be completed in the permitted length of time. The emissions per event were proportionally increased with the increase in event durations and those values were conservatively used in the modeling. The SUSD durations and emission limitations in the draft Plan Approval did not account for the 15-minute margin.

The DEP added a condition in the final Plan Approval to prohibit cold startups of the combustion turbines within one hour of each other when firing either natural gas or ultra-low sulfur diesel (ULSD) since these scenarios were not included in REC’s modeling for the 1-hour NO₂ National Ambient Air Quality Standards (NAAQS).

EPA Comment 2:

Seventeen sources were flagged by AERMOD for having stack exit velocities that were out of range in the 1-hour NO₂ and 24-hour PM-2.5 NAAQS simulations. Stack velocities for 3 modeled sources exceed 100 m/s. These were for stacks representing the Mountain Gathering LLC – Dry Run and the Columbia Gas – Renovo modeled sources. Flagged stack velocities taken from the AERMOD output file (.lst file) are summarized in the following table. Stack velocities above 100 m/s are outliers in the AERMOD flagged stacks. EPA suggests PA DEP or Renovo reexamine these stack velocities and ensure that they are reasonable representations of true stack exit velocities; these stack velocities may actually be in ft/sec.

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AERMOD Flagged Stack Velocity Summary

Renovo Energy Center: AERMOD Flagged Stack Velocities				
Stack ID	Source Name	Emission Rate (g/s)	Stack Velocity (m/s)	Stack Diameter (m)
BCH_CRK_1	NCL Natural Resources LLC - Beech Creek	0.1172	58.73	0.09
DRY_RUN_7	Mountain Gathering LLC - Dry Run	0.2457	113.66	0.30
FFROCK_5	Dominion Transmission, Inc. - Finnefrock	0.9173	51.72	0.30
LEIDY_4	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_5	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_6	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_10	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_11	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_12	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_13	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_14	Dominion Transmission, Inc. - Leidy	1.7237	51.66	0.40
LEIDY_15	Dominion Transmission, Inc. - Leidy	2.8337	67.15	0.52
LEIDY_16	Dominion Transmission, Inc. - Leidy	2.8337	67.15	0.52
LEIDY_17	Dominion Transmission, Inc. - Leidy	1.1100	67.15	0.52
CGRENOVO_7	Columbia Gas - Renovo	1.1075	121.01	0.15
CGRENOVO_8	Columbia Gas - Renovo	1.1075	121.01	0.15
TRACT678	NCL Natural Resources LLC - Tract 678	0.1159	58.73	0.09

Response:

The DEP determined that some of the nearby source parameters in AERMOD for the Mountain Gathering LLC – Dry Run and Columbia Gas – Renovo facilities were based on erroneous information. The DEP therefore revised the AERMOD input files for the 1-hour NO₂, 24-hour PM-2.5, and annual PM-2.5 NAAQS analyses to reflect the necessary corrections and re-ran AERMOD.

The table below lists the nearby source parameters in REC’s modeling that were corrected by the DEP.

Corrected Background Source Parameters in REC’s NAAQS Analyses

Facility	Source	Parameter	REC Original Value	DEP Corrected Value
Mountain Gathering LLC – Dry Run	DRY_RUN_7	Exit Velocity	113.65992 m/s	28.3464 m/s
Columbia Gas – Renovo	CGRENOVO_7 and CGRENOVO_8	Stack Height	4.2672 m	4.7244 m
		Exit Temperature	810.927778 K	779.816667 K
		Exit Velocity	121.0056 m/s	36.454 m/s

The following table lists the revised model output concentrations for the 1-hour NO₂, 24-hour PM-2.5, and annual PM-2.5 NAAQS analyses resulting from the DEP’s correction of the nearby source parameters. In the 1-hour NO₂ NAAQS analysis, the corrections resulted in the maximum predicted impacts to decrease by 0.00750 µg/m³ for the worst-case scenario and to decrease by 0.00038 µg/m³ for the design scenario. In the 24-hour PM-2.5 NAAQS analysis, the corrections did not affect the maximum predicted impacts for the worst-case and design

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scenarios. In the annual PM-2.5 NAAQS analysis, the corrections resulted in the maximum predicted impacts for both the worst-case and design scenarios to increase by 0.00020 $\mu\text{g}/\text{m}^3$.

Results of NAAQS Analyses with Corrected Background Source Parameters

Pollutant	Averaging Period	Maximum Predicted Impact ($\mu\text{g}/\text{m}^3$) – Worst-Case Scenario	Maximum Predicted Impact ($\mu\text{g}/\text{m}^3$) – Design Scenario	Ambient Background Concentration ($\mu\text{g}/\text{m}^3$)	Maximum Cumulative Ambient Impact ($\mu\text{g}/\text{m}^3$)	NAAQS ($\mu\text{g}/\text{m}^3$)
NO ₂	1-hour	167.98483	167.78835	18.8	186.78483	188
PM-2.5	24-hour	10.59221 ^a	10.59196 ^a	20.0	30.59221	35
PM-2.5	Annual	3.02267 ^b	2.98737 ^b	8.1	11.12267	12

^a Includes additional secondary formation concentration of 0.11 $\mu\text{g}/\text{m}^3$ for the 24-hour averaging period.

^b Includes additional secondary formation concentration of 0.0082 $\mu\text{g}/\text{m}^3$ for the annual averaging period.

The DEP notes that these modeling results differ from other modeling results which account for additional revisions to the modeling input data in response to another commenter's comments regarding good engineering practice (GEP) formula stack heights and monitored background concentrations.

The electronic data associated with the DEP's corrected NAAQS analyses are available upon request.

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FINAL DETERMINATION

Pursuant to 25 Pa Code Chapter 127, the comments submitted during the public comment period have been reviewed and are appropriately addressed in this document. The Department appreciates the many thoughtful comments, which covered a wide variety of aspects related to the proposed Renovo Energy Center project. The Department hopes the above information addresses the commenter's concerns. The Department appreciates the commenter's efforts in preserving and protecting our environment and the residents of our Commonwealth. It is the Department's determination that, after consideration of all comments received and revisions to the proposed Plan Approval, the available information indicates Renovo Energy Center's proposed construction of a natural gas-fired electric generation plant and associated control devices at the Renovo Energy Center Plant, located in the Borough of Renovo, Clinton County will meet the emission limitations and the conditions set forth in the Plan Approval and will comply with all applicable State and Federal air quality regulatory requirements. Therefore, the Department decided to issue the plan approval (No. 18-00033B) to Renovo Energy Center, LLC on **April 29, 2021**. The expiration date of the plan approval is **October 28, 2022**. The facility is required to demonstrate to the Department's satisfaction that emissions from the sources comply with all applicable Department Rules and Regulations and conform to the operational information stated in the application. Upon evaluation of the compliance information, the Department will subsequently issue an operating permit.

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