2 Penn Center, 1500 JFK Boulevard, Suite 1208
Philadelphia, Pennsylvania 19102
tel: 215 636-0600

July 2, 2021

Messrs. Vladimir Korolev and Yogesh Doshi
New Jersey Department of Environmental Protection
Division of Air Quality
Bureau of Air Permits
401 East State Street, 2nd Floor
P.O. Box 420, Mail Code 401-02
Trenton, NJ 08625-0420

VIA NJDEP Online

Subject: Passaic Valley Sewerage Commission (PVSC)
Facility ID: 07349
Title V Operating Permit Number: BOP 200003
Title V Operating Permit Significant Modification Application
for Proposed Standby Power Generation Facility

Dear Messrs. Smith and Doshi:

On behalf of the Passaic Valley Sewerage Commission (PVSC), CDM Smith Inc. (CDM Smith) is hereby submitting this Title V operating permit modification application to add a new Standby Power Generation Facility (SPGF) Facility at the PVSC Newark Bay Wastewater Treatment Plant (WWTP).

In October of 2012, PVSC was severely impacted by Superstorm Sandy. The 12-foot storm surge from adjacent Newark Bay inundated the facilities, flooding buildings, tunnels and process areas, destroying vehicles, equipment, and inventory stored on-site. The PVSC facility was rendered inoperable for several weeks. The New Jersey Department of Environmental Protection (NJDEP) identified the PVSC facility as a critical component of New Jersey's infrastructure and recommended that the facility be protected from similar events. Guidance issued by the NJDEP called for the protection of wastewater treatment plants as critical infrastructure to the 500-year or 0.2% annual chance storm event consistent with Presidential executive orders.

The proposed SPGF will provide power to operate the PVSC facility during disruption of the electrical power grid. In addition, a new floodwall will be constructed around the perimeter of the facility to protect critical facility infrastructure (currently part of a different project). These two mitigation measures together will protect the PVSC plant from storm surge from Newark Bay and the loss of the main and back-up utility power feeds to the main electrical distribution substation.

PVSC, through the New Jersey Office of Emergency Management, requested public assistance funding from the Department of Homeland Security, FEMA for these projects.

The SPGF is designed to support the entire WWTP electric load, allowing the plant to function upon loss of the utility electrical supply for up to two weeks. The facility's design net power generation capacity is 34 megawatts (MW). The SPGF is designed to operate in island mode, in that the SPGF will not export power to the utility electrical grid and the power generated on site will be consumed by the WWTP. To minimize disruption to the WWTP process, when utility electrical service is restored, the SPGF will parallel with the electrical utility service to seamlessly transfer the power source from the SPGF to the utility. Predicated on the Reliability and Resiliency requirement for critical equipment, the Facility is designed with an "N+1" configuration, meaning that the SPGF would run with two combustion turbine generators, and have a third on standby.

PVSC would install three (3) combustion turbine generators (CTGs) each with a maximum gross output of 28 MW. The CTGs would be fueled with natural gas as the only fuel and would exhaust into the air emissions control equipment ductwork and casing. The facility is designed as an indoor plant with the combustion turbine and emissions controls (consisting of a vertical casing with oxidation catalyst and selective catalytic reduction (SCR) catalyst in the hot gas path) located indoors. The SCR is designed to achieve a final NOx emission rate of 2.5 parts per million by volume, dry (ppmvd). The oxidation catalyst is designed to achieve a final CO emission rate of 3 ppmvd and VOC emission rate of 4 ppmvd.

The SPGF is designed to be capable of starting without support from the utility electric supply. To support black start of the turbine generator, PVSC would install two (2) 2,000-kW standby natural gas-fired generators (stationary combustion engines). The two black start generators (BSG) would be provided to meet the identified Reliability and Resiliency requirement of "N+1" configuration for critical equipment; only one would be needed to start the CTGs. In addition, PVSC is also proposing to install two 164-kW diesel fire pump engines.

On January 13, 2021, PVSC submitted a Title V Air Operating Permit significant modification application to add the proposed Standby Power Generation Facility. The January application included a requested non-emergency operating scenario, “PJM Peak Load Management” that would have allowed the SPGF to operate as a peaking or “peak shaving” power plant. On June 10, 2021, after discussions with community representatives and with the NJDEP, PVSC withdrew the January permit application in order to remove PJM Peak Load Management operating scenario. With this resubmitted application, PVSC is requesting that the SPGF operate only in emergencies (grid power failure), preparation for emergencies, and when requested to operate by the utility to prevent an impending grid failure (e.g. a brownout). This change results in an approximately 40 percent reduction in requested maximum potential annual operating hours for the SPGF - to 1,284 hours (total for all three CTGs) from the 2,100 hours proposed in the January 13, 2021 application.

The enclosed air permit application package includes:

1. Permit application text with the following sections:

    a. Section 1 - Introduction

    b. Section 2 - Community Engagement

    c. Section 3 - Greenhouse Gas Emissions and Alternative Technology Evaluation

    d. Section 4 – Regulatory Applicability

    e. Section 5 – Maximum Potential Emission Rates

    f. Section 6 – Health Risk Assessment

    g. Section 7: Permit Application Forms. A PDF of the air permit application submitted via NJDEP online completed using the NJDEP RADIUS application.

2. Appendices containing supporting documentation:

    a. Appendix A – Plot Plan

    b. Appendix B – Emission Rate Calculations

    c. Appendix C - Netting Analysis. As the netting analysis shows, the net increases in emissions do not trigger the emission offsets requirement (Subchapter 18 applicability) or PSD applicability.

    d. Appendix D - Vendor Provided Information

    e. Appendix E – Photovoltaic System Analysis

    f. Appendix F – National Renewable Energy Laboratory (NREL) Wind Maps

    g. Appendix G - Level 1 Health Risk Analysis Calculations

    h. Appendix H - Draft Air Quality Modeling Protocol

    i. Appendix I – Ironbound Community Corporation Public Information Session Meeting Notes

Due to the size of files, CDM Smith will arrange to send the modeling input and output files to NJDEP via Secured File Transfer (SFT) once the application is submitted on the NJDEP online.

Pursuant to N.J.A.C. 7:27-22.31(k), we understand that a permit application fee should not be submitted at this time. Rather, the NJDEP will forward an invoice to PVSC following the receipt of the application.

We believe that the enclosed information constitutes a complete permit application. If any questions arise or additional information is required during your review, please call Amit Sen at (215) 239-6542.

Sincerely,

Amit K. Sen
Project Engineer
CDM Smith Inc.

Enclosures
cc: Tom Laustsen, Chief Operating Officer (PVSC)
John Rotolo, Chief Engineer (PVSC)
Joe Frissora, Program Manager (AECOM+HDR JV)
Domenick Loschiavo, Project Manager (B&V)
Matthew Young, CDM Smith
Cynthia Hibbard, CDM Smith
Disha Shah, CDM Smith

CDM Smith
2 Penn Center, 1500 JFK Boulevard, Suite 1208
Philadelphia, Pennsylvania 19102
tel: 215 636-0600

July 2, 2021

Messrs. Vladimir Korolev and Yogesh Doshi VIA NJDEP Online
New Jersey Department of Environmental Protection
Division of Air Quality
Bureau of Air Permits
401 East State Street, 2nd Floor
P.O. Box 420, Mail Code 401-02
Trenton, NJ 08625-0420

Subject: Passaic Valley Sewerage Commission (PVSC)
Facility ID: 07349
Title V Operating Permit Number: BOP 200003
Title V Operating Permit Significant Modification Application
for Proposed Standby Power Generation Facility

Dear Messrs. Smith and Doshi:

On behalf of the Passaic Valley Sewerage Commission (PVSC), CDM Smith Inc. (CDM Smith) is hereby submitting this Title V operating permit modification application to add a new Standby Power Generation Facility (SPGF) Facility at the PVSC Newark Bay Wastewater Treatment Plant (WWTP).

In October of 2012, PVSC was severely impacted by Superstorm Sandy. The 12-foot storm surge from adjacent Newark Bay inundated the facilities, flooding buildings, tunnels and process areas, destroying vehicles, equipment, and inventory stored on-site. The PVSC facility was rendered inoperable for several weeks. The New Jersey Department of Environmental Protection (NJDEP) identified the PVSC facility as a critical component of New Jersey's infrastructure and recommended that the facility be protected from similar events. Guidance issued by the NJDEP called for the protection of wastewater treatment plants as critical infrastructure to the 500-year or 0.2% annual chance storm event consistent with Presidential executive orders.

The proposed SPGF will provide power to operate the PVSC facility during disruption of the electrical power grid. In addition, a new floodwall will be constructed around the perimeter of the facility to protect critical facility infrastructure (currently part of a different project). These two mitigation measures together will protect the PVSC plant from storm surge from Newark Bay and the loss of the main and back-up utility power feeds to the main electrical distribution substation.

PVSC, through the New Jersey Office of Emergency Management, requested public assistance funding from the Department of Homeland Security, FEMA for these projects.

The SPGF is designed to support the entire WWTP electric load, allowing the plant to function upon loss of the utility electrical supply for up to two weeks. The facility's design net power generation capacity is 34 megawatts (MW). The SPGF is designed to operate in island mode, in that the SPGF will not export power to the utility electrical grid and the power generated on site will be consumed by the WWTP. To minimize disruption to the WWTP process, when utility electrical service is restored, the SPGF will parallel with the electrical utility service to seamlessly transfer the power source from the SPGF to the utility. Predicated on the Reliability and Resiliency requirement for critical equipment, the Facility is designed with an "N+1" configuration, meaning that the SPGF would run with two combustion turbine generators, and have a third on standby.

PVSC would install three (3) combustion turbine generators (CTGs) each with a maximum gross output of 28 MW. The CTGs would be fueled with natural gas as the only fuel and would exhaust into the air emissions control equipment ductwork and casing. The facility is designed as an indoor plant with the combustion turbine and emissions controls (consisting of a vertical casing with oxidation catalyst and selective catalytic reduction (SCR) catalyst in the hot gas path) located indoors. The SCR is designed to achieve a final NOx emission rate of 2.5 parts per million by volume, dry (ppmvd). The oxidation catalyst is designed to achieve a final CO emission rate of 3 ppmvd and VOC emission rate of 4 ppmvd.

The SPGF is designed to be capable of starting without support from the utility electric supply. To support black start of the turbine generator, PVSC would install two (2) 2,000-kW standby natural gas-fired generators (stationary combustion engines). The two black start generators (BSG) would be provided to meet the identified Reliability and Resiliency requirement of "N+1" configuration for critical equipment; only one would be needed to start the CTGs. In addition, PVSC is also proposing to install two 164-kW diesel fire pump engines.

On January 13, 2021, PVSC submitted a Title V Air Operating Permit significant modification application to add the proposed Standby Power Generation Facility. The January application included a requested non-emergency operating scenario, “PJM Peak Load Management” that would have allowed the SPGF to operate as a peaking or “peak shaving” power plant. On June 10, 2021, after discussions with community representatives and with the NJDEP, PVSC withdrew the January permit application in order to remove PJM Peak Load Management operating scenario. With this resubmitted application, PVSC is requesting that the SPGF operate only in emergencies (grid power failure), preparation for emergencies, and when requested to operate by the utility to prevent an impending grid failure (e.g. a brownout). This change results in an approximately 40 percent reduction in requested maximum potential annual operating hours for the SPGF - to 1,284 hours (total for all three CTGs) from the 2,100 hours proposed in the January 13, 2021 application.

The enclosed air permit application package includes:

1. Permit application text with the following sections:

    a. Section 1 - Introduction

    b. Section 2 - Community Engagement

    c. Section 3 - Greenhouse Gas Emissions and Alternative Technology Evaluation

    d. Section 4 – Regulatory Applicability

    e. Section 5 – Maximum Potential Emission Rates

    f. Section 6 – Health Risk Assessment

    g. Section 7: Permit Application Forms. A PDF of the air permit application submitted via NJDEP online completed using the NJDEP RADIUS application.

2. Appendices containing supporting documentation:

    a. Appendix A – Plot Plan

    b. Appendix B – Emission Rate Calculations

    c. Appendix C - Netting Analysis. As the netting analysis shows, the net increases in emissions do not trigger the emission offsets requirement (Subchapter 18 applicability) or PSD applicability.

    d. Appendix D - Vendor Provided Information

    e. Appendix E – Photovoltaic System Analysis

    f. Appendix F – National Renewable Energy Laboratory (NREL) Wind Maps

    g. Appendix G - Level 1 Health Risk Analysis Calculations

    h. Appendix H - Draft Air Quality Modeling Protocol

    i. Appendix I – Ironbound Community Corporation Public Information Session Meeting Notes

Due to the size of files, CDM Smith will arrange to send the modeling input and output files to NJDEP via Secured File Transfer (SFT) once the application is submitted on the NJDEP online.

Pursuant to N.J.A.C. 7:27-22.31(k), we understand that a permit application fee should not be submitted at this time. Rather, the NJDEP will forward an invoice to PVSC following the receipt of the application.

We believe that the enclosed information constitutes a complete permit application. If any questions arise or additional information is required during your review, please call Amit Sen at (215) 239-6542.

Sincerely,

Amit K. Sen
Project Engineer
CDM Smith Inc.

Enclosures
cc: Tom Laustsen, Chief Operating Officer (PVSC)
John Rotolo, Chief Engineer (PVSC)
Joe Frissora, Program Manager (AECOM+HDR JV)
Domenick Loschiavo, Project Manager (B&V)
Matthew Young, CDM Smith
Cynthia Hibbard, CDM Smith
Disha Shah, CDM Smith

TITLE V AIR PERMIT APPLICATION

Passaic Valley Sewerage Commission (PVSC)

Title V Operating Permit No. BOP200003

Title V Operating Permit
Significant Modification Application
Proposed Standby Power Generation Facility

July 2021

Table of Contents

List of Figures

List of Tables

Appendices

This Page Left Intentionally Blank

Section 1

Introduction

1.1 Purpose

The Passaic Valley Sewerage Commission (PVSC) has prepared this air permit application to seek approval from the New Jersey Department of Environmental Projection (NDEP) for construction of a new Standby Power Generation Facility (SPGF) at the PVSC Facility, 600 Wilson Avenue, Newark, NJ.

PVSC provides wastewater treatment and biosolids management services for approximately 1.5 million residents, more than 5,000 commercial entities and 200 significant industrial users within its service area. PVSC's service area encompasses approximately 155 square miles and includes 48 municipalities in parts of Bergen, Essex, Hudson, Passaic and Union Counties. In addition, PVSC provides biosolids (sludge) management and Liquid Waste Acceptance services to municipal and industrial entities that transport sludge and wastes to the facility by truck or barge. PVSC's trucked-in wastes also include potable water sludge from New Jersey and New York. In total, the facility treats nearly 25% of the State of New Jersey's wastewater and biosolids and approximately 15% of the biosolids generated in New York City, a service population of over 3.4 million residents.

In October, 2012, PVSC was severely impacted by Superstorm Sandy. The 12-foot storm surge from adjacent Newark Bay inundated the facilities, flooding buildings, tunnels and process areas, destroying vehicles, equipment, and inventory stored on-site. Failure of the direct power connections to the Public Service Electric and Gas (PSE&G) grid caused the PVSC to lose control of their processes and dewatering capabilities. Damage to the facility was such that PVSC could not accept influent for several days. It is estimated that during the first four days following the Superstorm Sandy, approximately 840 million gallons of raw sewage was bypassed directly to the Passaic River and Newark Bay. When effluent pumps were brought back on-line on November 3, untreated sewage (with only a best effort at Primary disinfection) continued to be pumped to the outfall in New York Harbor for another 20 days. On November 23, 2012, enough of the PVSC's treatment systems had been re-activated for daily effluent quality to return to secondary treatment standards. Partial loss of secondary treatment function continued until July 2013.

The Federal Emergency Management Administration, Department of Homeland Security and the NJDEP identified the PVSC facility as a critical component of New Jersey's infrastructure and recommended that the facility be protected from similar events. Guidance issued by the NJDEP called for the protection of wastewater treatment plants as critical infrastructure to the 500-year or 0.2% annual chance storm event.

With assistance of New Jersey Office of Emergency Management (NJOEM), PVSC has procured federal funds to construct standby power generation at the site that would be able to satisfy the full electric load of the PVSC facility and enable continued, full operation in the event of another prolonged, widespread power outage, thus avoiding future water quality events when the next major storm and/or power outage occurs.

The SPGF project would significantly improve the power resiliency of PVSC and provide greater emergency environmental protection and reliability for the 3.4 million citizens it supports.

1.2 Executive Summary

The Passaic Valley Sewerage Commission (PVSC) has prepared this air permit application to seek approval from the New Jersey Department of Environmental Projection (NDEP) for construction of a new Standby Power Generation Facility (SPGF) at the PVSC Facility, 600 Wilson Avenue, Newark, NJ. The SPGF would operate only during emergencies, for exercising/maintenance of the CTGs, storm preparation, and when the reliability of the grid is threatened. The SPGF would include the following equipment:

- Three natural-gas-fired 28-MW-each[1] combustion turbine generators (CTGs). Only two would operate at a time. The exhaust of each CTG would be treated with a state-of-the-art (SOTA) air pollution equipment train consisting of an oxidation catalyst and selective catalytic reduction (SCR).
- Two 2-MW natural-gas-fired black start engine generators (BSGs). Only one would operate at a time to start the CTGs without utility electricity supply.
- Two 164-kW diesel fire pump engines. One would operate at a time to pump water for fire suppression if hydrant pressure is not available.
- One 10,000-gallon aqueous ammonia (19% ammonia solution) storage tank for the SCR air pollution control equipment.

This application is a modification to PVSC's Title V Air Operating Permit (NJDEP No. BOP 200003). The application is a consolidated preconstruction and operating permit application providing the following information required by both N.J.A.C. 7:27-22.24 and N.J.A.C. 7:27-8:

- NJDEP Application Forms. A hard copy of NJDEP's online RADIUS software completed application forms is provided in Section 7.
- Facility Plot Plan. Appendix A shows a facility layout and the location of the SPGF emission points.
- Maximum potential air emission rate calculations, and state-of-the-art air pollution control equipment analysis. See Section 5, and Appendices B, C and D.
- State and federal air rules applicability analysis. All proposed equipment would have emissions that would meet or be lower than applicable requirements. See Section 4.

[1] 34 MW is needed to run PVSC's wastewater treatment processes. The CTGs have been sized at 28 MW each so that two could meet the 34-MW demand, and so that they could do so under all conditions. A turbine's capacity to produce power drops sharply with higher temperatures. The CTGs have been selected to be able to produce at least 17 MW each at ambient temperatures of 99+ degrees F.

- Emissions netting analysis. This shows that the SPGF's net increases in in air emission rates would not trigger the emission offsets requirement (Subchapter 18 applicability). See Section 4.2 and Appendix C.

- Level 1 Risk Screening. The NJDEP Risk Screening Worksheet showed that further evaluation was required for CTG formaldehyde emissions. For the BSGs, further evaluation was required for formaldehyde and acrolein emissions. See Section 6.1 and Appendix H.

- Level 2 Refined Incremental Inhalation Health Risk Analysis. PVSC conducted refined dispersion modeling with actual hourly meteorological data (from Newark International Airport; provided by NJDEP) of formaldehyde and acrolein emissions from the CTGs and BSGs operating together. Modeled maximum ground-level concentrations (over five years of meteorological data) were found to be below all NJDEP incremental inhalation risk criteria. This was true at the point of highest concentrations (facility fence line) and at all nearby sensitive receptors (including the nearest Ironbound Community residences). The modeling must still be reviewed by the NJDEP, but these preliminary results indicate that the proposed SPGF would cause negligible incremental health risk to the community. See Section 6.2 and Appendix I.

PVSC has conducted additional evaluations at the request of the NJDEP to fulfill the objectives of the January 2020, New Jersey Energy Master Plan. Section 3 of this application contains a Greenhouse Gas (GHG) Emissions and Alternative Technology Evaluation. The analysis shows that the SPGF's maximum potential carbon-dioxide-equivalent (CO_2e) greenhouse gas emission rates would be lower than those from the Public Service Electric and Gas Company (PSE&G) regional utility grid for peak standby power production. This means that PVSC's removing its equipment from the electrical grid and providing its own power would provide a regional GHG and air quality benefit during peak demand periods when the reliability of the grid is threatened (e.g. a hot summer day). Section 3 also contains a renewable energy alternatives evaluation.

NJDEP has provided guidance for this air permit application, based on Executive Order No. 23, which was issued on April 20, 2018, for conducting community outreach about the proposed SPGF project. NJDEP suggested that (NJDEP pre-permitting meeting, March 5, 2020; NJDEP, email dated August 20, 2020; and NJDEP email dated December 2, 2020):

- PVSC submit this application to Ironbound Community Corporation (ICC) representatives for early consultation review before submitting it to the NJDEP Bureau of Stationary Sources.

- PVSC conduct a public information session with the Ironbound Community to present the proposed SPGF Project. This early consultation meeting would be in addition to the public hearing required for the draft Title V permit. A record of this meeting should be submitted with the air permit application.

- PVSC perform refined air dispersion modeling of SPGF toxic air pollutants requiring further evaluation after the Level 1 Risk Screening analysis. The NJDEP Bureau of Stationary Sources normally performs this Level 2 modeling after the air permit application is submitted (NJDEP Technical Manual 1003). However, in this case, NJDEP agreed that PVSC should prepare a draft protocol and conduct preliminary modeling (to be reviewed by NJDEP after the application is submitted) in order to provide information on possible public health stressors to the Ironbound Community.

A draft application was provided to ICC for review on December 14, 2020. Section 2 of this application discusses Community Engagement meetings and includes a record of the January 7, 2021, ICC public information session held for the draft air permit application. Four additional public outreach meetings have been planned. Section 6 of this application presents the preliminary Level 2 refined dispersion modeling and incremental inhalation health risk assessment.

1.3 Project Description

The proposed SPGF would provide power to operate the PVSC facility during disruption of the electrical power grid. PVSC would not sell power to the grid. A new floodwall would be constructed around the perimeter of the facility to protect critical facility infrastructure. These two mitigation measures together will protect the PVSC plant from storm surge from Newark Bay and the loss of the main and back-up utility power feeds to the main electrical distribution substation. PVSC, through the New Jersey Office of Emergency Management, requested public assistance funding from the Department of Homeland Security, Federal Emergency Management Agency (FEMA) for these projects.

The SPGF is designed to support the entire WWTP electric load, allowing the plant to function upon loss of the utility electrical supply. The facility's design net power generation capacity is 34 MW. This would meet PVSC’s full load power demand after the new flood mitigation measures being implemented under the FEMA Resiliency Program are operational. The SPGF is designed to operate in island mode, meaning that the SPGF would not export power to the utility electrical grid and the power generated on site will be consumed by the WWTP. To minimize disruption to the WWTP process, when utility electrical service is restored, the SPGF would parallel with the electrical utility service to seamlessly transfer the power source from the SPGF to the utility. PVSC’s Reliability and Resiliency requirement for critical equipment specifies that the SPGF be designed with an "N+1" configuration. This means that two CTGs would operate in an emergency to supply the WWTP full power demand, while the third unit (the “+1” or backup unit) would be available in case one of the other two units is down for repairs or has been damaged during the emergency.

The CTGs have been sized so that two could meet the 34-MW demand under any conditions. A turbine’s capacity to produce power drops sharply at higher temperatures. The CTGs have been selected to be able to produce at least 17 MW (net) each at ambient temperatures of 99+ degrees Fahrenheit. The resulting design is for three CTGs, each with a maximum gross output of 28 MW. For this application, the maximum gross CTG output of 28 MW each has been used in all emission rate calculations and modeling. The CTGs would be fueled with natural gas as the only fuel and would exhaust into the air emissions control equipment ductwork and casing. The facility is designed as an indoor plant with the combustion turbine and emissions controls (consisting of a vertical casing with oxidation catalyst and selective catalytic reduction (SCR) catalyst in the hot gas path) located indoors.

The SPGF is designed to be capable of starting without support from the utility electric supply. To support black-start of the turbine generator, PVSC would install two 2-MW standby natural gas-fired generators (stationary combustion engines). These two black-start generators (BSGs) would be provided to meet the Reliability and Resiliency requirement of "N+1" configuration for critical equipment (one unit to start the turbine generators, and a backup unit in case the first is not operational). Two 164-kW diesel fire pump engines would also be provided, with one operating to pump water for fire suppression. The SPGF project would significantly improve the resiliency of PVSC.

1.4 Emergency Operation

According to N.J.A.C. 7:27-22.1., “Emergency” means “any situation that arises from sudden and reasonably unforeseeable events beyond the control of an owner or operator of a facility, such as an unforeseen system capacity shortage caused by an act of God, that requires immediate corrective action to prevent system collapse or to restore normal operations at the facility.”

An “emergency generator” may operate in the emergency mode in the situations listed below (N.J.A.C. 7:27-19.1), and only to provide mechanical or thermal energy, or electrical power when the primary source of energy is unavailable. The three CTGs, two BSGs, and two emergency fire pump engines would all be considered “emergency generators.” The air permit would contain no restrictions on the number of hours this equipment could operate during an emergency.

- When there is a power outage or the facility’s primary source of mechanical or thermal energy fails because of an emergency;
- When the power disruption results from construction, repair, or maintenance activity at the facility - limited to 30 days in any calendar year; or
- When there is a voltage reduction issued by the Pennsylvania Jersey Maryland (PJM) Interconnection[2] and posted on the PJM internet website (www.pjm.com) under the “Emergency Procedures” menu. This would be in anticipation of an imminent grid failure, and happens rarely.

1.5 Non-Emergency Operating Scenarios

Non-emergency operation of the SPGF would occur for manufacturer-recommended routine readiness testing and maintenance, not to exceed 100 hours per year for each CTG, BSG and fire pump engine.

In addition, PVSC is seeking approval to enter into an agreement with PJM to operate the CTGs in a Demand Response program. For Demand Response PVSC would receive an electricity price reduction in exchange for disconnecting from the grid when called to do so by PJM or PSE&G. PVSC also requests permission to start the SPGF in advance of major storms. This Storm Preparation Mode would support a seamless transition in the event of storm-caused utility power failure. These operating scenarios are described in more detail, below.

[2] PJM Interconnection is the regional electricity transmission organization that coordinates the movement of wholesale electricity in New Jersey and 12 other nearby states.

For this application, it is assumed that each CTG would not exceed 592 hours/year (facility operating hours). In addition, all three CTGs together would be limited to 1,284 hours/year (machine operating hours) for all proposed non-emergency operating scenarios combined. In this operating structure, any one of the three turbines could operate up to 592 hours/year; however, the combined operating hours for all three turbines would not exceed 1,284 hours/year.

Each CTG would be permitted to operate for 100 hours/year for maintenance and testing (included within the permitted 1,284 total operating hours). The non-emergency operation of the CTGs would be in one of the operating scenarios described below. These operating scenarios and the maximum hours of operation per year are also provided in the RADIUS permit application (Section 7).

Black-start generators allow the CTGs to be started up when the grid is down, which is an emergency operation. The non-emergency operation of the black-start generators would be limited to 100 hours per year per generator for readiness testing and maintenance. Therefore, the maximum potential non-emergency operation would not exceed 100 hours per year per unit, or 200 hours per year total for the two BSGs.

Table 1-1 shows the breakdown of operating hours for the CTGs. In addition, the non-emergency operating hours for the CTGs are described in the sections below.

Table 1-1 CTG Operating Scenarios and Proposed Non-Emergency Annual Hours of Operation

	Maximum Potential Non-Emergency Operating Hours for One CTG	
Scenario	Revised (Hours/Year)	Basis
Readiness Testing and Maintenance		
Startup	5.0	12 startups/year at 25 minutes each.
Shutdown	2.0	12 shutdowns/year at 10 minutes each.
Steady State	93.0	Testing/maintenance would be conducted once/month, 12 times/year. Each run would take about 6 hours. Value revised to be calculated as difference between 100 hours/year and 7 hours/year for startup/shutdown.
Subtotal	**100**	
PJM Demand Response		
PJM Called Event	10	Estimated at one called event per year and 10 hours/event.
PJM Performance Tests	2	Up to two 1-hour performance tests per year could be required by PJM.
Startup	1.25	3 startups/year at 25 minutes each.
Shutdown	0.5	3 shutdowns/year at 10 minutes each.
Steady State	10.25	Difference between 12 hours/year and time needed for startup and shutdown.
Subtotal	**12**	
Storm Preparation Mode		
Startup	4.17	10 startups/year at 25 minutes each.
Shutdown	1.67	10 shutdowns/year at 10 minutes each.
Steady State	474.2	Difference between 480 hours/year and time needed for startup and shutdown.
Subtotal	**480**	SPGF would be started 48 hours in advance of up to 10 storms per year.
Grand Total	**592**	

Operating Hours		
Facility Total	**One CTG**	**Three CTGs**
Steady State	577.42	1247.83
Startup	10.42	25.83
Shutdown	4.17	10.33
Total	**592.00**	**1284.00**

1.5.1 Readiness (Normal) Testing and Maintenance

The maximum operating hours for readiness (normal) testing and maintenance would be limited to 100 hours per year per CTG. Normal testing and maintenance cannot take place on days when

CDM Smith

the Department forecasts air quality anywhere in New Jersey to be "unhealthy for sensitive groups," "unhealthy," or "very unhealthy" as defined in the EPA's Air Quality Index. (N.J.A.C. 7:27.19.2(d))

1.5.2 PJM Demand Response

Demand Response is a PJM program in which requests are made by PJM to end-use customers to reduce the customer's electricity load when the reliability of the grid is threatened. The customers receive payments from PJM members called Curtailment Service Providers. PVSC currently participates in the demand response program. Continued participation in the program will increase reliability of the grid and increase resiliency of PVSC's operation. The most recent PJM called "event" was over five years ago. For the purposes of estimating worst-case emission rates, it is assumed that up to one "event" would be called per year, and last for up to 10 hours. PJM currently requires only one (1) one-hour performance test per year if no actual "events" are called. However, up to two (2) one-hour tests per year may be required by PJM in the future to cover each of the summer and winter demand response enrollment periods.

PVSC would disconnect from the grid, and produce only enough power to support its own operations. No power would be exported or sold to the grid. This would provide benefit to the grid, reduce aggregate regional air emissions, reduce PVSC's electricity costs and pass the electricity cost savings to PVSC rate payers.

1.5.3 Storm Preparation

When there is a potential severe weather event that could impact PVSC operations, PVSC's Director of Security & Safety sends out an email alert and instructions for staff and operators to prepare for the event. The goal is to send the email out at least a day before the potential storm. Appendix B shows that these alerts have been sent from the same day to nine days ahead of storm events with about two and a half days ahead on average. If the SPGF were constructed and operational, the action items would include starting the facility at least 24 hours in advance of the weather event, and up to 48 hours in advance if possible. Because of uncertainty in storm tracks and severity, and the necessity of achieving steady state operation and completing tests on possible points of failure in "island mode," PVSC requests permission to start up to 48 hours in advance of a predicted severe storm.

The Federal Emergency Management Administration, Department of Homeland Security and the NJDEP have identified the PVSC facility as a critical component of New Jersey's infrastructure and recommended that the facility be protected from future storm events that could cause the release of untreated or partially treated sewage to the Passaic River and Newark Bay. In order to ensure seamless operation of PVSC's processes during a power failure, PVSC would start up the SPGF ahead of an expected power failure and seamlessly transfer the electrical load from the Utility to the SPGF where the SPGF would operate in "islanding mode."

Starting up the SPGF itself would take less than a half-hour. Connecting the SPGF to the facility's electrical systems would take few hours. If, however, the impending storm produces power fluctuations at the Utility, or if a sudden voltage variation occurs as equipment is being switched over to the SPGF, the power surge can damage equipment or take equipment offline. The most vulnerable operations are the Zimpro Sludge Stabilization Units and the Oxygen Production Facility.

The Zimpro Sludge Stabilization Units use high-pressure air and steam injection in reactors to oxidize and thicken the sludge. The time needed to start the sludge processing facilities is due to "cold start" of the reactors. To do a cold start, each reactor needs to be filled and then heated up via the boilers to get it up to the minimum temperature of 390°F before sludge processing can begin. PVSC typically needs eight reactors to process sludge and not all eight can be brought online at the same time.

The Oxygen Production Facility produces 500 tons per day of 95 percent pure oxygen to support the aerobic bacteria secondary treatment process and is considered the "lungs" of the Newark Bay WWTP. Creation of high-purity oxygen is driven by an 8000-horsepower electric compressor. If the compressor were to unexpectedly shut down due to a voltage spike, it could take a minimum of two days to restart the oxygen generation system.

PVSC needs enough time before the storm arrives to make sure the electrical switchover occurs smoothly for this critical equipment and to allow enough time to recover if not. For this reason, PVSC requests up to 48 hours in advance of a storm to start up the SPGF, make the switchover connections deliberately, and achieve reliable steady-state operation of the entire facility in "island mode" with enough time to address a possible failure of the supporting treatment systems before the storm arrives.

PVSC's Director of Security & Safety monitors the weather news, National Weather Service information, and calls the New Jersey State Police Regional Operations & Intelligence Center (NJ ROIC) to check on what they are recommending for emergency preparedness before making the decision to send the email alert. (https://www.njsp.org/division/investigations/njroic.shtml) PVSC has nine years of records of when the Director of Security & Safety sent out this notification. These are listed in Appendix B. The year 2020 was the worst year, with six storm alerts. Appendix B shows a generally increasing trend in the frequency of storm alerts.

Appendix B shows that if storm frequency continues to increase at the same rate as in the last nine years, then one would expect approximately 10 storm alerts per year at PVSC by the year 2030. (The life of SPGF equipment is expected to be 20 years or more.) On this basis, PVSC requests that each of two CTGs be permitted to operate for up to 480 hours/year (48 hours in advance of up to 10 storms/year) for Storm Anticipation Mode.

1.5.4 Startup and Shutdown

During CTG startup and shutdown, emission rates would be higher than during steady-state operation. NJDEP issued guidance (https://www.state.nj.us/dep/aqpp/permitguide/SSM.pdf) on August 9, 2018, requiring that startup and shutdown emissions be included as a separate operating scenario in permit applications. The guidance states that emission rates must be in compliance with Reasonably Available Control Technology (RACT) rules, and that startup and shutdown emissions must be included in calculations of annual emission rates in tons per year. Additionally, NJDEP requested[3] for this application that CTG startup and shutdown emissions

[3] NJDEP, telephone conversation, April 9, 2020.

should be considered both for RACT compliance (Section 4.1.1.1., below) and for the Health Risk Assessment (Section 6, below).

1.5.3.1 Startup

Non-emergency startups would occur for readiness testing and maintenance – once per month or 12 times per year for each of the three CTGs. Non-emergency startups would also occur for Demand Response, described above – up to 3 startups per year for each of two CTGs. In addition, up to 10 startups per year for each of two CTGs would occur for Storm Preparation Mode. Each CTG startup is designed to be 10 minutes or less due to the project's emergency response purpose. However, in the worst case, it could take up to 25 minutes from a cold condition to achieve steady state operation. Therefore, 25 minutes per startup was used for emission rate calculations. The emission rates are shown in Appendix B.

1.5.3.2 Shutdown

This operating scenario accounts for the increased emissions that occur as each CTG is transitioned from steady state operation to shutdown. The maximum number of non-emergency shutdowns per year would be the same as for the Startup Scenario – 12 times per year for each of three CTGs for testing/maintenance, 3 times per year for each of two CTGs for Demand Response, and 10 times per year for each of two CTGs for Storm Preparation Mode. It is assumed that each CTG shutdown could take up to 10 minutes. The emission rates are shown in Appendix B.

This Page Left Intentionally Blank

Section 2

Community Engagement

PVSC submitted a draft of this Title V Operating Permit Modification Application to Ironbound Community Corporation (ICC) representatives for review on December 14, 2020. PVSC conducted a public information session with ICC on January 7, 2021. A record of the meeting is in Appendix I of this Application. Appendix I summarizes all of the ICC comments and input received on this Application, and provides responses. Some changes were made to this Application in response to ICC comments. These are indicated in Appendix I. Four additional public outreach meetings have been planned.

Previously, PVSC held the meetings listed below with the ICC to discuss the proposed resiliency projects, including the Standby Power Generation Facility (SPGF), after the October 29, 2012, Superstorm Sandy event. Other attendees included, but were not limited to, community members and the New Jersey River and Bay Keepers Association.

- November 19, 2012 (at PVSC)
- December 19, 2013 (at PVSC)
- September 29, 2015 (at PVSC)
- December 15, 2015 (at PVSC)
- March 31, 2016 (at the Ironbound Community School)

Two additional meetings were scheduled at PVSC – on June 27, 2017, and June 28, 2018 – but were not attended by the invited community members or organizations.

The following questions and concerns were raised by community members about the resiliency projects, including the SPGF:

1. Construction truck traffic and its effects on the local streets and community.

   Construction vehicles delivering materials and concrete would primarily travel to the PVSC facility directly from the New Jersey Turnpike via Port Street and/or Doremus Avenue. The City of Newark reviews and permits truck travel along designated city streets. PVSC would work with the City of Newark to identify construction traffic routes that would minimize impact to the community.

2. Air quality concerns when the SPGF is tested and exercised.

   PVSC has agreed to provide ICC: (1) advance notice of when PVSC performs required tests of the power generating facility, and (2) After Action Reports containing the results of all such testing.

In addition, FEMA prepared the Passaic Valley Sewerage Commission Floodwall and On-Site Power System Environmental Assessment (EA) in May 2014. Public comments were accepted on the EA in June and July of 2014. The ICC submitted comments expressing concern about air quality impacts from operation of the SPGF. The comments included the following requests:

- that the project include best available control technology (especially for NOx emissions) for the SPGF;
- that the use of sustainable energy sources as backup power supplies be evaluated;
- that existing facility emissions (especially emissions of PM_{10} and $PM_{2.5}$) be reported;
- that SPGF emissions be mitigated to the maximum extent;
- that the standby power generation not come from diesel engines;
- a community air quality impact evaluation;
- that the NJDEP conduct a comprehensive facility-wide risk assessment that includes all equipment emitting hazardous air pollutants (HAPs) at the PVSC facility.

Maximum mitigation of air emissions, best available control technology and NJDEP State-of-the-Art (SOTA) control technology for the CTGs are discussed in Section 5.2, below. An evaluation of sustainable energy sources for the SPGF is presented in Section 3. Note that none of the proposed standby power generation would come from diesel engines – the CTGs and BSGs would be natural-gas-fired. The project would include two small (164 kW) diesel emergency fire pump engines that would not produce electrical power. PVSC total facility emission rates are shown in Section 4, Table 4-1, before and after the proposed SPGF project. Air dispersion modeling of toxic air pollutants, including assessment of inhalation health risk to the community, has been conducted; see Section 6.

Section 3

Greenhouse Gas Emissions and Alternative Technology Evaluation

3.0 Introduction

In January 2020, Governor Murphy released the state's Energy Master Plan, which lays out the state's approach to reach the Administration's goal of 100 percent clean energy by 2050. The state Energy Master Plan identifies seven key strategies with an implementation plan for each. Of these seven, the following four strategies are relevant for the proposed Standby Power Generation Project:

- **Strategy 2: Accelerating Deployment of Renewable Energy and Distributed Energy Resources** by developing offshore wind, community solar, a successor solar incentive program, solar thermal, and energy storage.
- **Strategy 3: Maximizing Energy Efficiency and Conservation, and Reducing Peak Demand**, including enacting 0.75 percent and 2 percent utility energy efficiency standards for natural gas and electricity, respectively, and improving energy efficiency programs in New Jersey.
- **Strategy 5: Decarbonizing and Modernizing New Jersey's Energy System** through planning and establishment of Integrated Distribution Plans, investing in grid technology to enable increased communication, sophisticated rate design, and reducing our reliance on natural gas.
- **Strategy 6: Supporting Community Energy Planning and Action in Underserved Communities** through incentivizing local, clean power generation, prioritizing clean transportation options in these communities, and supporting municipalities in establishing community energy plans.

This Greenhouse Gas Analysis section has been prepared to evaluate the proposed Standby Power Generation Project with respect to these Energy Master Plan strategies, because the proposed CTGs would be fired with natural gas. The NJDEP has commented[4] that PVSC should consider alternatives to the construction of a new 34-MW fossil-fuel-fired power plant, as well as options to maximize the energy efficiency of the plant.

The analysis has been organized into the following sections:

- Section 3.1 Greenhouse Gas (GHG) Emissions. This section presents the Project's maximum potential carbon-dioxide-equivalent emission rates and compares them with the PSE&G

[4] NJDEP Division of Air Quality Stationary Sources, Meeting to Review Approach for Title V Modification Application for the Standby Power Generation Facility, March 5, 2020, and follow-up phone conversations.

regional utility grid greenhouse gas emission rates for peak standby power production. (Strategy 3 – Reducing Peak Demand).

- Section 3.2 Renewable Energy Alternatives Evaluation (Strategies 2, 5 and 6 – Renewable Energy, Reducing Reliance on Natural Gas, Incentivizing Local Clean Power Generation)
- Section 3.3 Energy Efficiency (Strategy 3 – Energy Efficiency Programs)

3.1 Greenhouse Gas (GHG) Emissions

PVSC is proposing to install three Siemens Model SGT-600 combustion turbine generators (CTGs) that would fire natural gas. Although natural gas has less carbon per million British Thermal Unit (MMBtu) of fuel heat content than does oil or coal, it is a fossil fuel, and the proposed SPGF would emit greenhouse gases.

Table 3-1, below, shows calculated projected worst-case GHG emission rates for the three Non-Emergency Operating Scenarios described in Section 1.3. The maximum potential emission rate is based on the assumption that in no case would the SPGF as a whole operate for non-emergency purposes for more than 592 hours/year. Within these 592 facility hours, it is assumed that no more than two CTGs would operate at a time, and the third backup CTG would be operated for up to 100 hours for readiness testing and maintenance. Therefore, the total maximum potential CTG machine operating hours would be up to 1,284 per year.

Table 3-1 Maximum Potential Greenhouse Gas Emission Rates for the SPGF Facility

Case	Emission Factor [2] (lb CO2e/MWh)	GHG Emission Rates (tons CO2e/year) Max Potential
Standby Power Generation Facility (SPGF)	1,317	23,700
Pennsylvania Jersey Maryland (PJM) Interconnection Power Pool [1]	1,647	29,600

Notes:
[1] PJM is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia.
[2] SPGF emission factor is based on the EPA Mandatory Greenhouse Gas Reporting Rule (40 CFR Part 98) for natural gas combustion; see calculations in Appendix B of this application. PJM grid emission factor is from U.S. EPA, Emissions & Generation Resource Integrated Database, eGRID2019, released February 23, 2021. Available at https://www.epa.gov/egrid . Non-baseload output emission rates (for peaking power plants on the grid) were selected. Emission rates for five eGRID subregions were used to represent the PJM RTO service area, as shown in Appendix B.

Table 3-1 shows that although the proposed SPGF would be a new source of GHG emissions, it would provide a net benefit in displacing higher-emitting peak power generation on the PJM grid. The SPGF is proposed to operate only during emergencies, for exercising/maintenance of the CTGs, for storm preparation and during peak periods when the reliability of the grid is threatened, when the most polluting power plants tend to be brought on-line. For example, the PJM utility grid peaking power plants emit 1,647 pounds of carbon-dioxide-equivalent (CO_2e) GHG per megawatt (MW) for each hour they operate. The proposed SPGF would emit 1,317 pounds of CO_2e GHG per MW for each hour it operates. Therefore, disconnecting the PVSC facility from the grid and reducing utility power demand during peak periods of impending grid instability could also reduce regional GHG emissions by a net 330 lb CO_2e/MWh. Although the SPGF would not be consistent with Strategy 5 of the Energy Master Plan, it would be consistent with Strategy 3.

3.2 Renewable Energy Alternatives Evaluation

3.2.1 Energy Storage – Batteries

The PVSC Wastewater Treatment Plant historical average and maximum electrical power demand is 23 megawatts (MW) and 28 MW, respectively. The current planned power consumption is 34 MW to accommodate new flood mitigation measures being implemented under the FEMA Resiliency Program. The proposed SPGF and its auxiliary components are being designed for an electrical utility outage lasting 14 continuous days. Therefore, the SPGF must provide 34 MW times 336 hours, or 11,424 megawatt-hours (MWh) of electricity.

The highest capacity platform-style battery storage system available is the Samsung SDI 22S Module. This Module, which fits in an ISO Standard Container (40ft (L) x 8ft (W) x 8.5ft (H)), has a storage capacity of 6 MWh. A total of 1,904 units of the 22S Module would be required to meet the project's power requirements. Each 6-MWh unit has a footprint of 320 square feet (40 feet long by 8 feet wide). About 14 acres of land would be required to arrange these units side by side and end to end. The area allotted for the SPGF is 1.5 acres. The only other available free space on the PVSC property totals 7 acres. If the units were stacked vertically on the 1.5-acre SPGF site (and allowing for access between the towers and space for structural support), the overall height of this arrangement would be more than 200 feet above grade. This arrangement is not physically possible, as well as likely not permissible at this location, which is only 1.5 miles from Newark International Airport. Therefore, battery storage is considered a technically infeasible option for the SPGF.

3.2.2 Solar Power

PVSC conducted a plant-wide solar feasibility study March 2012 completed by DLB Associates. The purpose of the study was to determine feasibility of developing an emission-free energy source by installing photovoltaic (PV) solar systems, reducing the demand on local utility, and providing financial benefit by offsetting electricity costs. The analysis included investigating ownership options of PVSC-owned and -operated PV systems, and various power purchase agreement (PPA) provider owned and operated PV systems. Since 2012, the potential to generate more electricity from the same size units has increased. As a result, the figures from the 2012 report have been updated in Appendix F to reflect changes in estimated system size, and output. These results are summarized and compared to annual PVSC energy consumption in Table 3-2. The Table shows that the PV system's total maximum gross power output would be 10,629 kW, or 10.6 MW. This is what the panels could produce on a sunny day. This is only 31 percent of the 34 MW needed to run PVSC's equipment in an emergency. Furthermore, a PV system cannot be solely relied upon as a standby power source during cloudy and rainy days. As a result, the PV systems are only recommended to be used with full battery backup of a facility as discussed in Section 3.2.1. However, battery storage is considered a technically infeasible option for the SPGF.

Therefore, solar power is technically infeasible because it is not possible to provide 34 MW and it is not possible to provide the necessary battery storage.

Table 3-2 Solar Power Installation Location and Percent of Annual PVSC Consumption

Surveyed		Feasible Locations For Solar PV Installation			
Mounting Type[1]	Total Quantity of PV Panels	Quantity of Panels	Gross Power [kW]	Potential Annual Generation [MWh]	Percent of Annual PVSC Consumption [%]
Roof	38	21	859	1,117	0.6
Ground	31	23	8,565	11,323	6.5
Canopy (Parking Lots)	19	15	1,205	1,593	0.9
Total	88	59	10,629	14,033	8.1

Note: 1) PVSC has previously studied installing solar panel covers on the primary and the final settling tanks and determined it would not be practical due to the need to access the tanks for maintenance.

3.2.2 Wind Power

The wind power energy generation potential of the PVSC site was evaluated. The NREL Wind Maps attached in Appendix G show that the site of PVSC has an annual average wind speed of 5.5m/s at 80m (~260'). The National Renewable Energy Laboratory (NREL) notes that, "areas with annual average wind speeds around 6.5m/s and greater are generally considered to have a resource suitable for wind development." Additional challenges include: height restrictions based on proximity to Newark International Airport (EWR), footprint required for 34MW of wind turbines, and reliability of wind flow. The FAA requires wind turbines over 60 meters (200 feet) in height to be analyzed by the FAA for impact on surrounding airspace. Furthermore, the NREL map attached in Appendix G shows that the location of PVSC is excluded from installation of wind turbines at 110 meters (360 feet). This would exclude most utility scale (>1MW) wind turbines as a potential solution and using thousands of smaller wind turbines is not feasible due to the size of the system required to be built. Therefore, wind is only recommended to be used with full battery backup of a facility as discussed in Section 3.2.1. However, battery storage is considered a technically infeasible option for the SPGF. Therefore, wind power is technically infeasible, because it is not possible to provide 34 MW and it is not possible to provide the necessary battery storage.

3.3 Energy Efficiency

The purpose of the SPGF project is to provide reliable standby power generation to support the WWTP's range of electrical power demand as quickly as possible from the time utility electrical power is lost. The planned 34-MW power consumption is designed to be fully available from the CTGs within 10 minutes upon loss of electrical utility power. The worst-case startup time would be 25 minutes for a cold start condition.

The SPGF is arranged in an N+1 simple cycle configuration and is based on the selected Siemens "SGT-600" CTG. At International Standards Organization (ISO) conditions, the SGT-600 machine can produce 25.3 MW power at a gross efficiency of 34.6%. The SGT-600 gross efficiency is typical for the industrial gas turbine market, which spans the power output range of 5 to 100 MW. Alternatively, GE's proposed machine for the SPGF, the "LM2500DLE" CTG, has a gross efficiency of 35.9% but only produces 22.7 MW at the same ISO conditions compared to the 25.3 MW of the project's selected combustion turbine.

Combined cycle power generating facilities have approximately 50% gross efficiencies depending on the CTG and matched heat recovery steam generator (HRSG) and steam turbine generator (STG). Even though they can achieve higher efficiencies compared to simple cycle plants, combined cycle power plants have longer startup durations and are not well suited to meet the response time to restore power for the WWTP. Combined cycle facilities are restricted by the HRSG and STG in that the large thermal imbalance between the CTG exhaust and cold state of the HRSG and STG requires the CTG to be loaded slowly and gradually. This procedure is required to prevent damage to the STG and auxiliary equipment from thermal shock. The typical startup duration to reach full load is three hours and is significantly longer than the project's requirement for a timely restoration of power.

Combined Heat and Power (CHP) plants, which lack the STG component of combined cycle plants, have lower efficiencies than simple cycle plants due to additional CTG backpressure created by the heat recovery steam generator. Therefore, CHP was not considered a viable solution for the SPGF.

Therefore, neither combined cycle nor CHP are considered technically feasible options for the SPGF.

3.4 Conclusion

The state Energy Master Plan contains strategies to achieve 100 percent clean energy by 2050. Although the proposed SPGF would be a new source of GHG emissions, it would provide a net benefit in displacing higher-emitting peak power generation on the PJM grid. The SPGF would operate only during emergencies, for exercising/maintenance of the CTGs, storm preparation, and peak periods when the reliability of the grid is threatened, when the most polluting power plants tend to be brought on-line. Therefore, although the SPGF would not be consistent with Strategies 2, 5 and 6 of the Energy Master Plan to support clean energy and reduce reliance on natural gas, it would be consistent with Strategy 3 to reduce peak power demand and reduce GHG emissions from the grid. The SPGF would also be consistent with NJDEP's NJ Protecting Against Climate Threats ("PACT") policy.[5] The SPGF, as part of the FEMA resiliency program, fulfills a goal of NJ PACT to ". . . adapt to unavoidable impacts, such as sea-level rise, extreme weather, and chronic flooding." The SPGF would meet NJ PACT's other goal to reduce greenhouse gas emissions by displacing higher emitting sources on the grid.

The analysis shows that use of battery storage, solar or wind power instead of natural-gas-fired turbine generators are all currently technically infeasible. None of them could meet the primary purpose of the FEMA resiliency program to produce 34 MW for an electrical utility outage lasting 14 continuous days, necessary to protect the community from raw sewage flows during another Superstorm-Sandy-like event.

---

[5] NJ PACT policy is available at: https://www.nj.gov/dep/njpact/

This Page Left Intentionally Blank

Section 4

Regulatory Applicability

4.1 Title V Air Operating Permit Significant Modification

The SPGF is subject to the air quality regulations of the U.S. Environmental Protection Agency (U.S. EPA) and the NJDEP. The Facility currently operates under a Title V Air Operating Permit (Permit No. BOP 200003). The construction of the proposed SPGF would require a modification to facility's current Title V Air Operating Permit. The permit modification is a "significant modification" under N.J.A.C 7:27-22.24, because the CTGs, BSGs, and fire pump engines are subject to Federal New Source Performance Standards (NSPS) in 40 CFR 60.

4.1.1 Air Emission Sources

PVSC is proposing to install three (3) combustion turbine generators (CTGs) each with a maximum gross output of 28 MW. Only two of these would operate at a time. The CTGs would be fueled with natural gas as the only fuel and would include emissions controls consisting of oxidation catalyst and selective catalytic reduction (SCR). To support black-start of the turbine generator, PVSC is proposing to install two (2) 2,000 kW standby natural gas-fired generators (stationary combustion engines). Only one of these would operate at a time. The project would also include two (2) 164-kW diesel fire pump engines[6]. Only one would operate at a time. A facility plot plan is provided in Appendix A, which shows the location of these units and their exhaust stacks.

Table 4-1 presents the Major Stationary Source applicability thresholds and the Facility's potential to emit after the addition of the SPGF. The facility is currently a major source for carbon monoxide (CO), nitrogen oxides (NOx) and volatile organic compounds (VOC), and will remain so after the addition of the SPGF. Details of the potential to emit calculations are available in Section 5 and Appendix B.

Table 4-1 Summary of Estimated Potential Emissions in Tons per Year

Pollutant	Existing Facility Potential to Emit (tons/year)	Proposed SPGF Potential to Emit (tons/year)	Facility Potential to Emit after the SPGF's Maximum Potential to Emit Addition (tons/year)	Title V/Major Stationary Source Applicability Threshold (tons/year)
Carbon Monoxide (CO)	103.5	4.37	107.9	100
Nitrogen Oxides (NOx)	72.0	2.27	74.3	25
Particulate Matter (PM_{10})	14.8	2.86	17.7	100
Sulfur Dioxide (SO_2)	24.9	0.69	25.6	100

[6] The final selection of the fire pump engines has not yet been made. The largest candidate engine is a Clarke Model JU6H-UFADP8 164-kW engine. Two others are under consideration, both Clarke engines, rated at 147 kW and 117 kW. The candidate engine that produced the highest emission rates was used in Table 4-1.

Pollutant	Existing Facility Potential to Emit (tons/year)	Proposed SPGF Potential to Emit (tons/year)	Facility Potential to Emit after the SPGF's Maximum Potential to Emit Addition (tons/year)	Title V/Major Stationary Source Applicability Threshold (tons/year)
Total Suspended Particulate Matter (TSP)	13.8	2.87	16.7	100
Volatile Organic Compounds (VOC)	81.2	1.39	82.5	25
Ammonia (NH3)	---	1.35	1.35	100
Acrolein	---	0.011	0.011	10
Ethylene dibromide	---	0.000091	0.000091	10
Formaldehyde	0.25	0.26	0.51	10
HAPs (Total)	15.6	0.27	15.9	25

4.1.1.1 Regulatory Requirements for Combustion Turbine Generators

Federal Requirements

The three CTGs would be subject to, and would comply with, the Standards of Performance for Stationary Combustion Turbines, 40 CFR 60 Subpart KKKK[7]. 40 CFR 60.4310(a) in Subpart KKKK would exempt the CTGs from the rule's nitrogen oxide (NOx) emission limit if they are used for emergency purposes only (40 CFR 60.4420(i)). However, with the SPGF's proposed Demand Response and Storm Preparation operating modes, the following NOx emission limit would apply: 74 ppm corrected to 15 percent O_2 or 460 ng/J of useful output (3.6 lb/MWh). The CTGs would comfortably meet this limit at 2.5 ppm corrected to 15 percent O_2 .

Subpart KKKK also has a fuel-based sulfur dioxide (SO_2) emission limit that would apply to the CTGs in the Emergency, Demand Response and Storm Preparation operating modes: 0.06 pounds per million British Thermal Units (lb/MMBtu) of heat input (40 CFR 60.4330(a)(2)). The CTGs would comfortably meet this limit at 0.0029 lb/MMBtu.

State Requirements

The three CTGs would be subject to, and would comply with, the Reasonably Available Control Technology (RACT) regulations in N.J.A.C. 7:27-19.5 for NOx emissions from stationary combustion turbines. The CTGs would comply with the N.J.A.C. 7:27-19.5(d)2 limit of 2.2 pounds of NOx per MWh for all operating scenarios, including startup and shutdown, for an averaging period of one hour. Details of the RACT compliance calculations are provided in Appendix B.

The three CTGs would be subject to, and would comply with, the Reasonably Available Control Technology (RACT) regulations N.J.A.C. 7:27-16.9 for VOC emissions from stationary combustion turbines. The CTGs would comply with the N.J.A.C. 7:27-16.9(c) VOC limit of 50 parts per million by volume, dry basis (ppmvd) corrected to 15 percent oxygen for all operating scenarios, including startup and shutdown, for an averaging period of one hour. In addition, the CTGs would comply with the N.J.A.C. 7:27-16.9(b) CO limit of 250 ppmvd corrected to 15 percent oxygen for

[7] 40 CFR 60.4300 and 4305 state that Subpart KKKK applies to stationary combustion turbines constructed after February 18, 2005, and with a peak load heat input rate of 10 MMBtu/hr or greater. The 28-MW-each Siemens SGT-600 Turbines each has a heat input rate of 315 MMBtu/hr.

all operating scenarios for an averaging period of one hour. Details of the RACT compliance calculations are provided in Appendix B.

N.J.A.C. 7:27-3.5 regulates opacity (smoke) from stationary turbines and engines. The CTGs would comply with the requirement to emit less than 20 percent opacity, exclusive of visible condensed water vapor, except for periods not exceeding 10 consecutive seconds.

N.J.A.C. 7:27-4.2 sets limits for emission of particulate matter (PM) from combustion of fuel. The maximum allowable PM emission rate for each CTG (with a design heat input or fuel combustion rate of 315 MMBtu/hr) is 31.5 pounds of PM per hour (lb/hr). The vendor-provided PM emission rate for each CTG is 0.014 lb/MMBtu, or 4.41 lb/hr, well below the limit.

4.1.1.2 Regulatory Requirements for Black-Start Generators

Federal Requirements

The two BSGs would be subject to, and would comply with, the Standards of Performance for Standards of Performance for Stationary Spark Ignition Internal Combustion Engines, 40 CFR 60 Subpart JJJJ. As emergency engines, they would be required to meet the limits of: 2.0 grams per brakehorsepower hour (g/bhp-hr) for NOx, 4.0 g/bhp-hr for CO, and 1.0 g/bhp-hr for VOC. PVSC plans to voluntarily install natural-gas-fired engines meeting the more stringent requirements for non-emergency engines: 1.0 g/bhp-hr for NOx; 2.0 g/bhp-hr for CO, and 0.7 g/bhp-hr for VOC.

State Requirements

The BSGs would be subject to the N.J.A.C. 7:27-3.5 opacity standard. They would comply with the requirement to emit less than 20 percent opacity, exclusive of visible condensed water vapor, except for periods not exceeding 10 consecutive seconds.

The N.J.A.C. 7:27-4.2 PM limit would apply to the BSGs. The maximum allowable PM emission rate for each BSG (with a design heat input rate of 18.7 MMBtu/hr) is 7.7 pounds of PM per hour (lb/hr). The vendor-provided PM emission rate for each BSG is 0.0087 lb/MMBtu, or 0.16 lb/hr, well below the limit.

4.1.1.3 Regulatory Requirements for Fire Pump Engines

Federal Requirements

The two diesel fire pump engines would be subject to, and would comply with, the Standards of Performance for Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, 40 CFR 60 Subpart IIII. As emergency fire pump engines, they would be required to meet the limits of: 3.0 g/bhp-hr for NOx + non-methane hydrocarbons, 2.6 g/bhp-hr for CO, and 0.15 g/bhp-hr for PM. PVSC plans to purchase U.S. EPA Tier 3 certified engines, which would ensure compliance with these emission limits.

State Requirements

The fire pump engines would be subject to the N.J.A.C. 7:27-3.5 opacity standard. They would comply with the requirement to emit less than 20 percent opacity, exclusive of visible condensed water vapor, except for periods not exceeding 10 consecutive seconds.

The N.J.A.C. 7:27-4.2 PM limit would apply to the fire pump engines. The largest engine being considered has a design heat input rate of 1.54 MMBtu/hr. The maximum allowable PM emission rate for each fire pump engine would be 0.9 pounds of PM per hour (lb/hr). A Tier-3 certified engine would have a maximum PM emission rate of 0.08 lb/hr, well below the limit. See Appendix B for this calculation.

N.J.A.C. 7:27-9.2 restricts the sulfur content of No. 2 fuel oil, which would be combusted in the fire pump engines, to 15 parts per million (ppm) or less. The fire pump engines would comply with this requirement.

4.1.1.4 Aqueous (Aqua) Ammonia Storage Tank

PVSC is proposing to install a 10,000-gallon 19% aqueous ammonia storage tank. Aqueous ammonia is the reagent for the SCR air pollution control equipment. The tank is exempt from inclusion in the air permit application, because the capacity is not in excess of 10,000 gallons per N.J.A.C. 7:27-8.2. In addition, the proposed ammonia storage would be exempt from Chemical Accident Prevention Provisions (also known as Risk Management Plan Rule) of federal regulation 40 CFR 68. The threshold storage quantity only applies to aqueous ammonia with a concentration of 20% or greater, which is not applicable in this case.

Leak detection of the 19% aqueous ammonia storage system would be covered by two systems: liquid measurement within the containment area and ambient air monitoring.

A single liquid level transmitter would be installed within the tank containment area and would alarm the control room if it detects the presence of any liquid. Two ammonia vapor leak detectors would be installed in the vicinity of the 19% aqueous ammonia storage tank and forwarding pumps, and within the containment area. The detectors would measure an ambient ammonia concentration over a range of 0 to 500 parts per million (ppm). Each detector would activate a high-level alarm and high-high level shutdown. Upon alarm and/or shutdown, an alarm horn and beacon would be activated at the ammonia storage area and within the SPGF.

In the event of alarm, PVSC's Emergency Call Center would notify the City of Newark Fire Department of a release. PVSC will coordinate with local fire and emergency service providers on safety and site familiarization. Additionally, the tank will be included in PVSC's Discharge Prevention and Countermeasures Control (DPCC) Plan and subject to regular inspections.

4.2 Air Permit Regulatory Framework

4.2.1 Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rule)

The New Jersey's air quality regulation N.J.A.C. 7:27-18, Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rule), applies to a significant modification to an existing source's Title V Operating Permit.

Table 4-2 presents the significant net increase (major modification) stationary source thresholds. PVSC Facility's potential to emit after the SPGF addition does not exceed the major modification stationary source thresholds, and therefore PVSC is not a Prevention of Significant Deterioration (PSD) major stationary source.

Table 4-2 Major Modification Applicability

Pollutant	Proposed SPGF Potential to Emit (tons/year)	Emission Offset Threshold (ton/yr)
Carbon Monoxide (CO)	4.37	100
Nitrogen Oxides (NOx)	2.27	25
Particulate Matter (PM_{10})	2.86	15
Sulfur Dioxide (SO_2)	0.69	40
Total Suspended Particulate Matter (TSP)	2.87	25
Fine Particulate Matter ($PM_{2.5}$)	2.86	10
Volatile Organic Compounds (VOC)	1.39	25

As shown in Table 4-2 the SPGF does not exceed the significant net emission increase threshold in N.J.A.C. 7:27-18.7. Therefore, the project is not subject to N.J.A.C. 7:27-18, Control and Prohibition of Air Pollution from New or Altered Sources Affecting Ambient Air Quality (Emission Offset Rule).

This Page Left Intentionally Blank

Section 5

Maximum Potential Emission Rates

5.1 Source Emission Rates

The proposed SPGF's maximum potential emission rate calculations are provided in Appendix B. The following section provides a brief discussion for the proposed emission units and the basis of their maximum potential emission rates.

5.1.1 Combustion Turbine Generators

PVSC is proposing to install three natural-gas-fired CTGs. The selected equipment is a Siemens "SGT-600" turbine. The control of emissions of air pollutants from the CTGs will be accomplished with Selective Catalytic Reduction (SCR) and Oxidation Catalyst (OC) systems. The OC system controls emissions of carbon monoxide (CO) and volatile organic compounds (VOC), including organic hazardous air pollutants such as formaldehyde and acrolein. The SCR system controls emissions of nitrogen oxides (NOx).

The maximum potential emission rates for the proposed CTG units are presented in Table 5-1.

Table 5-1 Maximum Potential Emission Rates for CTGs

Pollutant	Proposed Emission Limits				
	One CTG Steady-state (pounds/hour)	One CTG Start Up (pounds/hour)	One CTG Shut Down (pounds/hour)	One CTG (tons/year)	Three CTGs (tons/year)
Carbon Monoxide (CO)	2.14	63.20	20.00	1.66	3.92
Nitrogen Oxides (NOx)	2.93	2.90	1.40	0.90	1.96
Particulate Matter (PM_{10})	4.41	1.84	0.74	1.31	2.83
Sulfur Dioxide (SO_2)	1.07	0.45	0.18	0.32	0.69
Total Suspended Particulate Matter (TSP)	4.41	1.84	0.74	1.31	2.83
Volatile Organic Compounds (VOC)	1.64	4.40	3.50	0.57	1.27
Ammonia	2.10	0.88	0.35	0.62	1.35
Hazardous Air Pollutants	0.15	0.88	0.81	0.065	0.147

The emission factors for CO, NO_x, PM_{10}, VOC, and ammonia were provided by the vendor. The SO_2 emission factor is based on U.S. EPA's *Compilation of Air Pollutant Emission Factors*, Report No. AP-42 ("AP-42"), Section 3.1, Stationary Gas Turbines. The SCR is designed to achieve a final NOx emission rate of 2.5 ppmvd. The oxidation catalyst is designed to achieve a final CO emission rate of 3 ppmvd and VOC emission rate of 4 ppmvd, for steady-state operation. For startup and shutdown scenarios, CO, NOx and VOC emissions are calculated based on vendor estimates. The emission factors for hazardous air pollutants (HAPs) for the CTGs are based on the AP-42 emission factors (plus 10% safety factor), except for formaldehyde for which emissions are calculated based on vendor-provided information. Calculations are provided in Appendix B. Vendor-provided information is shown in Appendix D.

5.1.2 Black-Start Generators

To support black-start of the turbine generator (BSG), PVSC is proposing to install two (2) 2-MW standby natural gas-fired generators (stationary combustion engines). The maximum potential emission rates for the proposed new BSGs are presented in Table 5-2.

Table 5-2 Maximum Potential Emission Rates for BSGs

Pollutant	Proposed Emission Limits		
	One BSG (pounds/hour)	One BSG (tons/year)	Two BSGs (tons/year)
Carbon Monoxide (CO)	3.25	0.16	0.33
Nitrogen Oxides (NOx)	1.63	0.081	0.16
Particulate Matter (PM_{10})	0.16	0.0081	0.016
Sulfur Dioxide (SO_2)	0.012	0.0006	0.0012
Total Suspended Particulate Matter (TSP)	0.34	0.017	0.034
Volatile Organic Compounds (VOC)	1.14	0.057	0.11
Hazardous Air Pollutants	0.40	0.020	0.040

The emission factors for CO, NO_x, PM_{10}, and VOC are based on vendor-provided information. The SO_2 emission factor is based on the AP-42, Section 3.2, Natural-Gas-Fired Reciprocating Engines emission factor (plus 10% safety factor). The emission factors for hazardous air pollutants (HAPs) for the BSGs are based on the AP-42 emission factors (plus 10% safety factor), except for formaldehyde for which emissions are calculated based on vendor provided information. Calculations are provided in Appendix B.

5.1.3 Fire Pump Engines

PVSC proposes to install two (2) 164-kW diesel fire pump engines[8]. The maximum potential emission rates for the proposed new fire pump engines are presented in Table 5-3.

Table 5-3 Maximum Potential Emission Rates for Fire Pump Engines

Pollutant	Proposed Emission Limits		
	One Engine (pounds/hour)	One Engine (tons/year)	Two Engines (tons/year)
Carbon Monoxide (CO)	1.29	0.064	0.13
Nitrogen Oxides (NOx)	1.45	0.072	0.14
Particulate Matter (PM_{10})	0.08	0.0039	0.0077
Sulfur Dioxide (SO_2)	0.001	3.87×10^{-5}	7.7×10^{-5}

[8] The final selection of the fire pump engines has not yet been made. The largest candidate engine is a Clarke Model JU6H-UFADP8 164-kW engine. Two others are under consideration, both Clarke engines, rated at 147 kW and 117 kW. The candidate engine that produced the highest emission rates was used in Table 5-3.

Pollutant	Proposed Emission Limits		
	One Engine (pounds/hour)	One Engine (tons/year)	Two Engines (tons/year)
Total Suspended Particulate Matter (TSP)	0.08	0.0039	0.0077
Volatile Organic Compounds (VOC)	0.07	0.0036	0.0072
Hazardous Air Pollutants	6.70×10^{-3}	3.35×10^{-4}	6.70×10^{-4}

The emission factors for CO, NO_x, PM_{10}, and VOC are based on vendor-provided information and the engine's being certified to meet U.S. EPA Tier 3 emissions standards. The SO_2 emission factor is based on AP-42, Section 3.3, Gasoline and Diesel Industrial Engines, and a fuel oil sulfur content of 15 ppm. The emission factors for hazardous air pollutants (HAPs) for the FPEs are based on AP-42 emission factors (plus 10% safety factor). Calculations are provided in Appendix B.

5.2 State-of-the-Art (SOTA)

The CTGs would each have an oxidation catalyst and SCR emissions control system. The natural-gas-fired BSGs and diesel fire pump engines would not have add-on air pollution control equipment. During steady-state operation of each CTG, the SCR would achieve a NOx emission rate of 2.5 parts per million by volume, dry (ppmvd), corrected to 15% oxygen. The oxidation catalyst would achieve a CO emission rate of 3 ppmvd and a VOC emission rate of 4 ppmvd, both corrected to 15% oxygen.

For an air permit application that proposes construction or installation of equipment and control apparatus which is a significant source identified in N.J.A.C. 7:27-8, the applicant is required to evaluate state-of-the-art (SOTA) for the source with potential to emit any hazardous air pollutant (HAP) at a rate equal to or greater than the SOTA threshold in Appendix 1, Table B; or with a potential to emit any criteria air pollutant at greater than or equal to 5.0 tons/year (Appendix 1, Table A of N.J.A.C. 7:27-8).

Appendix B shows that the maximum potential emission rates of the CTGs, BSGs and fire pump engines are all below the SOTA thresholds, and that SOTA is not required.

For the CTGs, the NOx and CO maximum potential emission rates are below the SOTA thresholds because PVSC is proposing the inclusion of SCR and an oxidation catalyst on each CTG as a federally enforceable permit condition. If the CTGs had no air pollution control equipment, their NOx and CO emission rates would exceed the SOTA thresholds. In this case, NJDEP's SOTA Manual for Stationary Gas Turbines[9] would require that each of these simple-cycle natural-gas-fired CTGs have Dry Low-NOx Combustors (DLN) for NOx control and an oxidation catalyst for CO control. DLN is a combustion technique (e.g., adjustment of fuel/air ratios), and does not remove as much NOx as does SCR. NJDEP's SOTA Manual requires SCR for NOx removal for combined cycle turbines, but not for simple cycle turbines. The Manual states that simple cycle turbines are less efficient than combined cycle turbines, but have the advantage of starting up quickly. NJDEP assumes that simple cycle turbines would be used in emergency and/or standby applications in

[9] State of the Art (SOTA) Manual for Stationary Gas Turbines, Revision Date: December 21, 2004, available at https://www.state.nj.us/dep/aqpp/downloads/sota/sota14.pdf .

which their annual capacity factor would be no more than 10%. Therefore, NJDEP only requires DLN for simple cycle turbines. NJDEP notes that if the annual capacity factor exceeds 10%, the combined cycle turbine requirement of SCR should apply. The SPGF's annual capacity factor would be less than five percent.[10] Therefore, by proposing SCR for NOx control, PVSC is proposing more than would otherwise be required for the CTGs, and is proposing to meet the lowest available emission rates.

[10] The SPGF's operation would be restricted to no more than 1,284 hours per year for 3 CTGs. Unrestricted operation would be 3 CTGs x 8760 hours/year = 26,280 hours/year. 1,284/26,280 = 5%..

Section 6

Health Risk Assessment

The objective of this health risk analysis is to assess potential health impacts from the toxic air pollutant (TAP) emissions resulting from the proposed SPGF Project. Impacts to human health associated with TAP emissions may include increased cancer risks, increased chronic (long-term) non-cancer health hazards, and increased acute (short-term) non-cancer health hazards from inhalation of TAPs.

6.2 Risk Analysis Approach

6.2.1 Level 1 Risk Analysis

Health risk assessments are required for new or modified equipment with the potential to emit toxic air pollutants above the “reporting thresholds” listed in N.J.A.C. 7:27-17. A health risk assessment is required for the CTGs, because each CTG has maximum potential emission rates of formaldehyde and acrolein that exceed these thresholds. A health risk assessment is also required for the BSGs due to maximum potential emission rates of acrolein, formaldehyde and ethylene dibromide exceeding the reporting thresholds. For the fire pump engines, all of the maximum potential air emission rates would be below reporting thresholds. This means that the air emission rates are insignificant, and not required to be reported in the application or considered in a health risk assessment. Appendix B shows the calculations and comparisons with reporting thresholds.

Appendix G includes a Level 1 Risk analysis using the NJDEP Risk Screening Worksheet for a single CTG. As shown in the Appendix G, negligible risk was determined for acrolein. However, further evaluation (Level 2 Risk Analysis) is required for formaldehyde.

In addition, Appendix G includes a Level 1 Risk Analysis for a single BSG. As shown in Appendix G, negligible risk was determined for ethylene dibromide. However, further evaluation (Level 2 Risk Analysis) is required for acrolein and formaldehyde.

6.2.2 Level 2 Risk Analysis

NJDEP policy states that if the Level 1 risk analysis indicates a need for further review, a refined risk assessment must be conducted. Only those toxic air pollutants with an further evaluation is required (FER) result are required to undergo a refined risk assessment. (NJDEP, 2010, “Procedures to Conduct Risk Assessments to Determine the Incremental Health Risks from New or Modified Equipment”; NJDEP, 2018, “Technical Manual 1003: Guidance on Preparing a Risk Assessment Protocol for Air Contaminant Emissions”; both available at https://www.state.nj.us/dep/aqpp/risk.html) Appendix G shows an “FER” result for formaldehyde emissions from a CTG, and for formaldehyde and acrolein emissions from a BSG.

A Level 2 analysis for formaldehyde and acrolein emissions from the CTGs and BSGs would be conducted using a refined atmospheric dispersion model that predicts ambient air concentrations more accurately than the Level 1 Worksheet by using stack- and source-specific data as well as representative local meteorological data.

Typically, the NJDEP conducts the refined dispersion modeling after the air permit application is submitted, unless the applicant specifies that they will conduct the analysis (Technical Manual 1003). PVSC has chosen to conduct this analysis early, as part of the permit application, to make inhalation health risk information available to the community for the review of this application. The NJDEP concurs with this approach (NJDEP, email dated August 20, 2020). The NJDEP required that PVSC conduct the modeling in accordance with Technical Manual 1002 and submit a draft modeling protocol and preliminary modeling results along with the permit application and risk screening spreadsheet.

Appendix H contains the Draft Air Quality Modeling Protocol based on the requirements of Technical Manual 1002. Section 6.3 presents the preliminary results from the refined dispersion modeling.

6.3 Refined Dispersion Modeling and Risk Impacts

The objective of this modeling is to predict the maximum ground level concentrations for the toxic air pollutant (TAP) (formaldehyde and acrolein) emitted by the proposed SPGF equipment. These maximum ground level concentrations have been used to predict impacts to human health associated with these TAPs, which may include increased cancer risk, increased chronic (long-term) non-cancer health hazards, and increased acute (short-term) non-cancer health hazards from inhalation of TAPs. Formaldehyde is a probable human carcinogen, and a product of fuel combustion. The NJDEP has found[11] that a lifetime exposure to an ambient concentration of 0.077 micrograms per cubic meter ($\mu g/m^3$) or greater could lead to a one-in-a-million lifetime incremental risk of getting cancer. Higher concentrations of formaldehyde (0.1 to 0.5 parts per million) are associated with nasal and eye irritation, neurological effects, increased risk of asthma and/or allergy. Acrolein is not a carcinogen, but is associated with eye watering, and burning of the nose and throat at concentrations exceeding 2.5 $\mu g/m^3$.[12]

An overview of the health risk analysis calculation procedure is included here, in addition to the supporting information provided in Appendix H.

6.3.1 Overview of Health Risk Analysis

6.3.1.1 Incremental Cancer Risk

Cancer risks were determined by multiplying exposure estimates for carcinogenic chemicals by corresponding Unit Risk Factor (URF). The unit risk factor (URF) is the estimated excess probability of contracting cancer as the result of continuous exposure over a 70-year lifetime to an ambient concentration of one microgram of a chemical per cubic meter of air (ug/m3). The methodology is conservative, as it assumes individuals would be exposed to the TAP for almost every hour of each day.

---

[11] NJDEP, June 2020, "Toxicity Values for Inhalation Exposure," available at: https://www.state.nj.us/dep/aqpp/downloads/risk/ToxAll2020.pdf

[12] For more information, see Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances & Disease Registry (ASTDR) information at: https://www.atsdr.cdc.gov/substances/indexAZ.asp#F

NJDEP Technical Manual 1002, Section 10.1, states that chronic health risks should be calculated based on a five-year average (43,800 hours) concentration. Therefore, incremental cancer risk (IR) for a TAP is determined by multiplying the five-year average modeled air concentration (averaged over five years of met data) predicted by AERMOD with the air toxic-specific inhalation Unit Risk Factor (URF) value.

Cancer Risk = C x URF

where:

C = 5-year average air concentration from AERMOD (µg/m³), of the unique toxic air pollutant

URF = Inhalation unit risk factor (µg/m³)⁻¹, of the unique toxic air pollutant

6.3.1.2 Long-Term (Chronic) Non-Cancer Risk (Hazard Quotient)

Chronic non-cancer health hazard estimates were calculated by dividing exposure estimates by specific Reference Concentrations (RfC). In the context of non-cancer health hazards, RfCs are estimates of the highest exposure levels that would not cause adverse chronic health effects even if exposures continue over a lifetime. The ratio of exposure concentration to reference concentration is termed as "Hazard Quotient" (HQ). A HQ greater than 1 indicates the potential for adverse health effects, and a HQ less than 1 indicates that adverse health effects are unlikely.

The hazard quotient for long-term non-cancer risk was calculated by dividing the maximum annual average modeled air concentration (from five years of met data) predicted by AERMOD by the long-term air toxic-specific reference concentration (RfC).

Hazard Quotient = C/RfC

where:

C = Maximum annual average ambient air concentration from AERMOD (µg/m³), of the unique toxic air pollutant

RfC = Reference concentration (µg/m³), of the unique toxic air pollutant.

6.3.1.3 Short-Term (Acute) Non-Cancer Risk (Hazard Quotient)

Short-term concentrations of the TAPs of concern were estimated by modeling the 1-hour maximum concentration. Acute non-cancer health hazards were then estimated at each receptor location by dividing the predicted maximum 1-hour TAP concentrations by the acute RfCs to determine the HQ.

Short-term RfCs are estimates of the highest exposure levels that would not cause adverse acute health effects even if exposures continue over an hour. The ratio of exposure concentration to reference concentration is termed as "Hazard Quotient short-term" (HQst). A HQst greater than 1 indicates the potential for adverse health effects, and a HQst less than 1 indicates that adverse health effects are unlikely.

NJDEP Technical Manual 1002, Section 10.1, states that the maximum air-toxic-specific short-term (one-hour average) concentration modeled should be used for calculating acute health risks. Therefore, the following equation was used to assess short-term non-cancer risk.

$$\textbf{Hazard Quotient}_{\textbf{short-term}} = \textbf{C}_{\textbf{st}}/\textbf{RfC}_{\textbf{st}}$$

where:

C_{st} = Short-term average ambient air concentration from AERMOD ($\mu g/m^3$), of the unique toxic air pollutant

RfC_{st} = Short-term reference concentration ($\mu g/m^3$), of the unique toxic air pollutant

The averaging periods, URF, RfC and risk thresholds for each TAP of concern are summarized in **Table 6-1**. If all evaluated health risks fall into the "negligible" category, no further risk assessment is needed.

Table 6-1 NJDEP Toxicity Values for Inhalation Exposure

Pollutant	Averaging Period	URF	RfC	Significant Risk Level
Formaldehyde	Long-term (5-yr or Annual)	1.3×10^{-5}	9	IR > 1E-6 and $HQ_{lt} > 1$
Formaldehyde	Short-term (1-hour)	-	55	$HQ_{st} > 1$
Acrolein	Short-term (1-hour)	-	2.5	$HQ_{st} > 1$

IR=Incremental Cancer Risk; HQ_{lt}=Hazard Quotient Long-term; HQ_{st} = Hazard Quotient Short-term; URF = Unit Risk Factor

Note: 1) Reference concentrations and Unit Risk Factor obtained from NJDEP's toxicity values for inhalation exposure, updated June 2020[13].

6.3.2 Refined Dispersion Modeling

6.3.2.1 Approach

PVSC has conducted refined air dispersion modeling to predict maximum ground-level ambient concentrations of formaldehyde and acrolein emissions at:

1) the receptor with the highest predicted air concentration in the five-year AERMOD simulation,
2) the nearest sensitive receptors (residences, correctional facilities, daycare centers, hospitals, nursing homes, playgrounds), and
3) the nearest Ironbound Community residences.

The refined dispersion modeling was conducted for the proposed Project, using the Lakes Environmental Software user interface for U.S.EPA's AERMOD, Version 19191. The CTG and BSG

[13] Accessed here: https://www.state.nj.us/dep/aqpp/downloads/risk/ToxAll2020.pdf , on October 30. 2020

exhaust stacks were designated as point sources in AERMOD; the individual unit Model IDs are shown in **Table 6-2**.

Table 6-2 Proposed SPGF Emission Sources

Model ID	Emission Unit and Emission Point NJID (per RADIUS forms)	Model Source Description	Emission Unit Description in RADIUS forms
CTG-1	E3001/PT301	Combustion Turbine Generator # 1	NG Turbine 1 – 28 MWe Natural Gas Turbine 1
CTG-2	E3002 /PT302	Combustion Turbine Generator # 2	NG Turbine 2 – 28 MWe Natural Gas Turbine 2
CTG-3	E3003/PT303	Combustion Turbine Generator # 3	NG Turbine 3 – 28 MWe Natural Gas Turbine 3
BSG-1	E3004/PT304	Black Start Generator # 1	NG Engine 1 – 2000 kW Natural Gas Black Start Engine 1
BSG-2	E3005/PT302	Black Start Generator # 2	NG Engine 2 – 2000 kW Natural Gas Black Start Engine 2

The Draft Air Quality Dispersion Modeling Protocol in Appendix H, Figures 1 through 6, show the proposed stack locations, building layout, receptor grid and sensitive receptor locations. The modeled value selection for each averaging period is presented in Table 6-3 below.

Table 6-3 Modeled Value Selection

Pollutant	Risk Assessment Category	Averaging Period	Modeled Value Selection
Formaldehyde	Carcinogenic Incremental Cancer Risk (IR)	5-years	5-yr average concentration (from 5-year met dataset)
Formaldehyde	Hazard Quotient (HQ) (Long-term) Non-cancer risk	Annual	Maximum Annual concentration (from 5- year met dataset)
Formaldehyde	HQ (Short-term) Non-cancer risk	1-hour	Maximum 1-hour concentration
Acrolein	HQ (Short-term) Non-cancer risk	1-hour	Maximum 1-hour concentration

A load screening analyses were conducted for each CTG and BSG to determine which discharge conditions produced the highest (worst) ground-level concentrations. These analyses included modeling of exhaust stack exit temperature, exit velocity, and pollutant emission rate for operating loads of 100%, 75% and 50% for each CTG and BSG for both short-term and long-term averaging periods. Table 6-4 provides the worst-case operating load scenario determined for each averaging period, for each unit. The detailed approach to load screening analysis and results are provided in Appendix H.

A load screening analysis was not conducted for CTGs in startup and shutdown modes. Instead, all possible startup hour and shutdown hour combinations were modeled. This is discussed further in Section 6.2.2.3.

Table 6-4 Load Screening Analysis Results Summary

Equipment	Averaging Period	Partial Operating Load Scenarios modeled	Worst-Case Partial Operating Load Scenario Determination
CTGs (Steady State)	Short-term (1-hour)	100%, 75% and 50%	100%
CTGs (Steady State)	Long-term (Annual)	100%, 75% and 50%	75%
BSGs	Short-term (1-hour)	100%, 75% and 50%	100%
BSGs	Long-term (Annual)	100%, 75% and 50%	100%

Section 6.3.2.2 describes the individual equipment modeled risk impacts. Peak value results from each piece of equipment, for each pollutant, are tabulated in Section 6.3.2.2. These peak values are compared with the NJDEP benchmark concentration. The benchmark concentration is defined as the air pollutant concentration equivalent to a one-in-a-million cancer risk level.

Section 6.3.2.3 describes the Project (combined equipment) risk impacts. Peak value results from the worst-case combination grouping of Project equipment, for each pollutant, are tabulated in Section 6.3.2.3. These peak values are then used to predict impacts to human health associated with these TAPs, particularly, incremental cancer risk, increased chronic (long-term) non-cancer health hazard, and increased acute (short-term) non-cancer health hazard.

6.3.2.2 Individual Equipment Risk Impacts

Individual CTG Formaldehyde Long-Term Average Concentrations

The stack parameters and emission rates used to model individual CTGs in the steady state operating scenario for formaldehyde, long term (annual) averaging period are summarized in Table 6-5 below. The emission rate shown in Table 6-5 for each CTG includes startup and shutdown emissions.

Table 6-5 AERMOD Model Input Parameters for CTG Long-Term Modeling

Parameter	Unit	Long-term Averaging Period
		75%
Stack Base Elevation	feet (above mean sea level)	8.36 - 9.68
Stack Flow Rate	actual cubic feet/minute	144,724
Stack Gas Temperature	degrees Fahrenheit	830
Stack Gas Velocity	feet per second	76.13
Stack Inside Diameter	meters	3.048
Stack Height	feet	106
Formaldehyde Emission Rate[1]	tons/year	0.0644
Formaldehyde Emission Rate	lb/hr	0.0147
Formaldehyde Emission Rate	g/s	0.0019

Note: AERMOD File Name: PVSC_CTG_Annual_rev_v4_Nano.isc

1. Formaldehyde emission rates shown in tons per year (tpy) represent annual combined CTG emissions that include emissions from steady state, startup and shutdown operation, as shown in the Appendix B calculations. The annual emission rates (tons/year) have been converted to lb/hr using 8760 hours to determine an annualized lb/hr value.

CDM Smith

Table 6-6 shows the AERMOD-predicted formaldehyde maximum ground-level concentrations at the peak impacted receptor from each CTG. All the concentrations are below the NJDEP inhalation risk threshold of 0.077 µg/m³ (this concentration produces an individual cancer risk of 1 potential cancer case per million people exposed). Table 6-6 shows that CTG Stack 2 and CTG Stack 3 are predicted to produce the highest ground-level concentrations of the three CTGs.

Table 6-6 AERMOD Maximum Predicted Annual Average Formaldehyde Concentrations (µg/m3) for CTGs

Parameter	Value	CTG Stack 1	CTG Stack 2	CTG Stack 3	NJDEP Risk Threshold	Units
Formaldehyde Result	Max 5-year average	0.0019	**0.0023**	**0.0021**	0.077	µg/m³
Formaldehyde Result	Max annual concentration	0.0020	**0.0024**	**0.0024**	0.077	µg/m³

Notes:

1. The 75 percent partial load operating scenario was modeled with annualized emission rates as shown in Table 6-3 for the annual averaging period.
2. The modeled output value selected for carcinogenic incremental cancer risk is the five-year average concentration over five years of meteorological data.
3. The modeled output value selected for long-term non-cancer risk (Hazard Quotient) is the maximum annual concentration produced from five years of meteorological data.

Individual CTG Formaldehyde Short-Term Average Concentrations

The stack parameters and emission rates used to model individual CTGs in the different operating scenarios (steady-state, startup and shutdown) are summarized in **Table 6-7**. AERMOD predicted the formaldehyde concentration from each piece of equipment at each ground-level receptor. The concentrations for the peak impacted receptor for each CTG scenario are summarized in **Table 6-8** below. All the concentrations are below the NJDEP short-term Reference Concentration (RfC) of 55 µg/m3.

Table 6-8 shows that the Source Group CT1SU50 produces the worst-case one-hour-average concentration when CTG1 is starting up for first 25 minutes at the 50% partial operating load scenario (without control), with the remainder of the hour (35 minutes) having CTG1 operating in the 50% partial operating load scenario (steady state, with emissions control). Similarly, CT3SU50 produces the second worst-case one-hour-average concentration when CTG3 is starting up for first 25 minutes in the 50% partial operating load scenario (without control), and operating for the remaining 35 minutes in the 50% partial operating load scenario (steady state, with emissions control).

This Page Left Intentionally Blank

CDM Smith

Table 6-7 AERMOD Model Input Parameters for CTG Short-Term Modeling

Parameter	Unit	CTG Stacks 1, 2, 3								
		Steady state			Start Up			Shutdown		
		100%	75%	50%	50%SU/100%SS	50%SU/75%SS	50%SU/50%SS	50%SD/100%SS	50%SD/75%SS	50%SD/50%SS
Stack Base Elevation	feet (above mean sea level)	8.36-9.68	8.36-9.68	8.36-9.68	8.36-9.68	8.36-9.68	8.36-9.68	8.36-9.68	8.36-9.68	8.36-9.68
Stack Flow Rate	actual cubic feet/minute	189,214	144,724	122,125	383,048	316,595	283,233	436,821	341,888	294,227
Stack Gas Temperature	degrees Fahrenheit	840	830	825	866	860.17	857.25	851	842.67	838.50
Stack Gas Velocity	feet per second	100.30	76.13	63.99	81.29	67.18	60.10	92.70	72.55	62.44
Stack Inside Diameter	meters	3.048	3.048	3.048	3.048	3.048	3.048	3.048	3.048	3.048
Stack Height	feet	106	106	106	106	106	106	106	106	106
Formaldehyde Emission Rate	lb/hr	0.15	0.12	0.09	0.968	0.95	0.933	0.93	0.905	0.88
Formaldehyde Emission Rate	g/s	0.0189	0.0151	0.0113	0.1219	0.1197	0.1175	0.1172	0.1140	0.1109

Note: AERMOD File Name: PVSC_CTG_Shortterm_rev_v8.isc

1. The stack parameters were obtained from the vendor for startup and shutdown operation. It is assumed that the 50% load condition represents the transient conditions occurring during startup and shutdown.
2. Each CTG startup event is assumed to take up to 25 minutes from a cold condition to achieve steady state operation, with no controls operating. During the remainder of 35 minutes in a startup hour, the turbine will be operating at steady state with emission controls. Each CTG shutdown event is assumed to take up to 10 minutes from steady state operation, with full emission controls operating, to shutdown with no controls. The smallest averaging time option available in AERMOD is one hour, therefore the following sections describe an approach that will be used to develop a health risk model for a full hour or 60 minutes averaging period that includes a startup or a shutdown event. These are defined as "Startup hour" and "Shutdown hour. A startup hour and shutdown hour are assumed to occur during the 50% transient load condition, but the remainder of hour which operates under steady state could occur at various partial loads such as 100%, 75% and 50%.
3. A weighted average method was used to obtain stack parameters for the startup hour and shutdown hour, as shown in Appendix H, Table H-7 and H-8 respectively. Appendix H, Table H-9 presents the weighted average formaldehyde emission rates for startup hour and shutdown hour.
4. Formaldehyde emission rates shown here represent the 100% operating load steady state scenario. The model also included partial operating loads such as 75% and 50%. The maximum predicted concentrations from the 75% and 50% operating load scenarios were lower than the 100% load steady state scenario. For more details, refer to Appendix H.

This Page Left Intentionally Blank

Table 6-8 AERMOD Maximum Predicted Hourly Formaldehyde Concentrations (µg/m3) for CTGs in Steady State

Source Group Name	Operating Scenario	Load (%)	Maximum 1-hour Formaldehyde Concentration
		Equipment	µg/m^3
CT1SS100	Steady State	100	0.310
CT2SS100	Steady State	100	0.256
CT3SS100	Steady State	100	0.311
CT1SS75	Steady State	75	0.304
CT2SS75	Steady State	75	0.254
CT3SS75	Steady State	75	0.299
CT1SS50	Steady State	50	0.259
CT2SS50	Steady State	50	0.214
CT3SS50	Steady State	50	0.249
CT1SU100	Startup Hour	50% SU/100% SS	2.336
CT2SU100	Startup Hour	50% SU/100% SS	1.974
CT3SU100	Startup Hour	50% SU/100% SS	2.329
CT1SU75	Startup Hour	50% SU/75% SS	2.664
CT2SU75	Startup Hour	50% SU/75% SS	2.210
CT3SU75	Startup Hour	50% SU/75% SS	2.575
CT1SU50	**Startup Hour**	**50% SU/50% SS**	**2.797**
CT2SU50	Startup Hour	50% SU/50% SS	2.296
CT3SU50	**Startup Hour**	**50% SU/50% SS**	**2.670**
CT1SD100	Shutdown Hour	50% SD/100% SS	2.034
CT2SD100	Shutdown Hour	50% SD/100% SS	1.715
CT3SD100	Shutdown Hour	50% SD/100% SS	2.039
CT1SD75	Shutdown Hour	50% SD/75% SS	2.395
CT2SD75	Shutdown Hour	50% SD/75% SS	1.970
CT3SD75	Shutdown Hour	50% SD/75% SS	2.333
CT1SD50	Shutdown Hour	50% SD/50% SS	2.565
CT2SD50	Shutdown Hour	50% SD/50% SS	2.128
CT3SD50	Shutdown Hour	50% SD/50% SS	2.470

SS=Steady state; SU =Startup; SD=Shutdown; CT1=CTG Stack 1, CT2=CTG Stack 2; CT3=CTG Stack 3.

Notes:

1. The modeled value output selected for non-cancer risk (short-term Hazard Quotient) is maximum 1-hour concentration.

Individual BSG Formaldehyde Long-term Average Concentrations

Table 6-9 shows the BSG stack parameters and formaldehyde emission rates used in the annual averaging period dispersion model run.

Table 6-9 AERMOD BSG Model Input Parameters and Long-Term Formaldehyde Emission Rates

Parameter	Unit	Long-term Averaging Period
		100% Load, BSG1, BSG2
Stack Base Elevation	feet (above mean sea level)	12.14 - 12.56
Stack Flow Rate	actual cubic feet/minute	16,371
Stack Gas Temperature	degrees Fahrenheit	881
Stack Gas Velocity	feet per second	124.57
Stack Inside Diameter	Meters	0.509
Stack Height	Feet	78.07
Formaldehyde Emission Rate[1]	tons/year	0.0586
Formaldehyde Emission Rate	lb/hr	0.0134
Formaldehyde Emission Rate	g/s	0.0017

Note: AERMOD File Name: PVSC_Blackstart_V6_Annual_nano.isc

1. Formaldehyde emission rates shown in tons per year have been converted to lb/hr using 8760 hours to determine an annualized lb/hr value.

AERMOD predicted the formaldehyde concentration of each piece of equipment at each ground-level receptor. The concentrations for the peak impacted receptor for each BSG are summarized in Table 6-10 below. All the concentrations are below the NJDEP inhalation risk threshold of 0.077 µg/m³. Table 6-10 shows that BSG Stack 2 produced the worst-case concentrations for the annual averaging period for formaldehyde.

Table 6-10 AERMOD Maximum Predicted Annual Average Formaldehyde Concentrations (µg/m3) for BSGs

Parameter	Value	BSG Stack 1	BSG Stack 2	NJDEP Risk Threshold	Units
Formaldehyde Result	Max 5-year average	0.0294	**0.0330**	0.077	µg/m³
Formaldehyde Result	Max annual concentration	0.0321	**0.0362**	0.077	µg/m³

Notes:

1. The 100 percent load operating scenario was modeled with annualized emission rates as shown in Table 6-3 for the annual averaging period.
2. The modeled output value selected for carcinogenic incremental cancer risk is the average of the five-year maximum concentration.
3. The modeled output value selected for long-term non-cancer risk (Hazard Quotient) is the maximum annual concentration produced from five years of meteorological data.

6.3.2.2.4 Individual BSG Formaldehyde Short-Term Average Concentrations

Table 6-11 lists the stack parameters and formaldehyde emission rates used to model individual BSGs for the one-hour averaging period.

Table 6-11 AERMOD BSG Model Input Parameters and Short-Term Formaldehyde Emission Rates

Parameter	Unit	Short-term Averaging Period
		100% Load, BSG1, BSG2
Stack Base Elevation	feet (above mean sea level)	12.14 - 12.56
Stack Flow Rate	actual cubic feet/minute	16,371
Stack Gas Temperature	degrees Fahrenheit	881
Stack Gas Velocity	feet per second	124.57
Stack Inside Diameter	meters	0.509
Stack Height	feet	78.07
Formaldehyde Emission Rate[1]	tpy	-
Formaldehyde Emission Rate	lb/hr	1.1719
Formaldehyde Emission Rate	g/s	0.1477

Note: AERMOD File Name: PVSC_Blackstart_V9_shorterm.isc

AERMOD predicted the formaldehyde concentration of each piece of equipment at each ground-level receptor. The concentrations for the peak impacted receptor for each BSG are summarized in **Table 6-12** below. All the concentrations are below the NJDEP short-term Reference Concentration (RfC) of 55 µg/m3. Table 6-12 shows BSG Stack 1 produced the worst-case concentration for short-term averaging period for formaldehyde.

Table 6-12 AERMOD Maximum Predicted Short-Term Formaldehyde Concentrations (µg/m3) for BSGs

Parameter	Averaging Time	BSG Stack 1	BSG Stack 2	NJDEP RfC	Units
Formaldehyde Concentration	1-hour	**13.760**	13.044	55	µg/m^3

Notes:

1. The 100 percent load operating scenario was modeled with hourly emission rates as shown in Table 6-9 for the 1-hour averaging period.
2. The modeled output value selected for the short-term non-cancer risk (Hazard Quotient) is the maximum 1-hour concentration.

Individual BSG Acrolein Short-Term Average Concentrations

Table 6-13 lists the stack parameters and acrolein emission rates used to model individual BSGs for the one-hour averaging period.

Table 6-13 AERMOD BSG Model Input Parameters and Short-Term Acrolein Emission Rates

Parameter	Unit	Short-term Averaging Period
		100% Load, BSG1, BSG2
Stack Base Elevation	feet (above mean sea level)	12.14 - 12.56
Stack Flow Rate	actual cubic feet/minute	16,371
Stack Gas Temperature	degrees Fahrenheit	881
Stack Gas Velocity	feet per second	124.57
Stack Inside Diameter	meters	0.509
Stack Height	feet	78.07
Acrolein Emission Rate	lb/hr	0.0961
Acrolein Emission Rate	g/s	0.0121

Note: AERMOD File Name: PVSC_Blackstart_V9_shorterm.isc

AERMOD predicted the formaldehyde concentration of each piece of equipment at each ground-level receptor. The concentrations for the peak impacted receptor for each BSG are summarized in **Table 6-14** below. All the concentrations are below the NJDEP short-term Reference Concentration (RfC) of 2.5 µg/m3. Table 6-14 shows that BSG Stack 1 produced the worst-case concentration for the short-term averaging period for acrolein.

Table 6-14 AERMOD Maximum Predicted Short-Term Acrolein Concentrations (µg/m3) for BSGs

Parameter	Value	BSG Stack 1	BSG Stack 2	NJDEP RfC	Units
Acrolein Result	1-hour	**1.127**	1.069	2.5	µg/m^3

Notes:

1. The 100 percent load operating scenario was modeled with hourly emission rates as shown in Table 6-7 for the 1-hour averaging period.
2. The modeled output value selected for short-term non-cancer risk (Hazard Quotient) is the maximum 1-hour concentration.

6.3.2.3 Combined Equipment Health Risk Impacts

Refined dispersion modeling was conducted for formaldehyde and acrolein emissions to evaluate combined overall risk impacts from simultaneous operation of the CTGs and BSGs together. A worst-case operating scenario was selected to calculate the combined overall risk impact from the Project.

The following was considered when calculating the combined risk from the Project.

- Total combined operation of all three CTGs together would be limited to 1,284 hours/year (machine operating hours) for all proposed non-emergency operating scenarios. Any one of the three CTGs could operate up to 592 hours/year; however, the combined operating hours for all three turbines would not exceed 1,284 hours/year.
- The non-emergency operation of the BSGs would be limited to 100 hours per year per generator for readiness testing and maintenance. Therefore, the maximum potential non-emergency operation for each BSG would not exceed 100 hours per year (200 hours per year total for the BSGs).
- PVSC is proposing to request a permit condition that would allow only one BSG to be exercised (in non-emergency operation) while two CTGs are operating.

Three separate combined risk model runs were prepared: 1) 5-year average and maximum annual average formaldehyde concentrations; 2) one-hour average formaldehyde concentrations, and 3) one-hour average acrolein concentrations. Although the CTGs passed the Level 1 Risk Screening for acrolein (and were, therefore, not required to be considered in Level 2), the BSGs were required further evaluation for short-term HQ for acrolein. Therefore, the CTG acrolein emission rates were included in the one-hour average combined equipment dispersion model run for short-term HQ.

The resulting maximum predicted concentrations shown in **Table 6-15** were used to calculate human health risk, as shown in **Table 6-16** below. Modeled maximum ground-level concentrations (over five years of meteorological data) were found to be below all NJDEP health risk criteria.

Figures 6-1 through 6-3 are concentration isopleth maps showing the maximum 5-year annual average formaldehyde, peak annual formaldehyde, and peak 1-hour formaldehyde concentrations from the combined SPGF sources. Figure 6-7 shows concentration isopleth maps for the maximum combined peak 1-hour acrolein concentrations. These figures show that the maximum ground-level concentrations would occur at the Facility fence line, adjacent to the proposed SPGF building.

6.3.4 Risk Impacts Near Sensitive Receptors

Table 6-17 lists the sensitive receptor locations that were selected for the analysis. The sensitive receptors include a residential apartment complex in the Ironbound District, the nearest residential area across the Newark Bay, prisons in vicinity of the Facility, and the N.J. Transit building next to PVSC Facility. The predicted concentrations near the sensitive receptor locations are shown in **Table 6-18**. These predicted concentrations were used to calculate human health risk impacts at the sensitive receptor locations. Modeled ground-level concentrations at the sensitive receptor locations were found to be below all NJDEP health risk criteria. Figures 6-4 through 6-7 show that the formaldehyde and acrolein concentrations from the proposed SPGF decrease significantly with distance from the PVSC facility.

Remainder of Page Left Intentionally Blank

Table 6-15 AERMOD Maximum Predicted Concentrations

Pollutant	Avg. Period	Description	Equipment Model ID	Source Group Name	Peak Location (X = UTM Easting; Y = UTM Northing)		Max 5-year Average	Peak Annual	Peak 1-hour
					X (m)	Y (m)	µg/m³	µg/m³	µg/m³
Formaldehyde	5-year & Annual	All 5 units operating over the 5-year period. BSG1 and BSG2 operating 100 hours at 100% load, CTG2 and CTG3 operating at 75% loading at 592 hours each, and CTG1 operating at 75% load at 100 hours.	BSG1_100, BSG2_100, CTG2SS75, CTG3SS75, CT1SS10[1]	Combined	573438.48	4507250.03	0.06624	0.0721	-
Formaldehyde	1-hour	BSG1 when CT1 and CT2 are starting up	BSG1, CT1SU50, CT2SU50	SRCGP34/35	573407.70	4507183.25	-	-	5.0803
Acrolein	1-hour	BSG1/BSG2 when CT1 and CT3 are starting up	BSG1, CT1SU50, CT3SU50	SRCGP26	573448.74	4507272.29	-	-	1.1273

AERMOD File Names: PVSC_Combined_Forma_Shortterm_V0_Terr.isc; PVSC_Formaldehyde_Annual_ALL_v2.isc; PVSC_Combined_Acr_Shortterm_v0.isc

1. CT1SS10 represents combustion turbine generator stack 1 operating 100 hours. The emission rate input for CT1SS10 in the combined model is 0.0109 tons per year (=0.0644*100/592), also equivalent to 0.000313 g/s). Formaldehyde emission rate of 0.0644 in tons per year (tpy) represent annual combined CTG emissions that include emissions from steady state, startup and shutdown operation, as shown in the Appendix B calculations.

Table 6-16 Combined Health Risk Assessment at Maximum Predicted Concentration Locations

Pollutant	Avg. Period	Incremental Cancer Risk	Long-term Non-cancer risk	Short-term Non-cancer risk	Peak Location (X = UTM Easting; Y = UTM Northing)		Peak Location (X = UTM Easting; Y = UTM Northing)	Peak Annual Conc.	Peak 1-hour Conc.
					X (m)	X (m)	µg/m³	µg/m³	µg/m³
Threshold ➔		**1E-06**	**1**	**1**					
Formaldehyde	5-Year & Annual	8.61E-7	0.0080	-	573438.48	4507250.03	0.06618	0.0721	-
Formaldehyde	1-hour	-		0.092	573407.70	4507183.25	-	-	5.0803
Acrolein	1-hour	-		0.451	573448.74	4507272.29	-	-	1.1273

AERMOD File Names: PVSC_Combined_Forma_Shortterm_V0_Terr.isc; PVSC_Formaldehyde_Annual_ALL_v2.isc; PVSC_Combined_Acr_Shortterm_v0.isc

This Page Left Intentionally Blank

Table 6-17 Sensitive Receptor Locations

Receptor	Location		Type of Location
	Easting X (m)	Northing Y (m)	
Sensitive Receptor 1	572069.7	4508360.8	Ironbound District (Apartment Complex Building) 63 Rome St.
Sensitive Receptor 2	575421.1	4507060.7	Droyer's Point (Apartment Complex Building)
Sensitive Receptor 3	573414.0	4507360.7	N.J. Transit Bldg
Sensitive Receptor 4	573594.5	4507837.1	Delaney Hall Juvenile Detention Facility
Sensitive Receptor 5	573696.0	4508135.8	Essex County Correctional Facility
Sensitive Receptor 6	569890.6	4507237.1	North State Prison

Remainder of Page Left Intentionally Blank

This Page Left Intentionally Blank

Table 6-18 Combined Health Risk Assessment and Maximum Predicted Concentration Near Sensitive Receptor Locations

Pollutant	Location		Description	Predicted Concentrations Near Sensitive Receptor Location				Risk Assessment			
				Formaldehyde			Acrolein	Formaldehyde			Acrolein
				Peak Annual	Average Annual	Peak 1-hour	Peak 1-hour	Incremental Cancer Risk	Long-term Non-cancer risk	Short-term Non-cancer risk	Short-term Non-cancer risk
	X	Y		ng/m³	ng/m³	µg/m³	µg/m³	Threshold → 1E-06	Threshold → 1	Threshold → 1	Threshold → 1
Sensitive Receptor Area	-	-	Ironbound Community	0.09-0.33	0.09-0.33	0.35-0.62	0.02-0.04	4.29E-9	3.67E-5	0.011	0.016
Sensitive Receptor 1	572069.7	4508360.8	Ironbound Community (Apartment Complex Building) 63 Rome St.	0.26	0.26	0.64	0.04	3.38E-9	2.89E-5	0.012	0.016
Sensitive Receptor 2	575421.1	4507060.7	Droyer's Point (Apartment Complex Building)	0.45	0.40	0.57	0.03	5.20E-9	5E-5	0.010	0.012
Sensitive Receptor 3	573414.0	4507360.7	N.J. Transit Bldg	11.50	11.00	2.38	0.52	1.43E-7	1.28E-3	0.043	0.208
Sensitive Receptor 4	573594.5	4507837.1	Delaney Hall Juvenile Detention Facility	1.31	1.30	1.16	0.16	1.69E-8	1.44E-4	0.021	0.064
Sensitive Receptor 5	573696.0	4508135.8	Essex County Correctional Facility	0.67	0.66	0.66	0.07	8.58E-9	7.44E-5	0.012	0.028

Pollutant	Location		Description	Predicted Concentrations Near Sensitive Receptor Location				Risk Assessment			
				Formaldehyde			Acrolein	Formaldehyde			Acrolein
				Peak Annual	Average Annual	Peak 1-hour	Peak 1-hour	Incremental Cancer Risk	Long-term Non-cancer risk	Short-term Non-cancer risk	Short-term Non-cancer risk
	X	Y		ng/m³	ng/m³	µg/m³	µg/m³	Threshold → 1E-06	Threshold → 1	Threshold → 1	Threshold → 1
Sensitive Receptor 6	569890.6	4507237.1	North State Prison	0.11	0.11	0.43	0.03	1.43E-9	1.22E-5	0.008	0.012

AERMOD File Names: PVSC_Combined_Forma_Shortterm_V0_Terr.isc; PVSC_Formaldehyde_Annual_ALL_v2.isc; PVSC_Combined_Acr_Shortterm_v0.isc

Notes:

1. Reference concentrations and Unit Risk Factor obtained from NJDEP's toxicity values for inhalation exposure, updated June 2020. Incremental Cancer Risk is based on a formaldehyde Unit Risk Factor (URF) of 1.3E-05 [(µg/m^3)$^{-1}$] from NJDEP's Toxicity Values for Inhalation exposure and a long-term reference concentration (RfC) for formaldehyde is 9 µg/m3. Accessed here: https://www.state.nj.us/dep/aqpp/downloads/risk/ToxAll2020.pdf , on October 30. 2020.
2. Reference concentrations were obtained from NJDEP's toxicity values for inhalation exposure, updated June 2020[5]. The short-term Reference Concentration for formaldehyde is 55 µg/m^3
3. Reference concentrations were obtained from NJDEP's toxicity values for inhalation exposure, updated June 2020[5]. The short-term Reference Concentration for Acrolein is 2.5 µg/m^3.
4. The modeled value output selected for carcinogenic incremental cancer risk is the 5-year average concentration over 5-years of met data.
5. The modeled value output selected for long-term non-cancer risk (Hazard Quotient) is maximum 5 -year concentration.
6. The modeled value output selected for non-cancer risk (short-term Hazard Quotient) is maximum 1-hour concentration.

6.4 Conclusion

NJDEP Technical Manual 1003[14] provides risk assessment guidelines for air permit applications to assist NJDEP in evaluating whether a proposed project could cause incremental inhalation health risks that are unacceptable. NJDEP's procedures, described in the sections above, evaluate the incremental inhalation risk from exposure to the proposed project's air toxic emissions. The Manual states that these procedures: "do not consider the existing risk of cancer and other maladies associated with smoking, occupational or domestic exposures, dietary habits, inherited traits, or other factors that impact health and wellbeing; nor do they consider health risks from other nearby air toxics sources or existing levels of toxics in the ambient air."

The NJDEP's risk management guidelines for proposed new or modified source operations in air permit applications are summarized in Tables 6-19 and 6-20, below:

Table 6-19 NJDEP Inhalation Incremental Cancer Risk Guidelines for New or Modified Sources

Risk Level	Outcome
Risk <= 1 in a million (1×10^{-6})	Negligible risk
1 in a million < Risk < 100 in a million	Case-by-case review by NJDEP Risk Management Committee
Risk >= 100 in a million (1×10^{-4})	Unacceptable risk

Source: NJDEP, 2018, Technical Manual 1003: Guidance on Preparing a Risk Assessment for Air Contaminant Emissions, Table 2-1

Table 6-20 NJDEP Long- and Short-Term Non-Cancer Inhalation Risk Guidelines for New or Modified Sources

Risk Level	Outcome
Hazard Quotient <= 1	Negligible risk
Hazard Quotient > 1	Case-by-case review by NJDEP Risk Management Committee

Source: NJDEP, 2018, Technical Manual 1003: Guidance on Preparing a Risk Assessment for Air Contaminant Emissions, Table 2-2

If all evaluated health risks fall into the "negligible" category, no further risk assessment or change to the air permit is needed. If any of the evaluated health risks do not fall into the "negligible" category, the NJDEP Risk Management Committee Review would evaluate the impact and make appropriate recommendations for mitigation.

6.4.1 Formaldehyde

Long-term formaldehyde emissions from the proposed SPGF would not cause an incremental cancer risk greater than 1 in a million near the project location or at any of the sensitive receptor locations. The maximum modeled incremental cancer risk of 8.61×10^{-7} would occur at the fence line on Doremus Avenue. Of all the sensitive receptors modeled, the maximum incremental cancer risk of 1.43×10^{-7} would occur for an employee at the N.J. Transit building. These impacts are all below the 1-in-a-million threshold. The incremental cancer risk for Ironbound Community

[14] NJDEP, 2018, Technical Manual 1003: Guidance on Preparing a Risk Assessment for Air Contaminant Emissions. Available at: https://www.nj.gov/dep/aqpp/downloads/techman/1003.pdf

is in the range of 4.29×10^{-9} , which is well below the 1-in-a-million threshold. The incremental long-term cancer health risk, therefore, would be considered negligible.

Formaldehyde emissions from the proposed SPGF would also not increase the long-term (chronic) HQ greater than 1 near the project location or at any of the sensitive receptor locations. The maximum chronic HQ of 0.008 occurs at the fence line on Doremus Avenue. Of all the sensitive receptors evaluated, the maximum chronic HQ risk impact of 0.00128 would occur for an employee at the N.J. Transit building. These impacts are all below the threshold of 1. The chronic HQ for Ironbound Community is in the range of 3.67×10^{-5} combined, which is well below the threshold of 1. The long-term incremental non-cancer inhalation health risk would, therefore, be considered negligible.

Short-term peak formaldehyde emissions from the proposed SPGF would not increase the short-term (acute) HQ greater than 1 near the project location or at any of the sensitive receptor locations. The maximum acute HQ of 0.09 occurs at the fence line on Doremus Avenue. Of all the sensitive receptors evaluated, the maximum acute HQ risk impact of 0.043 is predicted to occur for an employee at the N.J. Transit building. The short-term HQ for Ironbound Community is in the range of 0.016, which is well below the threshold of 1. The short-term incremental non-cancer inhalation health risk would, therefore, be considered negligible.

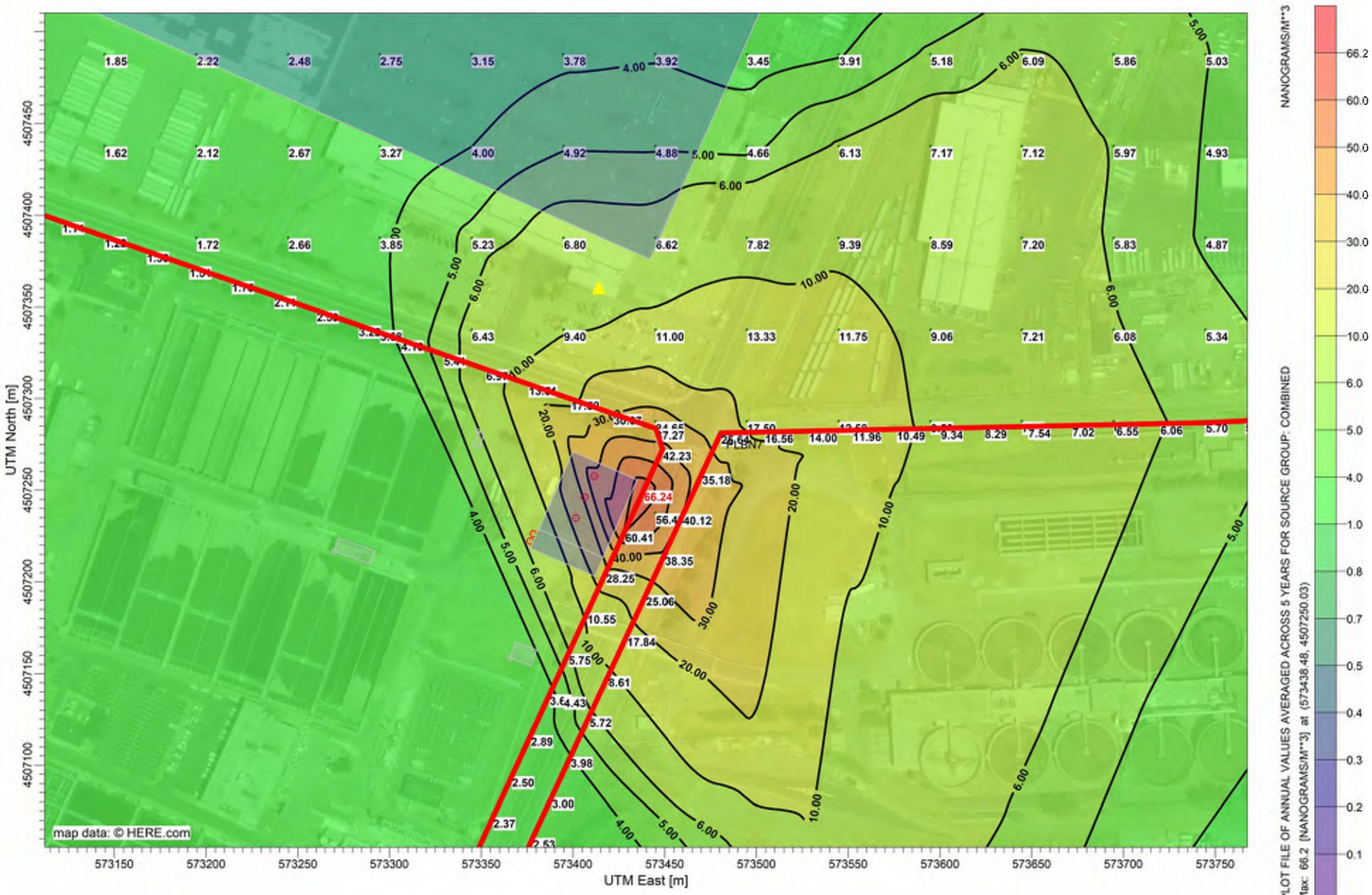
6.4.2 Acrolein

Short-term peak acrolein emissions from the proposed SPGF would not increase the short-term (acute) HQ greater than 1 near the project location or at any of the sensitive receptor locations. The maximum acute HQ of 0.451 is modeled to occur at the fence line on Doremus Avenue. Of all the sensitive receptors selected, the maximum acute HQ risk impact of 0.208 would occur for an employee at the N.J. Transit building. These impacts are all below the threshold of 1. The short-term HQ for Ironbound Community is in the range of 0.012 , which is well below the threshold of 1. The short-term incremental non-cancer inhalation health risk would, therefore, be considered negligible.

PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-1 Formaldehyde 5-year Averaging Period

NJDEP Inhalation Risk Threshold = 77 ng/m3 (or 0.077 ug/m3)



COMMENTS:

5-yr Average, Formaldehyde, Combined Source Group

SOURCES:

5

RECEPTORS:

2110

OUTPUT TYPE:

Concentration

MAX:

66.2 NANOGRAMS/M3**

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

6/23/2021

SCALE: 1:2,187

0 0.05 km

PROJECT NO.:

215015

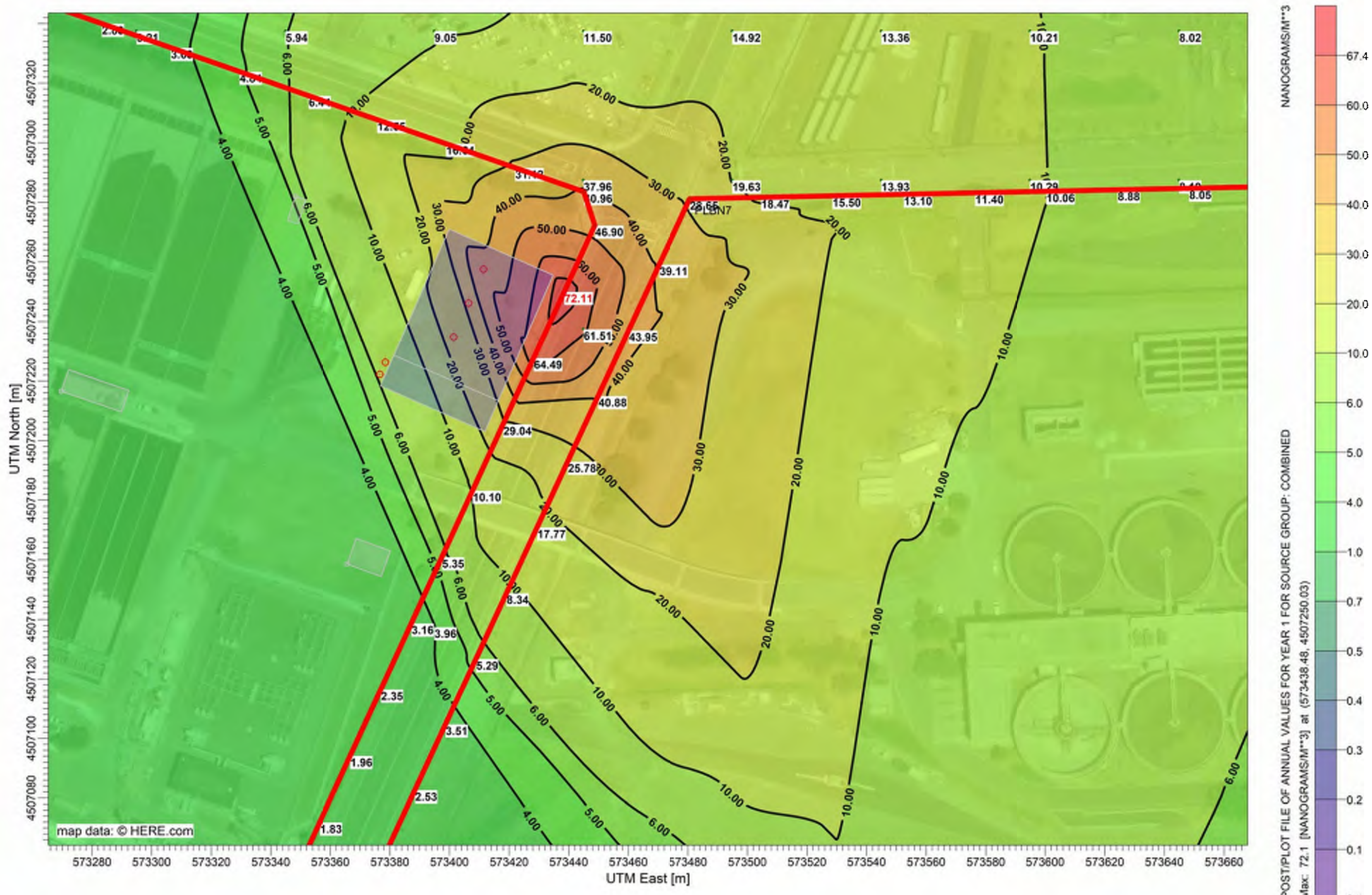
AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Formaldehyde_Annual_ALL_v2\PVSC_Formaldehyde_Annual_ALL_v2.isc

PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-2 Formaldehyde Peak Annual Averaging Period

NJDEP Long-term Formaldehyde Reference Concentration = 9000 ng/m3 (or 9 ug/m3)



COMMENTS:

Peak Annual Average, Formaldehyde, Combined Source Group

SOURCES:
5

RECEPTORS:
2110

OUTPUT TYPE:
Concentration

MAX:
72.1 NANOGRAMS/M3**

COMPANY NAME:
CDM Smith

MODELER:
Disha Shah

DATE:
6/23/2021

SCALE: 1:1,343

0 — 0.03 km

CDM Smith

PROJECT NO.:
215015

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Formaldehyde_Annual_ALL_v2\PVSC_Formaldehyde_Annual_ALL_v2.isc

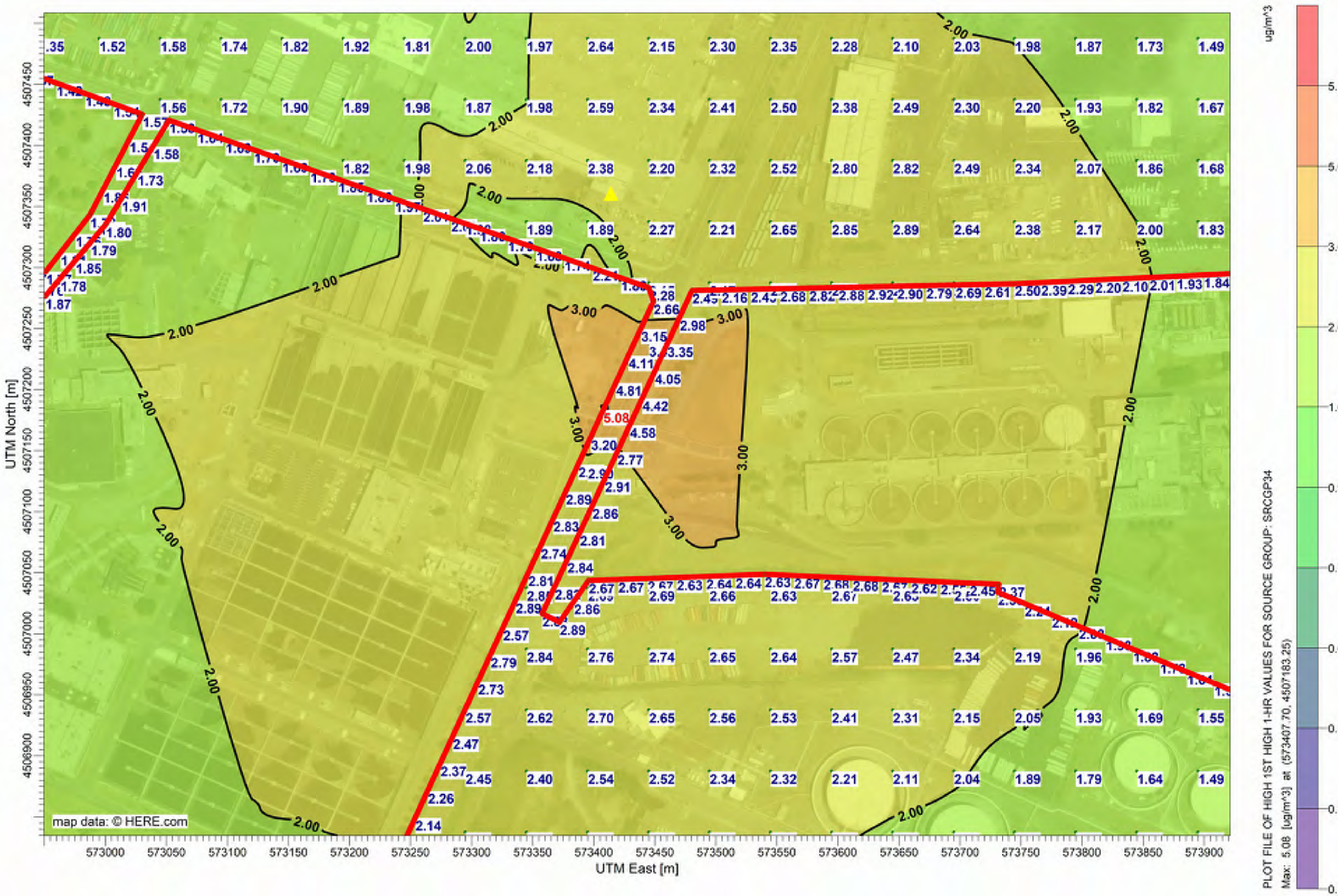
PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-3 Formaldehyde Peak 1-hour Averaging Period

NJDEP Short-Term Reference Concentration = 55 ug/m3

COMMENTS:

Peak 1-hour; Formaldehyde; Source Group 34



SOURCES:

29

RECEPTORS:

2110

OUTPUT TYPE:

Concentration

MAX:

5.08 ug/m^3

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

11/6/2020

SCALE: 1:3,242

0 0.1 km

PROJECT NO.:

215015

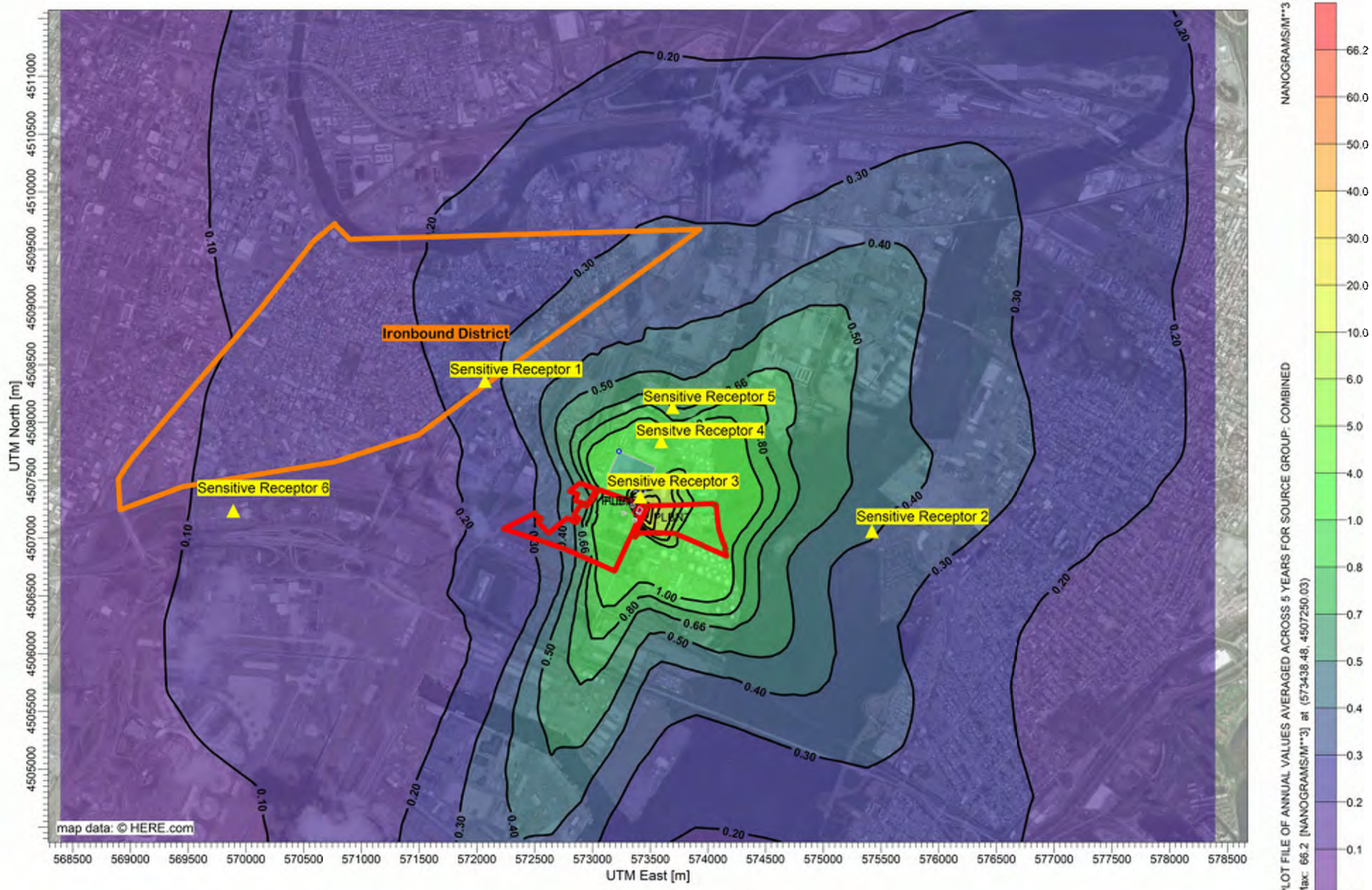
AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Combined_Forma_Shortterm_V0_Terr\PVSC_Combined_Forma_Shortterm_V0_Terr.isc

PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-4 Sensitive Receptors Formaldehyde 5-year Averaging Period

NJDEP Inhalation Risk Threshold = 77 ng/m3 (or 0.077 ug/m3)



COMMENTS:
5-yr Average, Formaldehyde, Combined Source Group

SOURCES: **5**

RECEPTORS: **2110**

OUTPUT TYPE: **Concentration**

MAX: **66.2 NANOGRAMS/M**3**

COMPANY NAME: **CDM Smith**

MODELER: **Disha Shah**

DATE: **6/23/2021**

SCALE: 1:34,657
0 — 1 km

CDM Smith

PROJECT NO.: **215015**

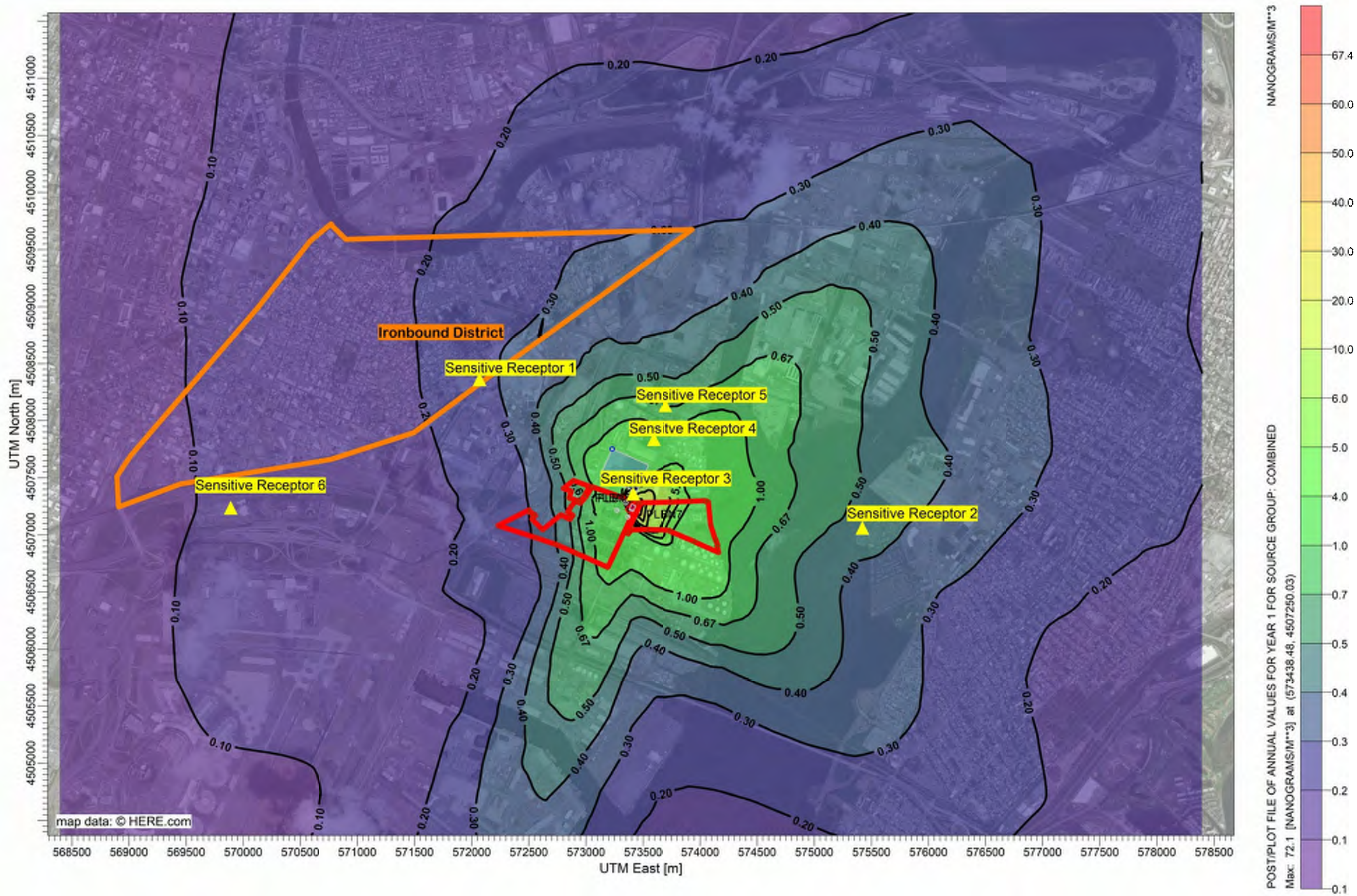
AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Formaldehyde_Annual_ALL_v2\PVSC_Formaldehyde_Annual_ALL_v2.isc

PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-5 Sensitive Receptors Formaldehyde Peak Annual Averaging Period

NJDEP Long-term Formaldehyde Reference Concentration = 9000 ng/m3 (or 9 ug/m3)



COMMENTS:

Peak Annual Average, Formaldehyde, Combined Source Group

SOURCES:

5

RECEPTORS:

2110

OUTPUT TYPE:

Concentration

MAX:

72.1 NANOGRAMS/M3**

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

6/23/2021

SCALE: 1:34,657

0 — 1 km

PROJECT NO.:

215015

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Formaldehyde_Annual_ALL_v2\PVSC_Formaldehyde_Annual_ALL_v2.isc

PROJECT TITLE:

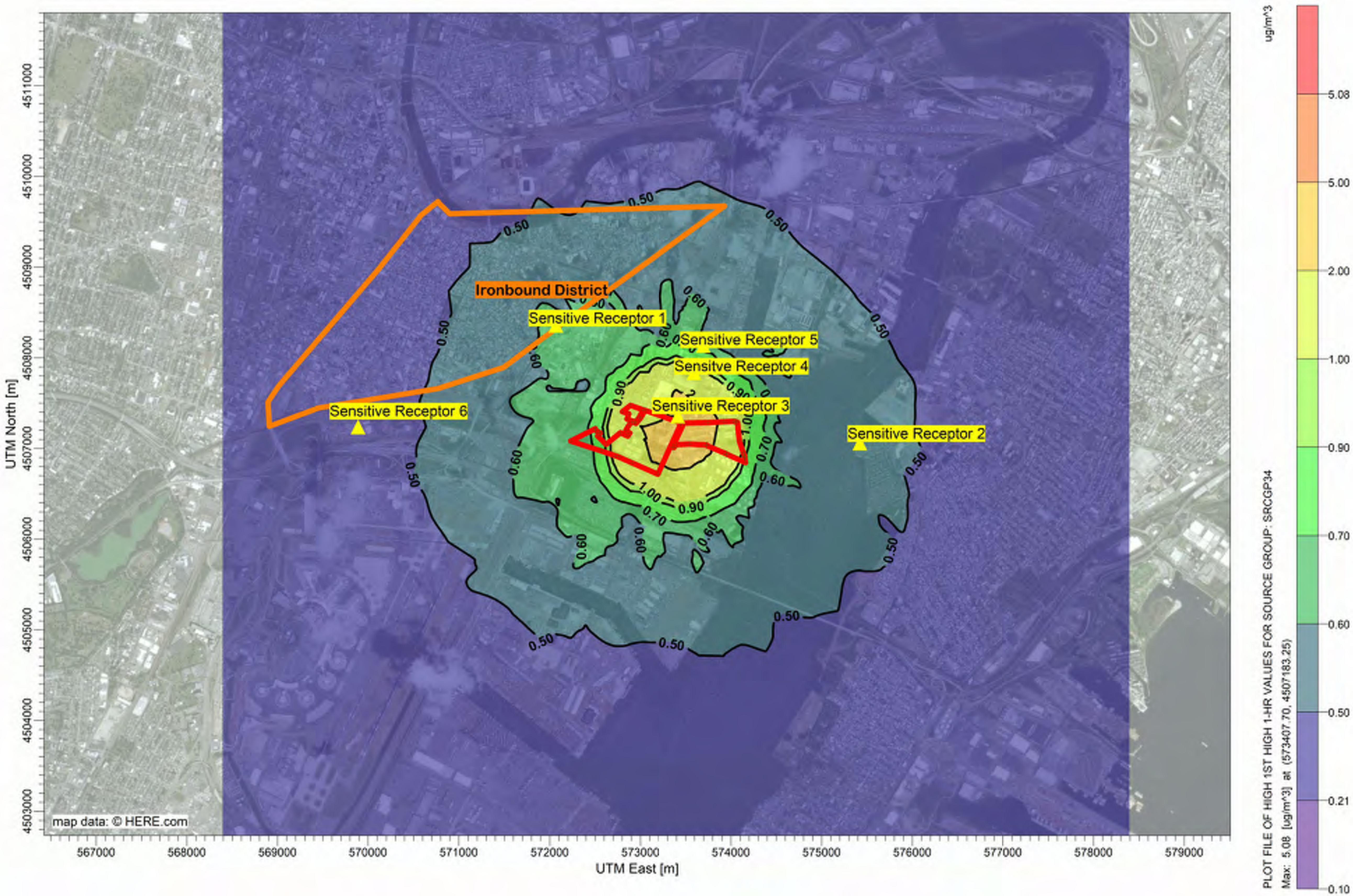
PVSC SPGF Dispersion Modeling

Figure 6-6 Sensitive Receptors Formaldehyde Peak 1-hour Averaging Period

NJDEP Short-term Reference Concentration = 55 ug/m3

COMMENTS:

Peak 1-hour; Formaldehyde; Source Group 34



SOURCES:

29

RECEPTORS:

2110

OUTPUT TYPE:

Concentration

MAX:

5.08 ug/m^3

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

11/6/2020

SCALE: 1:43,645

0 — 1 km

CDM Smith

PROJECT NO.:

215015

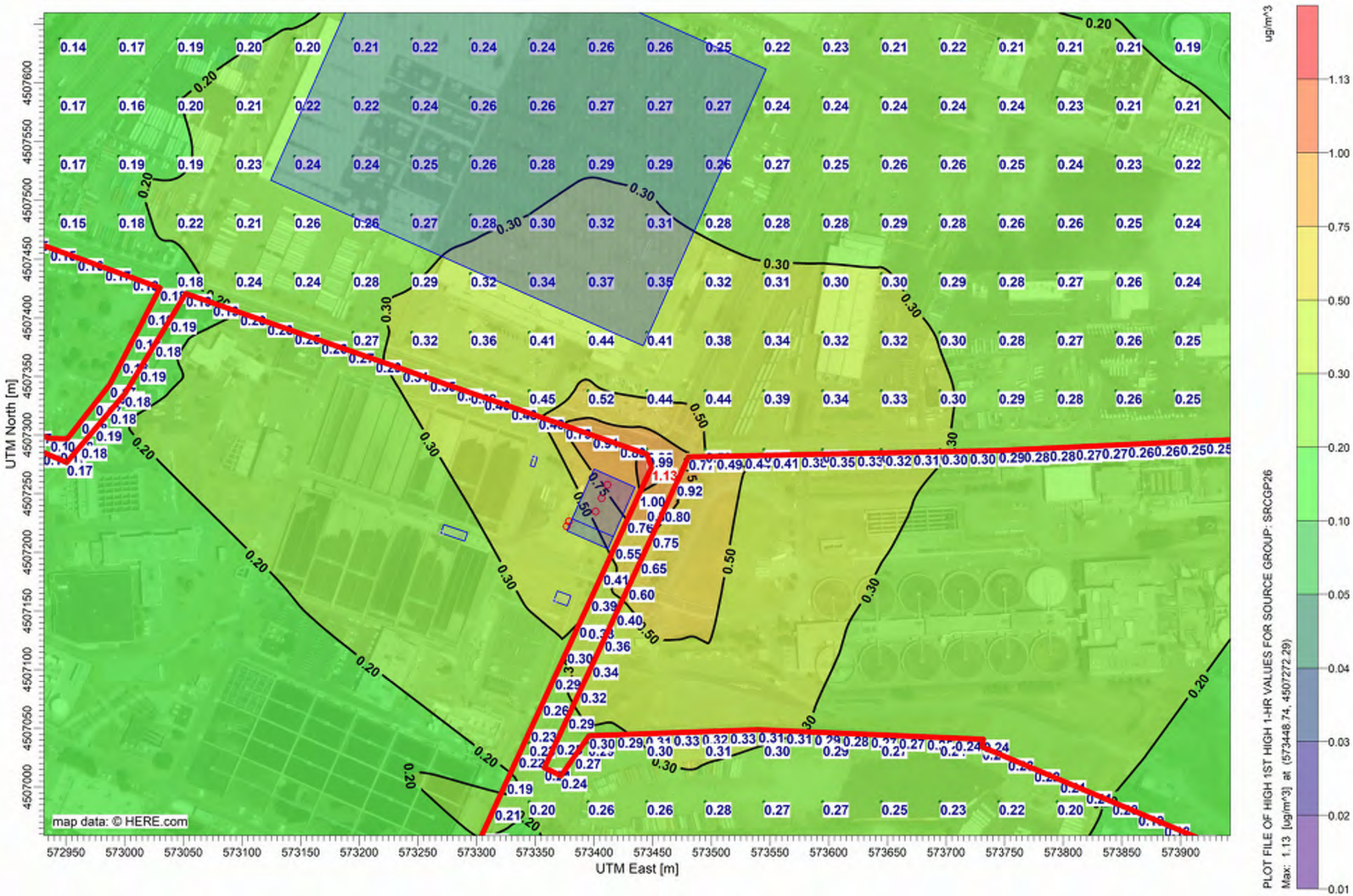
AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Combined_Forma_Shortterm_V0_Terr\PVSC_Combined_Forma_Shortterm_V0_Terr.isc

PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-7 Peak 1-hour Acrolein

NJDEP Short-Term Reference Concentration = 2.5 ug/m3



COMMENTS:

Peak 1- hour
Acrolein
Source Group 26

SOURCES:
23

RECEPTORS:
2110

OUTPUT TYPE:
Concentration

MAX:
1.13 ug/m^3

COMPANY NAME:
CDM Smith

MODELER:
Disha Shah

DATE:
11/6/2020

SCALE: 1:3,373

0 0.1 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Combined_Acr_Shortterm_v0\PVSC_Combined_Acr_Shortterm_v0.isc

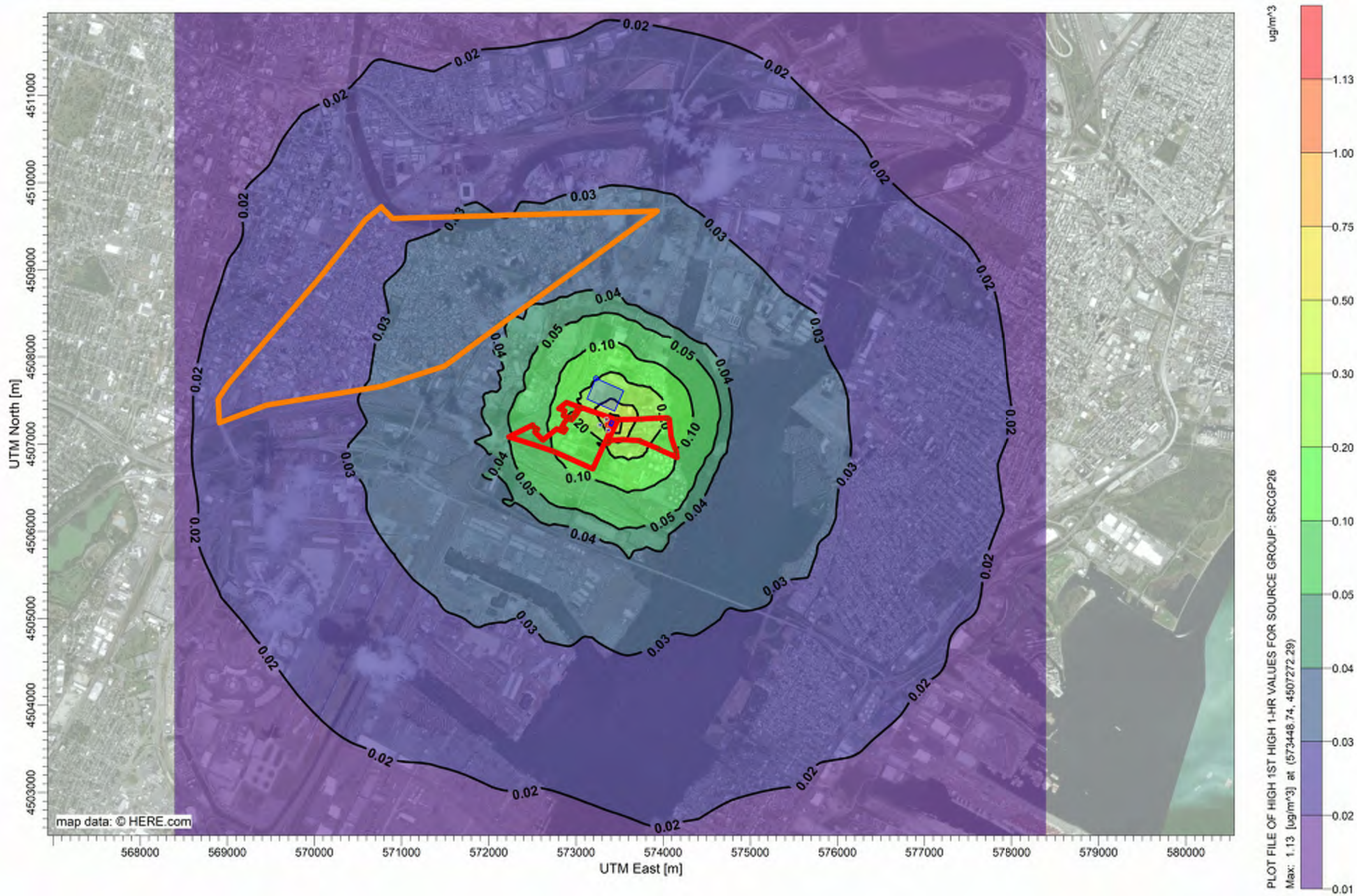
PROJECT TITLE:

PVSC SPGF Dispersion Modeling
Figure 6-8 Sensitive Receptors Peak 1-hour Acrolein

NJDEP Short-term Reference Concentration = 2.5 ug/m3

COMMENTS:

Peak 1- hour
Acrolein
Source Group 26



SOURCES:

23

RECEPTORS:

2110

OUTPUT TYPE:

Concentration

MAX:

1.13 ug/m^3

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

11/6/2020

SCALE: 1:45,427

0 1 km

CDM Smith

PROJECT NO.:

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_Combined_Acr_Shortterm_v0\PVSC_Combined_Acr_Shortterm_v0.isc

Section 7

NJDEP Title V Permit Application RADIUS Forms

7.1 Permit Application Forms

The air permit application has been completed using the NJDEP RADIUS computer program and submitted via NJDEP online. This section contains a hardcopy printout of the application forms.

Remainder of Page Left Intentionally Blank

Passaic Valley Sewerage Commission (07349) Date: 6/25/2021

New Jersey Department of Environmental Protection
Reason for Application

Permit Being Modified

Permit Class: BOP **Number:** 200003

Description of Modifications: Passaic Valley Sewerage Commission (PVSC) is applying for a modification to its Title V Operating Permit to include a new Standby Power Generation Facility (SPGF) Facility.

In October of 2012, PVSC was severely impacted by Superstorm Sandy. The 12-foot storm surge from adjacent Newark Bay inundated the facilities, flooding buildings, tunnels and process areas, destroying vehicles, equipment, and inventory stored on-site. Failure of the direct power connections to the Public Service Electric and Gas (PSE&G) grid caused the PVSC to lose control of their processes and dewatering capabilities. With assistance of New Jersey Office of Emergency Management (NJOEM), PVSC has procured federal funds to construct standby generation at the site that would be able to satisfy the full electric load of the PVSC facility and enable continued, full operation in the event of another prolonged, widespread power outage, thus avoiding future water quality events when the next major storm and/or power outage occurs.

The proposed Standby Power Generation Facility (SPGF) is designed to support the entire WWTP electric load, allowing the plant to function upon loss of the utility electrical supply. The facility's design net power generation capacity is 34 MW. The SPGF is designed to operate in island mode, in that the SPGF will not export power to the utility electrical grid and the power generated on site will be consumed by the WWTP. To minimize disruption to the WWTP process, when utility electrical service is restored, the SPGF will parallel with the electrical utility service to seamlessly transfer the power source from the SPGF to the utility. Predicated on the Reliability and Resiliency requirement for critical equipment, the Facility is designed with an "N+1" configuration matching that of PVSC's electrical distribution system configuration.

PVSC will install three (3) combustion turbine generators (CTGs) each with a maximum gross output of 28 MW. The CTGs will be fueled with natural gas as the only fuel and will exhaust into the air emissions control equipment ductwork and casing. The facility is designed as an indoor plant with the combustion turbine and emissions controls (consisting of a vertical casing with oxidation catalyst and selective catalytic reduction (SCR) catalyst in the hot gas path) located indoors.

The SPGF is designed to be capable of starting without support from the utility electric supply. To support black-start of the turbine generator, PVSC will install two (2) 2,000 kW standby natural gas-fired generators (stationary combustion engines). Two (2) black-start generators (BSG) will be provided to meet the identified Reliability and Resiliency requirement of "N+1" configuration for critical equipment. The SPGF project will significantly improve the resiliency for PVSC. In addition, two 164-kW diesel fire pump engines are also proposed. Only one would operate at a time to pump water for fire suppression if hydrant pressure is not available.

The SPGF is proposed to operate only during emergencies, for exercising/maintenance of the CTGs, for storm preparation, and during peak periods (demand response) when the reliability of the grid is threatened. No power would be exported or sold to the grid.

New Jersey Department of Environmental Protection
Facility Profile (General)

Facility Name (AIMS): Passaic Valley Sewerage Commission

Facility ID (AIMS): 07349

Street Address: PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE
NEWARK, NJ 07105

Mailing Address: PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE
NEWARK, NJ 07105

State Plane Coordinates:

X-Coordinate:	596,552
Y-Coordinate:	684,568
Units:	Feet
Datum:	NAD83
Source Org.:	xAddress Match
Source Type:	Digital Image

County: Essex

Location Description: Wastewater treatment plant in Essex County area, NJ

Industry:

Primary SIC:	
Secondary SIC:	
NAICS:	221320

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Air Permit Information Contact

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Marques Eley
NJ EIN: 00226002471
Title: Senior Engineer
Phone: (973) 466-2969 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: meley@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: BOP - Operating Permits

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Marques Eley
NJ EIN: 00226002471
Title: Process Control Engineer
Phone: (973) 466-2969 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: meley@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: Consultant

Organization: CDM Smith Inc.
Org. Type: Corporation
Name: Amit Sen
NJ EIN:
Title: Environmental Engineer
Phone: (215) 239-6542 x
Fax: (215) 636-9811 x
Other: ( ) - x
Type:
Email: senak@cdmsmith.com

Mailing Address: CDM Smith
2 Penn Center
1500 JFK Boulevard, Suite 1208
Philadelphia, PA 19102

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Emission Statements

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Marques Eley
NJ EIN: 00226002471
Title: Senior Engineer
Phone: (973) 466-2969 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: meley@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: Fees/Billing Contact

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Joseph Kelly
NJ EIN: 00226002471
Title: Chief Financial Officer
Phone: (973) 817-5998 x
Fax: (973) 344-4392 x
Other: ( ) - x
Type:
Email: jkelly@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: General Contact

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Marques Eley
NJ EIN: 00226002471
Title: Senior Engineer
Phone: (973) 466-2969 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: meley@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Legal Counsel

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Michael Witt
NJ EIN: 00226002471
Title: General Counsel
Phone: (973) 817-5944 x
Fax: (973) 344-7454 x
Other: ( ) - x
Type:
Email: mwitt@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: NOx RACT Annual Adjust. Report Contact

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Marques Eley
NJ EIN: 00226002471
Title: Senior Engineer
Phone: (973) 466-2969 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: meley@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: On-Site Manager

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Thomas A. Laustsen
NJ EIN: 00226002471
Title: Chief Operating Officer
Phone: (973) 817-5980 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: tlaustsen@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Operator

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Thomas A. Laustsen
NJ EIN: 00226002471
Title: Chief Operating Officer
Phone: (973) 817-5980 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: tlaustsen@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: Owner (Current Primary)

Organization: Passaic Valley Sewerage Commission
Org. Type: Municipal
Name: Passaic Valley Sewerage Commission
NJ EIN: 00226002471
Title: Owner
Phone: (973) 817-5699 x
Fax: (973) 817-5738 x
Other: ( ) - x
Type:
Email: mdefrancisci@PVSC.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: Responsible Official

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Thomas A. Laustsen
NJ EIN: 00226002471
Title: Chief Operating Officer
Phone: (973) 817-5980 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: tlaustsen@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Responsible Party

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Greg Tramontozzi
NJ EIN: 00226002471
Title: Executive Director
Phone: (973) 466-2915 x
Fax: (973) 817-5738 x
Other: ( ) - x
Type:
Email: mailto:gtramontozzi@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

Contact Type: Title V Compliance Certification Contact

Organization: Passaic Valley Sewerage Commission
Org. Type: Auth/Dist/Comm
Name: Marques Eley
NJ EIN: 00226002471
Title: Senior Engineer
Phone: (973) 466-2969 x
Fax: (973) 817-5709 x
Other: ( ) - x
Type:
Email: meley@pvsc.com

Mailing Address: Passaic Valley Sewerage Commission
600 Wilson Avenue
Newark, NJ 07105

New Jersey Department of Environmental Protection
Facility Profile (Permitting)

1. Is this facility classified as a small business by the USEPA?	No
2. Is this facility subject to N.J.A.C. 7:27-22?	Yes
3. Are you voluntarily subjecting this facility to the requirements of Subchapter 22?	No
4. Has a copy of this application been sent to the USEPA?	No
5. If not, has the EPA waived the requirement?	No
6. Are you claiming any portion of this application to be confidential?	No
7. Is the facility an existing major facility?	Yes
8. Have you submitted a netting analysis?	Yes
9. Are emissions of any pollutant above the SOTA threshold?	No
10. Have you submitted a SOTA analysis?	No

11. If you answered "Yes" to Question 9 and "No" to Question 10, explain why a SOTA analysis was not required

12. Have you provided, or are you planning to provide air contaminant modeling? Yes

Air Contaminant(s)	
Name	**CAS Number**
Acrolein	00107-02-8
Formaldehyde	00050-00-0

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E3001	NG Turbine 1	28 MWe Natural Gas Turbine 1	Combustion Turbine		12/1/2021	No		
E3002	NG Turbine 2	28 MWe Natural Gas Turbine 2	Combustion Turbine		12/1/2021	No		
E3003	NG Turbine 3	28 MWe Natural Gas Turbine 3	Combustion Turbine		12/1/2021	No		
E3004	NG Engine 1	2000 kW Natural Gas Black Start Engine 1	Emergency Generator		12/1/2021	No		
E3005	NG Engine 2	2000 kW Natural Gas Black Start Engine 2	Emergency Generator		12/1/2021	No		
E3006	DS FP Engn 1	Diesel Fire Pump Engine 1	Emergency Fire Pump		12/1/2021	No		
E3007	DS FP Engn 2	Diesel Fire Pump Engine 2	Emergency Fire Pump		12/1/2021	No		

000000 E3001 (Combustion Turbine)
Print Date: 6/25/2021

Make:			
Manufacturer:	Siemens		
Model:	SGT-600		
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	315.00		
Type of Turbine:	Industrial		
Type of Cycle:	Simple-Cycle	Description:	
Industrial Application:	Electical Generator	Description:	
Power Output:	28,000.00	Units:	Kilowatts

Is the combustion turbine using (check all that apply):

A Dry Low NOx Combustor:	☑		
Steam Injection:	☐	Steam to Fuel Ratio:	
Water Injection:	☐	Water to Fuel Ratio:	
Other:	☐	Description:	

Is the turbine Equipped with a Duct Burner? ○ Yes ● No

Have you attached a diagram showing the location and/or the configuration of this equipment? ● Yes ○ No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application? ● Yes ○ No

Comments:

000000 E3002 (Combustion Turbine)
Print Date: 6/25/2021

Make:			
Manufacturer:	Siemens		
Model:	SGT-600		
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	315.00		
Type of Turbine:	Industrial		
Type of Cycle:	Simple-Cycle	Description:	
Industrial Application:	Electical Generator	Description:	
Power Output:	28,000.00	Units:	Kilowatts

Is the combustion turbine using (check all that apply):

A Dry Low NOx Combustor:	☑		
Steam Injection:	☐	Steam to Fuel Ratio:	
Water Injection:	☐	Water to Fuel Ratio:	
Other:	☐	Description:	

Is the turbine Equipped with a Duct Burner? ○ Yes ● No

Have you attached a diagram showing the location and/or the configuration of this equipment? ● Yes ○ No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application? ● Yes ○ No

Comments:

000000 E3003 (Combustion Turbine)
Print Date: 6/25/2021

Make:			
Manufacturer:	Siemens		
Model:	SGT-600		
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	315.00		
Type of Turbine:	Industrial		
Type of Cycle:	Simple-Cycle	Description:	
Industrial Application:	Electical Generator	Description:	
Power Output:	28,000.00	Units:	Kilowatts

Is the combustion turbine using (check all that apply):

A Dry Low NOx Combustor:	☑		
Steam Injection:	☐	Steam to Fuel Ratio:	
Water Injection:	☐	Water to Fuel Ratio:	
Other:	☐	Description:	

Is the turbine Equipped with a Duct Burner? ○ Yes ● No

Have you attached a diagram showing the location and/or the configuration of this equipment? ● Yes ○ No

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application? ● Yes ○ No

Comments:

000000 E3004 (Emergency Generator)
Print Date: 6/25/2021

Make:	
Manufacturer:	Caterpillar
Model:	G3520
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	18.70
Will the equipment be used in excess of 500 hours per year?	○ Yes ● No

Have you attached a diagram showing the location and/or the configuration of this equipment?	● Yes ○ No	Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	● Yes ○ No

Comments:

000000 E3005 (Emergency Generator)
Print Date: 6/25/2021

Make:	
Manufacturer:	Caterpillar
Model:	G3520
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	18.70
Will the equipment be used in excess of 500 hours per year?	○ Yes ● No

Have you attached a diagram showing the location and/or the configuration of this equipment?	● Yes ○ No	Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	● Yes ○ No

Comments:

000000 E3006 (Emergency Fire Pump)
Print Date: 6/25/2021

Make:	Clarke
Manufacturer:	
Model:	JU6H-UFADP8
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	1.54
Will the equipment be used in excess of 500 hours per year?	○ Yes ● No
Have you attached a diagram showing the location and/or the configuration of this equipment?	● Yes ○ No
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	● Yes ○ No
Comments:	Fire pump engine model will be Clark JU6H-UFADP8 or equivalent.

000000 E3007 (Emergency Fire Pump)
Print Date: 6/25/2021

Make:	Clarke
Manufacturer:	
Model:	JU6H-UFADP8
Maximum rated Gross Heat Input (MMBtu/hr-HHV):	1.54
Will the equipment be used in excess of 500 hours per year?	○ Yes ● No
Have you attached a diagram showing the location and/or the configuration of this equipment?	● Yes ○ No
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	● Yes ○ No
Comments:	Fire pump engine model will be Clark JU6H-UFADP8 or equivalent.

Passaic Valley Sewerage Commission (07349) Date: 6/25/2021

New Jersey Department of Environmental Protection
Control Device Inventory

CD NJID	Facility's Designation	Description	CD Type	Install Date	Grand-Fathered	Last Mod. (Since 1968)	CD Set ID
CD31	SCR Turbine1	Selective Catalytic Reduction for Turbine 1	Selective Catalytic Reduction	12/1/2021	No		
CD32	SCR Turbine2	Selective Catalytic Reduction for Turbine 2	Selective Catalytic Reduction	12/1/2021	No		
CD33	SCR Turbine3	Selective Catalytic Reduction for Turbine 3	Selective Catalytic Reduction	12/1/2021	No		
CD34	OC Turbine1	Oxidation Catalyst for Turbine 1	Oxidizer (Catalytic)	12/1/2021	No		
CD35	OC Turbine2	Oxidation Catalyst for Turbine 2	Oxidizer (Catalytic)	12/1/2021	No		
CD36	OC Turbine3	Oxidation Catalyst for Turbine 3	Oxidizer (Catalytic)	12/1/2021	No		

000000 CD31 (Selective Catalytic Reduction)
Print Date: 6/25/2021

Make:	Peerless
Manufacturer:	Cormetech
Model:	CMHCDET
Minimum Temperature at Catalyst Bed (°F):	825.0
Maximum Temperature at Catalyst Bed (°F):	855.0
Minimum Temperature at Reagent Injection Point (°F):	825.0
Maximum Temperature at Reagent Injection Point (°F):	855.0
Type of Reagent:	Ammonia
Description:	
Chemical Formula of Reagent:	19% ammonium hydroxide
Minimum Reagent Charge Rate (gpm):	0.1
Maximum Reagent Charge Rate (gpm):	0.1
Minimum Concentration of Reagent in Solution (% Volume):	18.00
Minimum NOx to Reagent Mole Ratio:	1.10
Maximum NOx to Reagent Mole Ratio:	1.28
Maximum Anticipated Ammonia Slip (ppm):	5.000
Type of Catalyst:	Vanadium-Titanium-Tungsten
Volume of Catalyst (ft³):	169.00
Form of Catalyst:	ceramic honeycomb
Anticipated Life of Catalyst:	5000.00
Units:	hours
Have you attached a catalyst replacement schedule?	○ Yes ● No
Method of Determining Breakthrough:	stack NOx analyzer
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	field traverse testing
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	○ Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	○ Yes ● No

000000 CD31 (Selective Catalytic Reduction)
Print Date: 6/25/2021

Comments:	Min reagent charge rate is 0.03 gpm; max reagent charge rate is 0.08 gpm.

000000 CD32 (Selective Catalytic Reduction)
Print Date: 6/25/2021

Make:	Peerless
Manufacturer:	Cormetech
Model:	CMHCDET
Minimum Temperature at Catalyst Bed (°F):	825.0
Maximum Temperature at Catalyst Bed (°F):	855.0
Minimum Temperature at Reagent Injection Point (°F):	825.0
Maximum Temperature at Reagent Injection Point (°F):	855.0
Type of Reagent:	Ammonia
Description:	
Chemical Formula of Reagent:	19% ammonium hydroxide
Minimum Reagent Charge Rate (gpm):	0.1
Maximum Reagent Charge Rate (gpm):	0.1
Minimum Concentration of Reagent in Solution (% Volume):	18.00
Minimum NOx to Reagent Mole Ratio:	1.10
Maximum NOx to Reagent Mole Ratio:	1.28
Maximum Anticipated Ammonia Slip (ppm):	5.000
Type of Catalyst:	Vanadium-Titanium-Tungsten
Volume of Catalyst (ft^3):	169.00
Form of Catalyst:	ceramic honeycomb
Anticipated Life of Catalyst:	5000.00
Units:	hours
Have you attached a catalyst replacement schedule?	○ Yes ● No
Method of Determining Breakthrough:	stack NOx analyzer
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	field traverse testing
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	○ Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	○ Yes ● No

000000 CD32 (Selective Catalytic Reduction)
Print Date: 6/25/2021

Comments:	Min reagent charge rate is 0.03 gpm; max reagent charge rate is 0.08 gpm.

000000 CD33 (Selective Catalytic Reduction)
Print Date: 6/25/2021

Make:	Peerless
Manufacturer:	Cormetech
Model:	CMHCDET
Minimum Temperature at Catalyst Bed (°F):	825.0
Maximum Temperature at Catalyst Bed (°F):	855.0
Minimum Temperature at Reagent Injection Point (°F):	825.0
Maximum Temperature at Reagent Injection Point (°F):	855.0
Type of Reagent:	Ammonia
Description:	
Chemical Formula of Reagent:	19% ammonium hydroxide
Minimum Reagent Charge Rate (gpm):	0.1
Maximum Reagent Charge Rate (gpm):	0.1
Minimum Concentration of Reagent in Solution (% Volume):	18.00
Minimum NOx to Reagent Mole Ratio:	1.10
Maximum NOx to Reagent Mole Ratio:	1.28
Maximum Anticipated Ammonia Slip (ppm):	5.000
Type of Catalyst:	Vanadium-Titanium-Tungsten
Volume of Catalyst (ft^3):	169.00
Form of Catalyst:	ceramic honeycomb
Anticipated Life of Catalyst:	5000.00
Units:	hours
Have you attached a catalyst replacement schedule?	○ Yes ● No
Method of Determining Breakthrough:	stack NOx analyzer
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	field traverse testing
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	○ Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	○ Yes ● No

000000 CD33 (Selective Catalytic Reduction)
Print Date: 6/25/2021

Comments:	Min reagent charge rate is 0.03 gpm; max reagent charge rate is 0.08 gpm.

000000 CD34 (Oxidizer (Catalytic))
Print Date: 6/25/2021

Make:	
Manufacturer:	Synergy
Model:	PMC-DLC-CO
Minimum Inlet Temperature (°F):	600.0
Maximum Inlet Temperature (°F)	1200.0
Minimum Outlet Temperature (°F)	600.0
Maximum Outlet Temperature (°F):	1200.0
Minimum Residence Time (sec)	0.03
Fuel Type:	Natural gas
Description:	
Maximum Rated Gross Heat Input (MMBtu/hr):	
Minimum Pressure Drop Across Catalyst (psi):	0.065
Maximum Pressure Drop Across Catalyst (psi):	0.108
Catalyst Material:	Active Ingredients: Platinum, Paladium
Form of Catalyst:	Plate
Description:	
Minimum Expected Life of Catalyst:	5000.00
Units:	hours
Volume of Catalyst (ft^3):	55.00
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	field traverse testing
Have you attached data from recent performance testing?	○ Yes ● No
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	○ Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	○ Yes ● No
Comments:	

000000 CD35 (Oxidizer (Catalytic))
Print Date: 6/25/2021

Make:	
Manufacturer:	Synergy
Model:	PMC-DLC-CO
Minimum Inlet Temperature (°F):	600.0
Maximum Inlet Temperature (°F)	1200.0
Minimum Outlet Temperature (°F)	600.0
Maximum Outlet Temperature (°F):	1200.0
Minimum Residence Time (sec)	0.03
Fuel Type:	Natural gas
Description:	
Maximum Rated Gross Heat Input (MMBtu/hr):	
Minimum Pressure Drop Across Catalyst (psi):	0.065
Maximum Pressure Drop Across Catalyst (psi):	0.108
Catalyst Material:	Active Ingredients: Platinum, Paladium
Form of Catalyst:	Plate
Description:	
Minimum Expected Life of Catalyst:	5000.00
Units:	hours
Volume of Catalyst (ft^3):	55.00
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	field traverse testing
Have you attached data from recent performance testing?	Yes ● No
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	Yes ● No
Comments:	

000000 CD36 (Oxidizer (Catalytic))
Print Date: 6/25/2021

Make:	
Manufacturer:	Synergy
Model:	PMC-DLC-CO
Minimum Inlet Temperature (°F):	600.0
Maximum Inlet Temperature (°F)	1200.0
Minimum Outlet Temperature (°F)	600.0
Maximum Outlet Temperature (°F):	1200.0
Minimum Residence Time (sec)	0.03
Fuel Type:	Natural gas
Description:	
Maximum Rated Gross Heat Input (MMBtu/hr):	
Minimum Pressure Drop Across Catalyst (psi):	0.065
Maximum Pressure Drop Across Catalyst (psi):	0.108
Catalyst Material:	Active Ingredients: Platinum, Paladium
Form of Catalyst:	Plate
Description:	
Minimum Expected Life of Catalyst:	5000.00
Units:	hours
Volume of Catalyst (ft³):	55.00
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	1
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	field traverse testing
Have you attached data from recent performance testing?	○ Yes ● No
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	○ Yes ● No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	○ Yes ● No
Comments:	

Passaic Valley Sewerage Commission (07349)

Date: 6/25/2021

New Jersey Department of Environmental Protection
Emission Points Inventory

PT NJID	Facility's Designation	Description	Config.	Equiv. Diam. (in.)	Height (ft.)	Dist. to Prop. Line (ft)	Exhaust Temp. (deg. F)			Exhaust Vol. (acfm)			Discharge Direction	PT Set ID
							Avg.	Min.	Max.	Avg.	Min.	Max.		
PT301	NG TURBINE 1	Natural Gas Turbine 1 exhaust stack	Round	120	106	93	830.0	825.0	840.0	358,750.0	301,558.0	472,670.0	Up	
PT302	NG TURBINE 2	Natural Gas Turbine 2 exhaust stack	Round	120	106	93	830.0	825.0	840.0	358,750.0	301,558.0	472,670.0	Up	
PT303	NG TURBINE 3	Natural Gas Turbine 3 exhaust stack	Round	120	106	93	830.0	825.0	840.0	358,750.0	301,558.0	472,670.0	Up	
PT304	NG ENGINE 1	Black Start Engine 1 exhaust stack	Round	20	78	153	889.0	881.0	920.0	12,837.0	9,468.0	16,371.0	Up	
PT305	NG ENGINE 2	Black Start Engine 2 exhaust stack	Round	20	78	151	889.0	881.0	920.0	12,837.0	9,468.0	16,371.0	Up	
PT306	DS FP ENGN 1	FIre Pump Engine 1 exhaust stack	Round	5	18	62	986.0	986.0	986.0	1,189.0	1,189.0	1,189.0	Up	
PT307	DS FP ENGN 2	FIre Pump Engine 2 exhaust stack	Round	5	18	62	986.0	986.0	986.0	1,189.0	1,189.0	1,189.0	Up	

Passaic Valley Sewerage Commission (07349)

Date: 6/25/2021

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 301 NG Turbines Three Natural Gas Turbines

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	NG Turbine 1	NG Turbine 1 - Testing and Maintenance	Maintenance	E3001	CD31 (P) CD34 (P)	PT301	2-02-002-01	0.0	93.0		301,558.0	472,670.0	825.0	840.0
OS2	NG Turbine 1	NG Turbine 1 - Startup	Startup	E3001	CD31 (P) CD34 (P)	PT301	2-02-002-01	0.0	10.4		166,671.0	361,219.0	881.0	1,046.0
OS3	NG Turbine 1	NG Turbine 1 - Shutdown	Shutdown	E3001	CD31 (P) CD34 (P)	PT301	2-02-002-01	0.0	4.2		166,671.0	361,219.0	881.0	1,046.0
OS4	NG Turbine 1	NG Turbine 1 - Demand Response	Normal - Steady State	E3001	CD31 (P) CD34 (P)	PT301	2-02-002-01	0.0	10.3		301,558.0	472,670.0	825.0	840.0
OS5	NG Turbine 2	NG Turbine 2 - Testing and Maintenance	Maintenance	E3002	CD32 (P) CD35 (P)	PT302	2-02-002-01	0.0	93.0		301,558.0	472,670.0	825.0	840.0
OS6	NG Turbine 2	NG Turbine 2 - Startup	Startup	E3002	CD32 (P) CD35 (P)	PT302	2-02-002-01	0.0	10.4		166,671.0	361,219.0	881.0	1,046.0
OS7	NG Turbine 2	NG Turbine 2 - Shutdown	Shutdown	E3002	CD32 (P) CD35 (P)	PT302	2-02-002-01	0.0	4.2		166,671.0	361,219.0	881.0	1,046.0
OS8	NG Turbine 2	NG Turbine 2 - Demand Response	Normal - Steady State	E3002	CD32 (P) CD35 (P)	PT302	2-02-002-01	0.0	10.3		301,558.0	472,670.0	825.0	840.0
OS9	NG Turbine 3	NG Turbine 3 - Testing and Maintenance	Maintenance	E3003	CD33 (P) CD36 (P)	PT303	2-02-002-01	0.0	93.0		301,558.0	472,670.0	825.0	840.0
OS10	NG Turbine 3	NG Turbine 3 - Startup	Startup	E3003	CD33 (P) CD36 (P)	PT303	2-02-002-01	0.0	10.4		166,671.0	361,219.0	881.0	1,046.0
OS11	NG Turbine 3	NG Turbine 3 - Shutdown	Shutdown	E3003	CD33 (P) CD36 (P)	PT303	2-02-002-01	0.0	4.2		166,671.0	361,219.0	881.0	1,046.0
OS12	NG Turbine 3	NG Turbine 3 - Demand Response	Normal - Steady State	E3003	CD33 (P) CD36 (P)	PT303	2-02-002-01	0.0	10.3		301,558.0	472,670.0	825.0	840.0

Passaic Valley Sewerage Commission (07349)

Date: 6/25/2021

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 301 NG Turbines Three Natural Gas Turbines

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS13	NG Turbine 1	NG Turbine 1 - Storm Preparation	Normal - Steady State	E3001	CD31 (P) CD34 (P)	PT301	2-02-002-01	0.0	474.2		301,558.0	472,670.0	825.0	840.0
OS14	NG Turbine 2	NG Turbine 2 - Storm Preparation	Normal - Steady State	E3002	CD32 (P) CD35 (P)	PT302	2-02-002-01	0.0	474.2		301,558.0	472,670.0	825.0	840.0
OS15	NG Turbine 3	NG Turbine 3 - Storm Preparation	Normal - Steady State	E3003	CD33 (P) CD36 (P)	PT303	2-02-002-01	0.0	474.2		301,558.0	472,670.0	825.0	840.0

U 304 NG Engines Two Black Start Engines

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	NG Engine 1	NG Black Start Engine 1 - Testing and Maintenance	Maintenance	E3004		PT304	2-02-002-02	0.0	100.0		9,468.0	16,371.0	881.0	920.0
OS2	NG Engine 2	NG Black Start Engine 2 - Testing and Maintenance	Maintenance	E3005		PT305	2-02-002-02	0.0	100.0		9,468.0	16,371.0	881.0	920.0

Passaic Valley Sewerage Commission (07349)

Date: 6/25/2021

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 306 DS FP Engns Two Diesel Fire Pump Engines

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
OS1	DS FP Engn 1	Diesel Fire Pump Engn 1	Maintenance	E3006		PT306	2-02-001-02	0.0	100.0		1,189.0	1,189.0	986.0	986.0
OS2	DS FP Engn 2	Diesel Fire Pump Engn 2	Maintenance	E3007		PT307	2-02-001-02	0.0	100.0		1,189.0	1,189.0	986.0	986.0

000000 U301 OS1 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS1 (Efficiency Table - CD31) Print Date: 6/25/2021			
Pollutant Category	**Capture Efficiency (%)**	**Removal Efficiency (%)**	**Overall Efficiency (%)**
HAP (Total)			
PM-10			
VOC (Total)			
NOx	100.00	90.00	90.00
PM-2.5			
Other (Total)			
SO2			
CO			
Pb			
TSP			

000000 U301 OS1 (Oxidizer (Catalytic) - CD34)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS2 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS2 (Efficiency Table - CD31) Print Date: 6/25/2021			
Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
NOx			
Pb			
PM-2.5			
TSP			
HAP (Total)			
Other (Total)			
PM-10			
SO2			
VOC (Total)			
CO			

000000 U301 OS3 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS3 (Efficiency Table - CD31)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
CO			
NOx			
Pb			
PM-2.5			
TSP			
HAP (Total)			
Other (Total)			
PM-10			
SO2			
VOC (Total)			

000000 U301 OS4 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS4 (Efficiency Table - CD31)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
HAP (Total)			
PM-10			
VOC (Total)			
NOx	100.00	90.00	90.00
PM-2.5			
TSP			
Other (Total)			
SO2			
CO			
Pb			

000000 U301 OS4 (Oxidizer (Catalytic) - CD34)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS5 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS5 (Efficiency Table - CD32) Print Date: 6/25/2021			
Pollutant Category	**Capture Efficiency (%)**	**Removal Efficiency (%)**	**Overall Efficiency (%)**
HAP (Total)			
Other (Total)			
PM-10			
SO2			
VOC (Total)			
CO			
NOx	100.00	90.00	90.00
Pb			
PM-2.5			
TSP			

000000 U301 OS5 (Oxidizer (Catalytic) - CD35)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS6 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS6 (Efficiency Table - CD32) Print Date: 6/25/2021			
Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
CO			
NOx			
Pb			
PM-2.5			
SO2			
TSP			
VOC (Total)			
HAP (Total)			
Other (Total)			
PM-10			

000000 U301 OS7 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS7 (Efficiency Table - CD32)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
HAP (Total)			
Other (Total)			
PM-10			
SO2			
VOC (Total)			
CO			
NOx			
Pb			
PM-2.5			
TSP			

000000 U301 OS8 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS8 (Efficiency Table - CD32)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
TSP			
VOC (Total)			
CO			
HAP (Total)			
NOx	100.00	90.00	90.00
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			

000000 U301 OS8 (Oxidizer (Catalytic) - CD35)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS9 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS9 (Efficiency Table - CD33)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
HAP (Total)			
Other (Total)			
PM-10			
SO2			
VOC (Total)			
CO			
NOx	100.00	90.00	90.00
Pb			
PM-2.5			
TSP			

000000 U301 OS9 (Oxidizer (Catalytic) - CD36)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS10 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS10 (Efficiency Table - CD33)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
CO			
HAP (Total)			
NOx			
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			
TSP			
VOC (Total)			

000000 U301 OS11 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS11 (Efficiency Table - CD33)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
CO			
HAP (Total)			
NOx			
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			
TSP			
VOC (Total)			

000000 U301 OS12 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS12 (Efficiency Table - CD33) Print Date: 6/25/2021			
Pollutant Category	**Capture Efficiency (%)**	**Removal Efficiency (%)**	**Overall Efficiency (%)**
CO			
HAP (Total)			
NOx	100.00	90.00	90.00
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			
TSP			
VOC (Total)			

000000 U301 OS12 (Oxidizer (Catalytic) - CD36)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS13 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS13 (Efficiency Table - CD31) Print Date: 6/25/2021			
Pollutant Category	**Capture Efficiency (%)**	**Removal Efficiency (%)**	**Overall Efficiency (%)**
HAP (Total)			
PM-10			
VOC (Total)			
NOx	100.00	90.00	90.00
PM-2.5			
TSP			
Other (Total)			
SO2			
CO			
Pb			

000000 U301 OS13 (Oxidizer (Catalytic) - CD34)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS14 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS14 (Efficiency Table - CD32)
Print Date: 6/25/2021

Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
TSP			
VOC (Total)			
CO			
HAP (Total)			
NOx	100.00	90.00	90.00
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			

000000 U301 OS14 (Oxidizer (Catalytic) - CD35)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U301 OS15 (Fuel Information Table)
Print Date: 6/25/2021

Is this fuel a blend?	○ Yes ● No
Fuel Category:	Commercial
Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	
Units:	
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Amount of Oxygen in Flue Gas (%):	
Amount of Moisture in Flue Gas (%):	
Comments:	

000000 U301 OS15 (Efficiency Table - CD33) Print Date: 6/25/2021			
Pollutant Category	Capture Efficiency (%)	Removal Efficiency (%)	Overall Efficiency (%)
TSP			
VOC (Total)			
CO			
HAP (Total)			
NOx	100.00	90.00	90.00
Other (Total)			
Pb			
PM-10			
PM-2.5			
SO2			

000000 U301 OS15 (Oxidizer (Catalytic) - CD36)
Print Date: 6/25/2021

Maximum Feed Rate to the Oxidizer (tons/hr):	
Oxygen Content in Exhuast (%O2):	15.00
CO Concentration in Exhaust (ppmvd):	3.000000
Total VOC Concentration in Exhaust (ppmvd):	4.000000

000000 U304 OS1 (Fuel Information Table)
Print Date: 6/25/2021

Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	1.83
Units:	MMft^3/yr
Estimated Actual Amount of Fuel Burned Annually:	1.83
Units:	MMft^3/yr
Comments:	

000000 U304 OS2 (Fuel Information Table)
Print Date: 6/25/2021

Fuel Type:	Natural gas
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0030
Amount of Ash in Fuel (%):	
Fuel Heating Value:	1,020.00
Units:	BTU/scf
Estimated Maximum Amount of Fuel Burned Annually:	1.83
Units:	MMft^3/yr
Estimated Actual Amount of Fuel Burned Annually:	1.83
Units:	MMft^3/yr
Comments:	

000000 U306 OS1 (Fuel Information Table)
Print Date: 6/25/2021

Fuel Type:	Diesel fuel
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0015
Amount of Ash in Fuel (%):	
Fuel Heating Value:	137,030.00
Units:	BTU/gal
Estimated Maximum Amount of Fuel Burned Annually:	1,124.00
Units:	gal/yr
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Comments:	

000000 U306 OS2 (Fuel Information Table)
Print Date: 6/25/2021

Fuel Type:	Diesel fuel
Description (if other):	
Amount of Sulfur in Fuel (%):	0.0015
Amount of Ash in Fuel (%):	
Fuel Heating Value:	137,030.00
Units:	BTU/gal
Estimated Maximum Amount of Fuel Burned Annually:	1,124.00
Units:	gal/yr
Estimated Actual Amount of Fuel Burned Annually:	
Units:	
Comments:	

Passaic Valley Sewerage Commission (07349) Date: 6/25/2021

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00142000	0.00142000	0.00142000	tons/yr	No
Ammonia			1.35000000	1.35000000	tons/yr	No
CO		37.56000000	3.92000000	3.92000000	tons/yr	No
Formaldehyde		0.88400000	0.14600000	0.14600000	tons/yr	No
HAPs (Total)		0.88600000	0.14700000	0.14700000	tons/yr	No
NOx (Total)		18.00000000	1.96000000	1.96000000	tons/yr	No
Pb		0.00000000	0.00000000	0.00000000	tons/yr	No
PM-10 (Total)		2.83000000	2.83000000	2.83000000	tons/yr	No
SO2		0.69000000	0.69000000	0.69000000	tons/yr	No
TSP		2.83000000	2.83000000	2.83000000	tons/yr	No
VOC (Total)		1.27000000	1.27000000	1.27000000	tons/yr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS2**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00092400	0.00092400	0.00092400	lb/hr	No
Ammonia			0.88000000	0.88000000	lb/hr	No
CO		63.20000000	63.20000000	63.20000000	lb/hr	No
Formaldehyde		0.88100000	0.88100000	0.88100000	lb/hr	No
HAPs (Total)		0.88100000	0.88100000	0.88100000	lb/hr	No
NOx (Total)		2.90000000	2.90000000	2.90000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		1.84000000	1.84000000	1.84000000	lb/hr	No
SO2		0.45000000	0.45000000	0.45000000	lb/hr	No
TSP		1.84000000	1.84000000	1.84000000	lb/hr	No
VOC (Total)		4.40000000	4.40000000	4.40000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS3**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00037000	0.00037000	0.00037000	lb/hr	No
Ammonia			0.35000000	0.35000000	lb/hr	No
CO		20.00000000	20.00000000	20.00000000	lb/hr	No
Formaldehyde		0.80500000	0.80500000	0.80500000	lb/hr	No
HAPs (Total)		0.80500000	0.80500000	0.80500000	lb/hr	No
NOx (Total)		1.40000000	1.40000000	1.40000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		0.74000000	0.74000000	0.74000000	lb/hr	No
SO2		0.18000000	0.18000000	0.18000000	lb/hr	No
TSP		0.74000000	0.74000000	0.74000000	lb/hr	No
VOC (Total)		3.50000000	3.50000000	3.50000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS4**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS4**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS5**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS6**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00092400	0.00092400	0.00092400	lb/hr	No
Ammonia			0.88000000	0.88000000	lb/hr	No
CO		63.20000000	63.20000000	63.20000000	lb/hr	No
Formaldehyde		0.88100000	0.88100000	0.88100000	lb/hr	No
HAPs (Total)		0.88100000	0.88100000	0.88100000	lb/hr	No
NOx (Total)		2.90000000	2.90000000	2.90000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		1.84000000	1.84000000	1.84000000	lb/hr	No
SO2		0.45000000	0.45000000	0.45000000	lb/hr	No
TSP		1.84000000	1.84000000	1.84000000	lb/hr	No
VOC (Total)		4.40000000	4.40000000	4.40000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS7**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00037000	0.00037000	0.00037000	lb/hr	No
Ammonia			0.35000000	0.35000000	lb/hr	No
CO		20.00000000	20.00000000	20.00000000	lb/hr	No
Formaldehyde		0.80500000	0.80500000	0.80500000	lb/hr	No
HAPs (Total)		0.80500000	0.80500000	0.80500000	lb/hr	No
NOx (Total)		1.40000000	1.40000000	1.40000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS7**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-10 (Total)		0.74000000	0.74000000	0.74000000	lb/hr	No
SO2		0.18000000	0.18000000	0.18000000	lb/hr	No
TSP		0.74000000	0.74000000	0.74000000	lb/hr	No
VOC (Total)		3.50000000	3.50000000	3.50000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS8**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS9**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS10**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00092400	0.00092400	0.00092400	lb/hr	No
Ammonia			0.88000000	0.88000000	lb/hr	No
CO		63.20000000	63.20000000	63.20000000	lb/hr	No
Formaldehyde		0.88100000	0.88100000	0.88100000	lb/hr	No
HAPs (Total)		0.88100000	0.88100000	0.88100000	lb/hr	No
NOx (Total)		2.90000000	2.90000000	2.90000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS10**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-10 (Total)		1.84000000	1.84000000	1.84000000	lb/hr	No
SO2		0.45000000	0.45000000	0.45000000	lb/hr	No
TSP		1.84000000	1.84000000	1.84000000	lb/hr	No
VOC (Total)		4.40000000	4.40000000	4.40000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS11**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00037000	0.00037000	0.00037000	lb/hr	No
Ammonia			0.35000000	0.35000000	lb/hr	No
CO		20.00000000	20.00000000	20.00000000	lb/hr	No
Formaldehyde		0.80500000	0.80500000	0.80500000	lb/hr	No
HAPs (Total)		0.80500000	0.80500000	0.80500000	lb/hr	No
NOx (Total)		1.40000000	1.40000000	1.40000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		0.74000000	0.74000000	0.74000000	lb/hr	No
SO2		0.18000000	0.18000000	0.18000000	lb/hr	No
TSP		0.74000000	0.74000000	0.74000000	lb/hr	No
VOC (Total)		3.50000000	3.50000000	3.50000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS12**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

Subject Item: **U304 NG Engines**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.01000000	0.01000000	0.01000000	tons/yr	No
CO		0.32500000	0.32500000	0.32500000	tons/yr	No
Ethylene dibromide		0.00009110	0.00009110	0.00009110	tons/yr	No
Formaldehyde		0.11700000	0.11700000	0.11700000	tons/yr	No
HAPs (Total)		0.12700000	0.12700000	0.12700000	tons/yr	No
NOx (Total)		0.16300000	0.16300000	0.16300000	tons/yr	No
Pb		0.00000000	0.00000000	0.00000000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: U304 NG Engines

Operating Scenario: OS0 Summary

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-10 (Total)		0.01630000	0.01630000	0.01630000	tons/yr	No
SO2		0.00121000	0.00121000	0.00121000	tons/yr	No
TSP		0.03370000	0.03370000	0.03370000	tons/yr	No
VOC (Total)		0.11400000	0.11400000	0.11400000	tons/yr	No

Subject Item: U304 NG Engines

Operating Scenario: OS1

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.09610000	0.09610000	0.09610000	lb/hr	No
CO		3.25000000	3.25000000	3.25000000	lb/hr	No
Ethylene dibromide		0.00091100	0.00091100	0.00091100	lb/hr	No
Formaldehyde		1.17000000	1.14000000	1.14000000	lb/hr	No
HAPs (Total)		1.27000000	1.27000000	1.27000000	lb/hr	No
NOx (Total)		1.63000000	1.63000000	1.63000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		0.16300000	0.16300000	0.16300000	lb/hr	No
SO2		0.01210000	0.01210000	0.01210000	lb/hr	No
TSP		0.33700000	0.33700000	0.33700000	lb/hr	No
VOC (Total)		1.14000000	1.14000000	1.14000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U304 NG Engines**

Operating Scenario: **OS2**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.09610000	0.09610000	0.09610000	lb/hr	No
CO		3.25000000	3.25000000	3.25000000	lb/hr	No
Ethylene dibromide		0.00091100	0.00091100	0.00091100	lb/hr	No
Formaldehyde		1.17000000	1.14000000	1.14000000	lb/hr	No
HAPs (Total)		1.27000000	1.27000000	1.27000000	lb/hr	No
NOx (Total)		1.63000000	1.63000000	1.63000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		0.16300000	0.16300000	0.16300000	lb/hr	No
SO2		0.01210000	0.01210000	0.01210000	lb/hr	No
TSP		0.33700000	0.33700000	0.33700000	lb/hr	No
VOC (Total)		1.14000000	1.14000000	1.14000000	lb/hr	No

Subject Item: **U306 DS FP Engns**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO		0.12900000	0.12900000	0.12900000	tons/yr	No
HAPs (Total)		0.00067700	0.00067700	0.00067700	tons/yr	No
NOx (Total)		0.14500000	0.14500000	0.14500000	tons/yr	No
PM-10 (Total)		0.00770000	0.00770000	0.00770000	tons/yr	No
SO2		0.00007700	0.00007700	0.00007700	tons/yr	No
TSP		0.00770000	0.00770000	0.00770000	tons/yr	No
VOC (Total)		0.00720000	0.00720000	0.00720000	tons/yr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U306 DS FP Engns**

Operating Scenario: **OS1**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO		1.29000000	1.29000000	1.29000000	lb/hr	No
HAPs (Total)		0.00670000	0.00670000	0.00670000	lb/hr	No
NOx (Total)		1.45000000	1.45000000	1.45000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		0.08000000	0.08000000	0.08000000	lb/hr	No
SO2		0.00100000	0.00100000	0.00100000	lb/hr	No
TSP		0.08000000	0.08000000	0.08000000	lb/hr	No
VOC (Total)		0.07000000	0.07000000	0.07000000	lb/hr	No

Subject Item: **U306 DS FP Engns**

Operating Scenario: **OS2**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
CO		1.29000000	1.29000000	1.29000000	lb/hr	No
HAPs (Total)		0.00670000	0.00670000	0.00670000	lb/hr	No
NOx (Total)		1.45000000	1.45000000	1.45000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		0.08000000	0.08000000	0.08000000	lb/hr	No
SO2		0.00100000	0.00100000	0.00100000	lb/hr	No
TSP		0.08000000	0.08000000	0.08000000	lb/hr	No
VOC (Total)		0.07000000	0.07000000	0.07000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS13**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS14**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **U301 NG Turbines**

Operating Scenario: **OS14**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

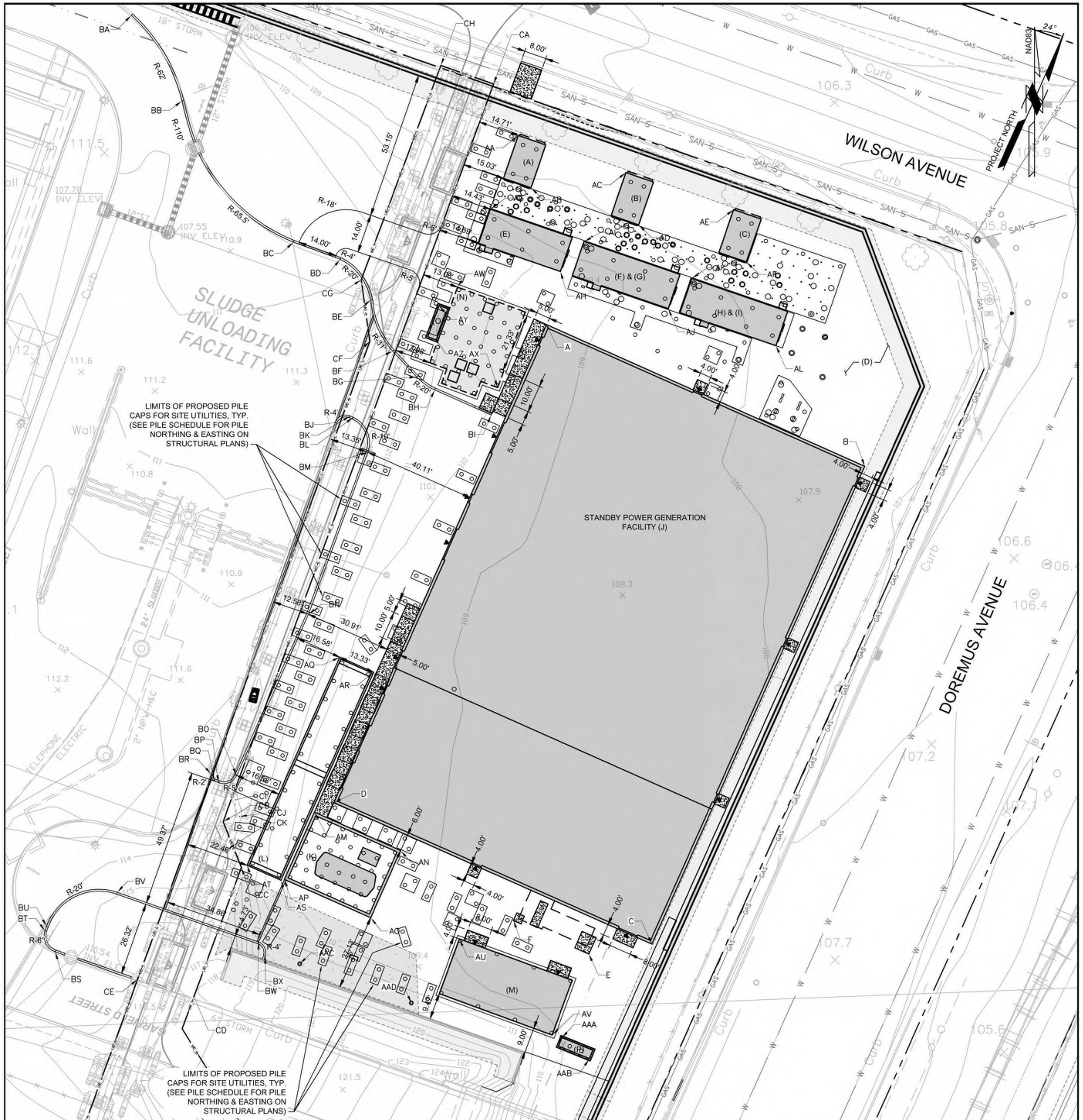
Subject Item: **U301 NG Turbines**

Operating Scenario: **OS15**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
Acrolein		0.00222000	0.00222000	0.00222000	lb/hr	No
Ammonia			2.10000000	2.10000000	lb/hr	No
CO		56.07000000	2.14000000	2.14000000	lb/hr	No
Formaldehyde		1.33000000	0.15000000	0.15000000	lb/hr	No
HAPs (Total)		1.33600000	0.15200000	0.15200000	lb/hr	No
NOx (Total)		28.63000000	2.93000000	2.93000000	lb/hr	No
Pb		0.00000000	0.00000000	0.00000000	lb/hr	No
PM-10 (Total)		4.41000000	4.41000000	4.41000000	lb/hr	No
SO2		1.07000000	1.07000000	1.07000000	lb/hr	No
TSP		4.41000000	4.41000000	4.41000000	lb/hr	No
VOC (Total)		1.64000000	1.64000000	1.64000000	lb/hr	No

APPENDIX A
Plot Plan



PLAN
1" = 20'

20' 10' 0 20' 40'
1"=20'

NORTHING AND EASTING SUMMARY

POINT NO.	NORTHING	EASTING	DESCRIPTION
1	684888.09	594409.19	A
2	684837.11	594523.68	B
3	684665.06	594447.08	C
4	684716.04	594332.58	D
5	684661.50	594424.34	E
6	684673.57	594397.23	F

NORTHING AND EASTING SUMMARY

POINT NO.	NORTHING	EASTING	DESCRIPTION
7	684956.22	594398.96	AA
8	684937.35	594403.56	AB
9	684942.87	594437.72	AC
10	684924.00	594442.33	AD
11	684929.52	594476.49	AE
12	684910.66	594481.10	AF
13	684929.66	594388.93	AG
14	684907.22	594414.17	AH
15	684918.05	594422.65	AI
16	684893.88	594452.93	AJ
17	684904.70	594461.42	AK
18	684880.53	594491.70	AL
19	684712.59	594325.58	AM
20	684698.76	594356.64	AN
21	684674.55	594345.86	AO
22	684688.38	594314.80	AP
23	684768.36	594334.72	AQ
24	684762.94	594346.90	AR
25	684688.03	594313.55	AS
26	684693.45	594301.36	AT
27	684666.94	594377.78	AU
28	684632.34	594411.16	AV
29	684901.61	594377.13	AW
30	684865.42	594391.54	AX
31	684894.98	594370.50	AY
32	684882.57	594369.50	AZ
33	684631.26	594414.64	AAA
34	684623.67	594424.50	AAB
35	684657.97	594320.30	AAC
36	684643.88	594360.44	AAD

NORTHING AND EASTING SUMMARY

POINT NO.	NORTHING	EASTING	DESCRIPTION
37	684999.50	594259.69	BA
38	684968.62	594277.91	BB
39	684917.80	594318.01	BC
40	684911.62	594334.87	BD
41	684896.99	594345.82	BE
42	684878.57	594353.74	BF
43	684869.25	594362.41	BG
44	684864.61	594368.91	BH
45	684855.56	594389.23	BI
46	684852.88	594333.03	BJ
47	684855.22	594338.44	BK
48	684854.74	594339.52	BL
49	684842.17	594344.84	BM
50	684783.82	594323.45	BN
51	684725.77	594297.61	BO
52	684723.24	594291.00	BP
53	684723.90	594289.52	BQ
54	684726.39	594288.45	BR
55	684662.28	594232.26	BS
56	684669.93	594228.59	BT
57	684671.48	594229.14	BU
58	684683.71	594254.64	BV
59	684665.82	594305.48	BW
60	684660.72	594307.93	BX

NORTHING AND EASTING SUMMARY

POINT NO.	NORTHING	EASTING	DESCRIPTION
61	684974.72	594390.08	CA
62	684709.11	594292.73	CB
63	684692.71	594299.30	CC
64	684646.24	594282.25	CD
65	684652.42	594261.98	CE
66	684882.13	594345.53	CF
67	684904.26	594342.44	CG
68	684981.41	594371.11	CH
69	684717.03	594297.14	CI
70	684711.04	594298.60	CJ
71	684699.22	594294.36	CK

NORTHING AND EASTING SUMMARY NOTES:

1. POINT NO.'S 1 - 6 (DESCRIPTION A - F): STANDBY POWER FACILITY BUILDING LIMITS.
2. POINT NO.'S 7 - 36 (DESCRIPTION AA - AAD): SITE ACCESSORY STRUCTURES (SEE STRUCTURE IDENTIFICATION CHART).
3. POINT NO.'S 37 - 60 (DESCRIPTION BA - BX): FACE OF PROPOSED CURB LOCATIONS.
4. POINT NO.'S 61 - 71 (DESCRIPTION CA - CK): PSE&G DUCT BANK EASEMENT LIMITS.
5. POINT NO.'S 69, 70 & 71 (DESCRIPTION CI, CJ, CK): PSE&G DUCT BANK STRUCTURE LIMITS LOCATED OUTSIDE OF THE EASEMENT LIMITS.
6. POINTS NO.'S 35 & 36 (DESCRIPTION AAC & AAD): EXTERIOR LIGHT POSTS

STRUCTURE IDENTIFICATION

ITEM #	DESCRIPTION
(A)	FUEL GAS COOLER 1
(B)	FUEL GAS COOLER 2
(C)	FUEL GAS COOLER 3
(D)	GAS YARD
(E)	FUEL GAS COMPRESSOR 1
(F)	FUEL GAS FILTER 1
(G)	FUEL GAS COMPRESSOR 2
(H)	FUEL GAS FILTER 2
(I)	FUEL GAS COMPRESSOR 3
(J)	STANDBY POWER BUILDING
(K)	AMMONIA CONTAINMENT AREA
(L)	AMMONIA TRUCK UNLOADING FACILITY
(M)	FIRE PUMP HOUSE
(N)	OIL-WATER BURIED STORAGE RESERVOIR
(O)	BACK FLOW PREVENTER STRUCTURE
(P)	BACK FLOW PREVENTER STRUCTURE

ISSUED FOR BID

REVISIONS

REV	ZONE	BY	DATE	DESCRIPTION
0		MY	8/14/20	ISSUED FOR BID

BLACK & VEATCH
489 Fifth Ave NY, NY 10017; COA No. 24GA27981200

CDM Smith
110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE.
NEWARK, NEW JERSEY 07105

"Protecting Public Health and the Environment"

STANDBY POWER GENERATION FACILITY
NEWARK, NEW JERSEY

POWER GENERATION BUILDING

SITE LAYOUT PLAN

DESIGNED BY: CVF
DRAWN BY: CVF
CHECKED BY: MY
APPROVED BY: MY

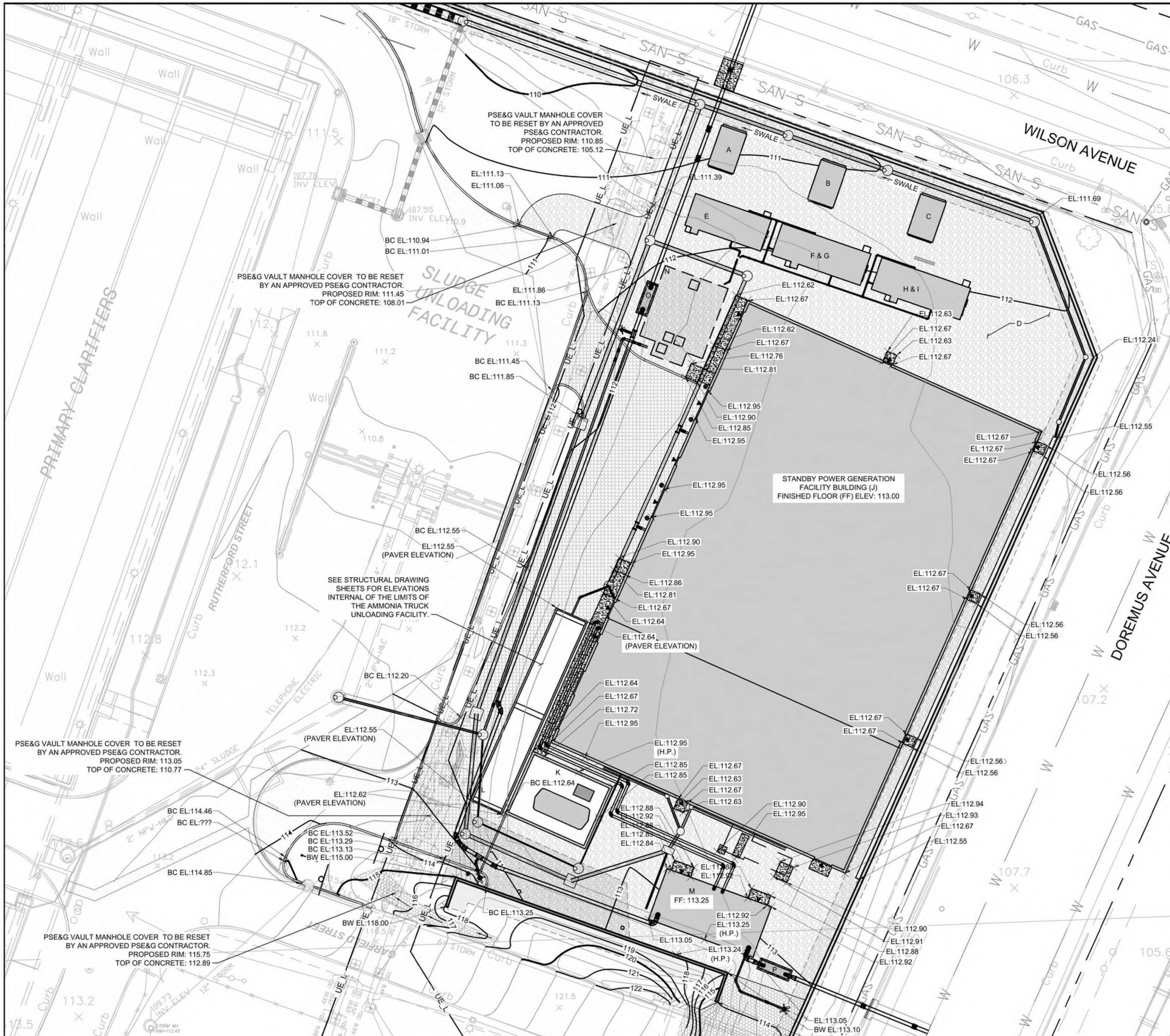
TIMOTHY J. DUPUIS
CIVIL ENGINEER
N.J. Professional Engineer Lic. No. 24GE05246800

DATE

Date: 8/14/2020
Scale: 1" = 20'
SHEET 34 OF 536

D
CONTRACT No: B040
COST CENTER: 6310-2685
DWG No: C-1004
REV. 0

* THIS IS A COMPUTER GENERATED DRAWING
DO NOT MAKE CHANGES MANUALLY

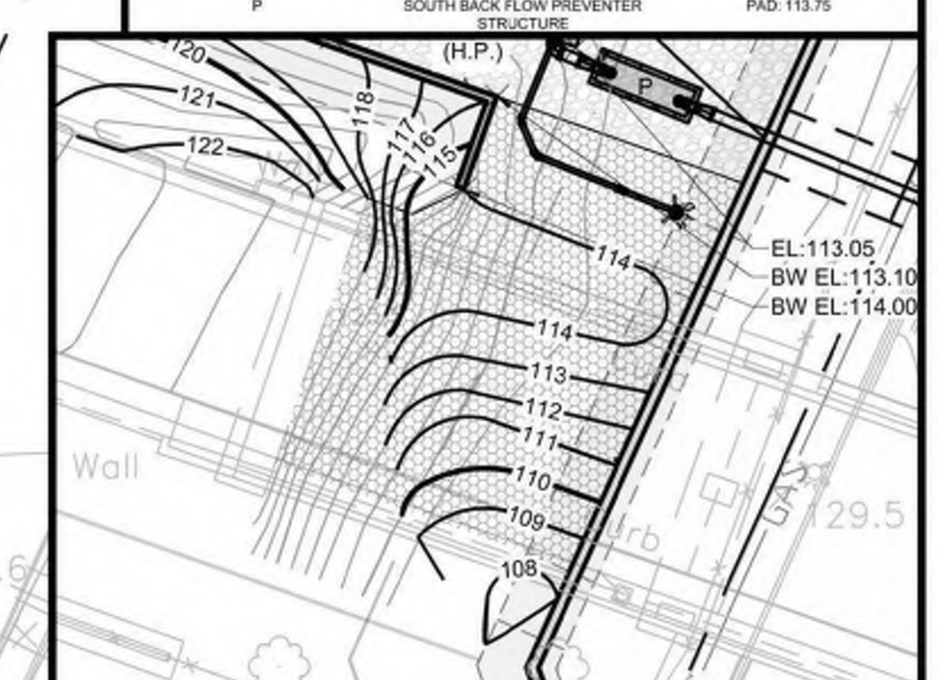


EXISTING PSE&G VAULT MANHOLE COVERS:

1. THERE ARE A TOTAL OF 4 (FOUR) EXISTING PSE&G VAULT MANHOLE COVERS LOCATED WITHIN THE LIMITS OF DISTURBANCE.
2. ANY OF THESE PSE&G VAULT MANHOLE COVERS WHICH ARE REQUIRED TO BE RESET TO MEET THE NEW SITE GRADES ARE TO BE RESET ONLY BY AN APPROVED PSE&G CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO SCHEDULE AND COORDINATE WITH PSE&G A CONTRACTOR WHO IS QUALIFIED AND APPROVED TO PERFORM THIS WORK.

STRUCTURE IDENTIFICATION/ELEVATIONS

ITEM #	DESCRIPTION	ELEVATIONS
A	FUEL GAS COOLER 1	PAD: 113.00
B	FUEL GAS COOLER 2	PAD: 113.00
C	FUEL GAS COOLER 3	PAD: 113.00
D	GAS YARD	(BY OTHERS)
E	FUEL GAS COMPRESSOR (FGC) 1	PAD: 113.00
F	FUEL GAS FILTER 1	ON FGC 1 PAD
G	FUEL GAS COMPRESSOR (FGC) 2	PAD: 113.00
H	FUEL GAS FILTER 2	ON FGC 2 PAD
I	FUEL GAS COMPRESSOR (FGC) 3	PAD: 113.00
J	STANDBY POWER BUILDING	FF: 113.00
K	AMMONIA CONTAINMENT AREA	SEE STRUCTURAL DRAWINGS
L	AMMONIA TRUCK UNLOADING FACILITY	SEE SPOT ELEVATIONS PROVIDED
M	FIRE PUMP HOUSE	FF: 113.25
N	OIL-WATER BURIED STORAGE RESERVOIR	SEE STRUCTURAL DRAWINGS FOR STRUCTURE INVERTS/ELEVS.
O	NORTH BACK FLOW PREVENTER STRUCTURE	PAD: 112.90
P	SOUTH BACK FLOW PREVENTER STRUCTURE	PAD: 113.75



RIP-RAP/GRADING UNDER BRIDGE
1" = 20'

PLAN
1" = 20'

REVISIONS

REV	ZONE	BY	DATE	DESCRIPTION
0		MY	8/14/20	ISSUED FOR BID

BLACK & VEATCH
489 Fifth Ave NY, NY 10017; COA No. 24GA27981200

CDM Smith
110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE.
NEWARK, NEW JERSEY 07105
"Protecting Public Health and the Environment"

STANDBY POWER GENERATION FACILITY
NEWARK, NEW JERSEY

POWER GENERATION BUILDING

SITE GRADING PLAN

DESIGNED BY:	CVF
DRAWN BY:	CVF
CHECKED BY:	MY
APPROVED BY:	MY

TIMOTHY J. DUPUIS
CIVIL ENGINEER
DATE
N.J. Professional Engineer Lic. No. 24GE05246800

Date:	8/14/2020		
Scale:	1"=20'	SHEET 36 OF 536	
D	CONTRACT No: B040	COST CENTER: 6310-2685	
DWG No:	C-1006	REV.	0

ISSUED FOR BID

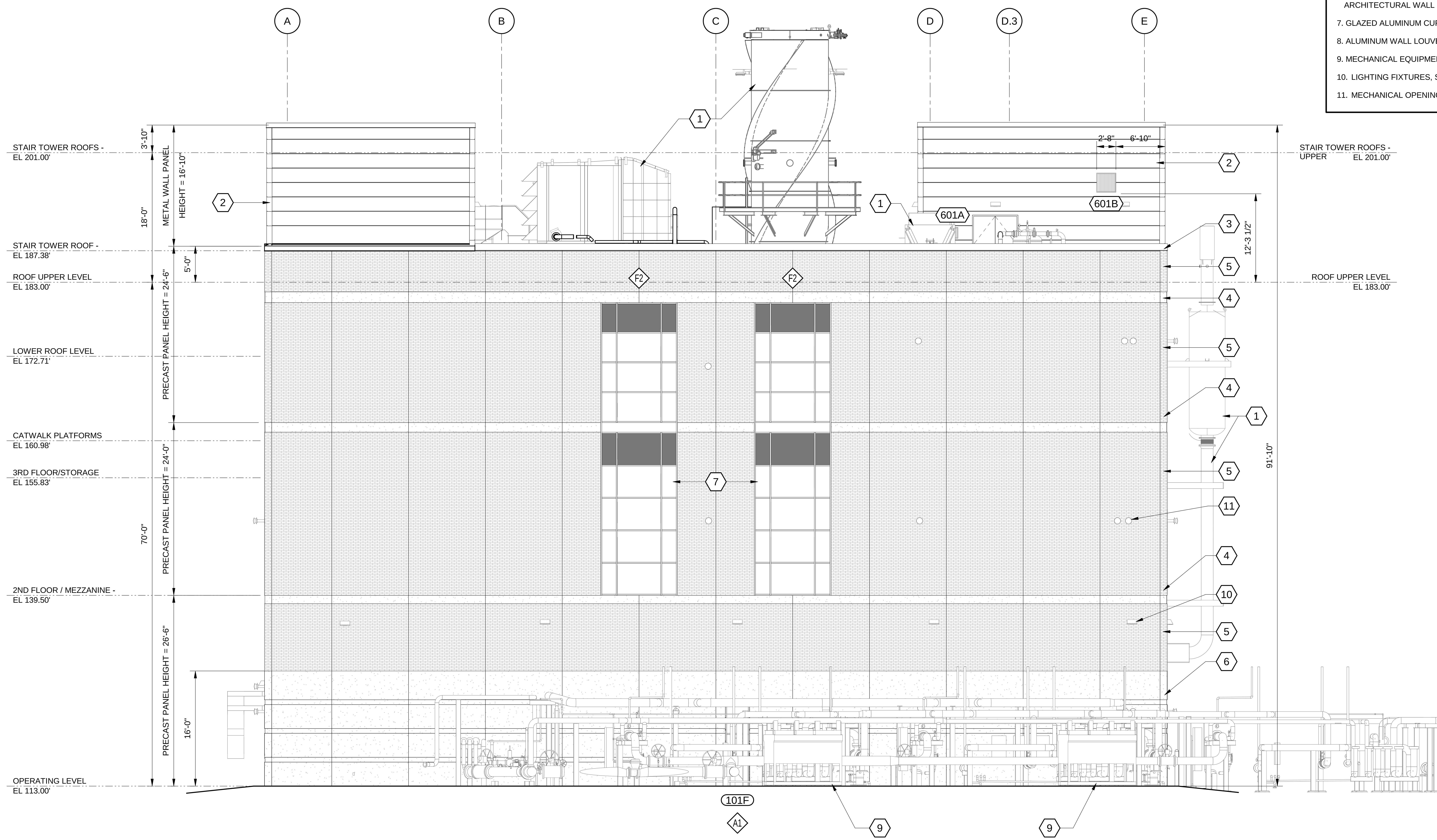
* THIS IS A COMPUTER GENERATED DRAWING
DO NOT MAKE CHANGES MANUALLY

GENERAL SHEET NOTES

NOT USED.

SHEET KEYNOTES

1. PROCESS MECHANICAL EQUIPMENT. SEE PROCESS MECHANICAL DRAWINGS.
2. INSULATED METAL WALL PANELS.
3. PREFINISHED METAL COPING, TYP.
4. EXPOSED BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
5. THIN BRICK BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
6. EXPOSED BAND WITH REVEALS ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
7. GLAZED ALUMINUM CURTAIN WALL SYSTEM.
8. ALUMINUM WALL LOUVER SYSTEM.
9. MECHANICAL EQUIPMENT. SEE MECHANICAL DRAWINGS.
10. LIGHTING FIXTURES, SEE ELECTRICAL DRAWINGS.
11. MECHANICAL OPENINGS, SEE MECHANICAL DRAWINGS, TYP.



NORTH ELEVATION
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

ISSUED FOR BID

REVISIONS

REV	ZONE	BY	DATE	DESCRIPTION
0		DRH	8/14/20	ISSUED FOR BID

BLACK & VEATCH
ARCHITECTS NEW JERSEY, L.L.C.

CDM Smith
110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE.
NEWARK, NEW JERSEY 07105
"Protecting Public Health and the Environment"

STANDBY POWER GENERATION FACILITY
NEWARK, NEW JERSEY

ARCHITECTURAL NORTH ELEVATION

DESIGNED BY:	RAB
DRAWN BY:	DGD
CHECKED BY:	DRH
APPROVED BY:	DRH

I hereby certify that this document was prepared by me or under my supervision and that I am a duly registered architect under the laws of the state of New Jersey.

DUANE R. HICKS
Architect
DATE
N.J. Registered Architect Lic. No. 21A102098000
COA No. 21AC00101700

Date: 8/14/2020
Scale: 1/8" = 1'-0" SHEET 71 OF 536
D CONTRACT No: B040 COST CENTER: 6310-2685
DWG No: A-2001 REV. 0

* THIS IS A COMPUTER GENERATED DRAWING DO NOT MAKE CHANGES MANUALLY

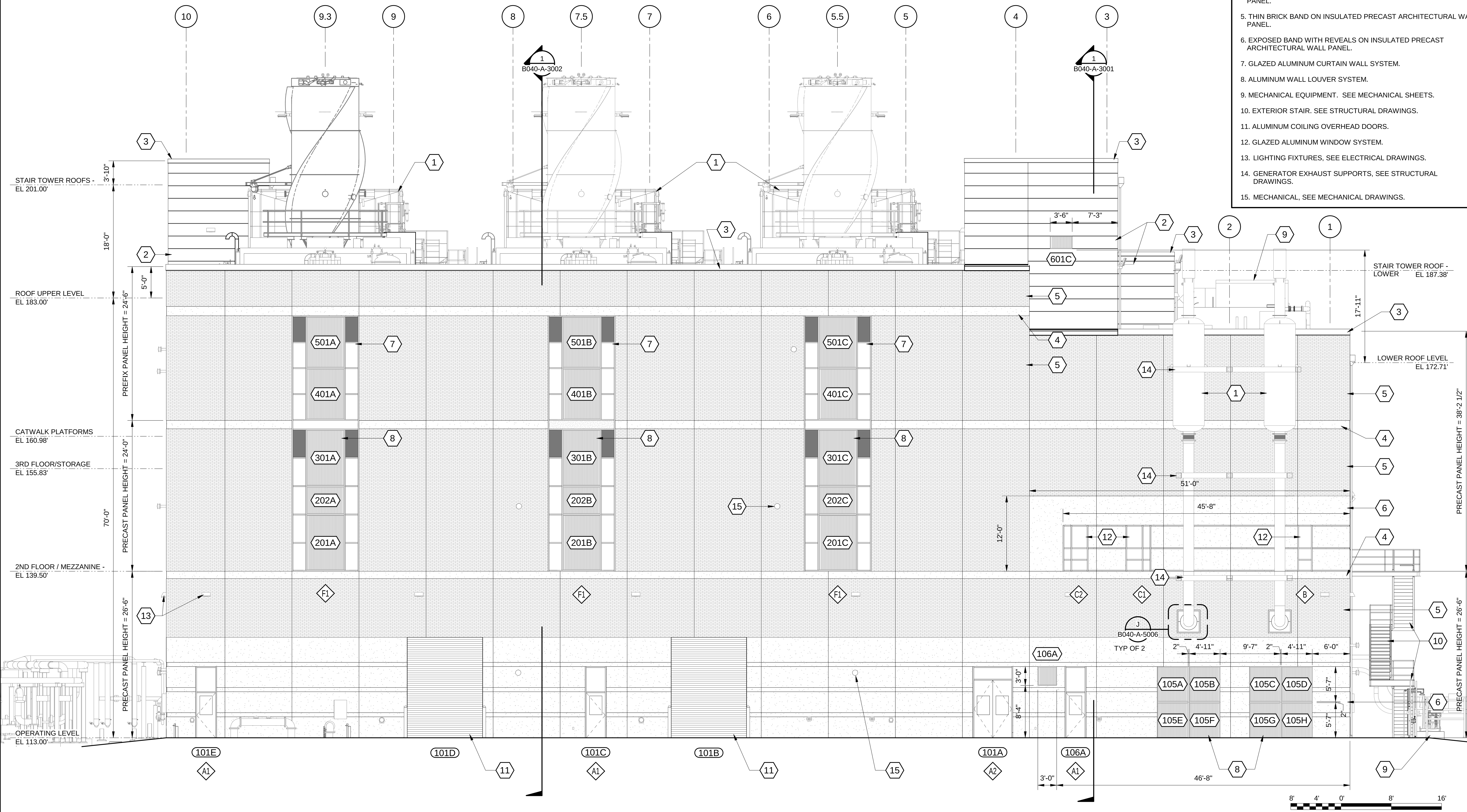
PLOTTED: 9/2/2020 11:19:19 PM

GENERAL SHEET NOTES

NOT USED.

SHEET KEYNOTES

1. PROCESS MECHANICAL EQUIPMENT. SEE PROCESS MECHANICAL DRAWINGS.
2. INSULATED METAL WALL PANELS.
3. PREFINISHED METAL COPING, TYP.
4. EXPOSED BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
5. THIN BRICK BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
6. EXPOSED BAND WITH REVEALS ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
7. GLAZED ALUMINUM CURTAIN WALL SYSTEM.
8. ALUMINUM WALL LOUVER SYSTEM.
9. MECHANICAL EQUIPMENT. SEE MECHANICAL SHEETS.
10. EXTERIOR STAIR. SEE STRUCTURAL DRAWINGS.
11. ALUMINUM COILING OVERHEAD DOORS.
12. GLAZED ALUMINUM WINDOW SYSTEM.
13. LIGHTING FIXTURES, SEE ELECTRICAL DRAWINGS.
14. GENERATOR EXHAUST SUPPORTS, SEE STRUCTURAL DRAWINGS.
15. MECHANICAL, SEE MECHANICAL DRAWINGS.



WEST ELEVATION

1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

ISSUED FOR BID

REV	ZONE	BY	DATE	DESCRIPTION
0		DRH	8/14/20	ISSUED FOR BID

REVISIONS

BLACK & VEATCH
ARCHITECTS NEW JERSEY, L.L.C.

CDM Smith
110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE.
NEWARK, NEW JERSEY 07105

"Protecting Public Health and the Environment"

STANDBY POWER
GENERATION FACILITY
NEWARK, NEW JERSEY

ARCHITECTURAL
WEST ELEVATION

DESIGNED BY:	RAB
DRAWN BY:	DGD
CHECKED BY:	DRH
APPROVED BY:	DRH

I hereby certify that this document was prepared by me or under my supervision and that I am a duly registered architect under the laws of the State of New Jersey.

DUANE R. HICKS, Architect — DATE

N.J. Registered Architect Lic. No. 21AI02098000
COA No. 21AC00101700

Date: 8/14/2020

Scale: 1/8" = 1'-0" — SHEET 72 OF 536

D — CONTRACT No: B040 — COST CENTER: 6310-2685

DWG No: A-2002 — REV. 0

* THIS IS A COMPUTER GENERATED DRAWING
DO NOT MAKE CHANGES MANUALLY

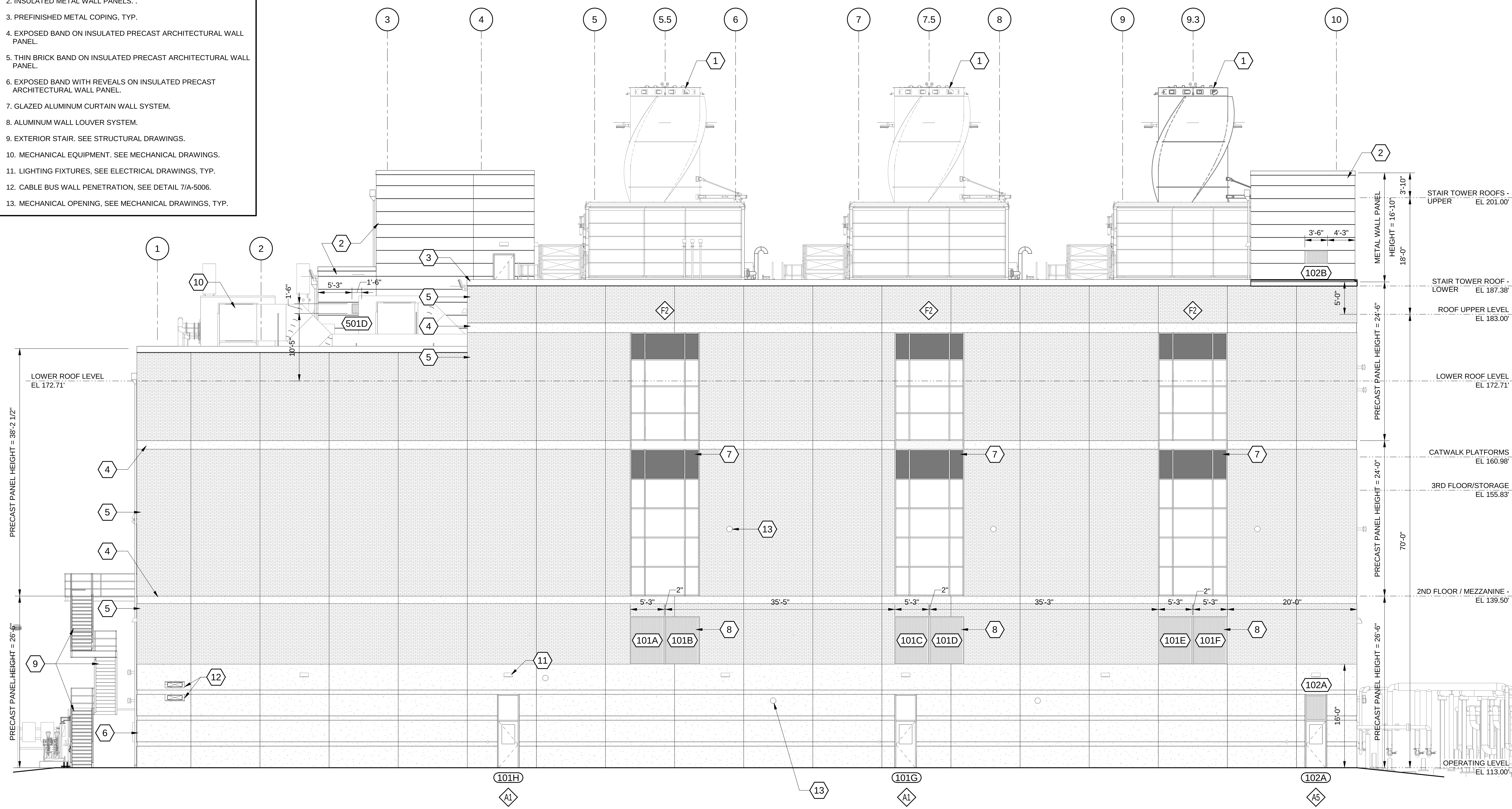
PLOTTED: 9/2/2020 11:22:57 PM

GENERAL SHEET NOTES

NOT USED.

SHEET KEYNOTES

1. PROCESS MECHANICAL EQUIPMENT. SEE PROCESS MECHANICAL DRAWINGS.
2. INSULATED METAL WALL PANELS. .
3. PREFINISHED METAL COPING, TYP.
4. EXPOSED BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
5. THIN BRICK BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
6. EXPOSED BAND WITH REVEALS ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
7. GLAZED ALUMINUM CURTAIN WALL SYSTEM.
8. ALUMINUM WALL LOUVER SYSTEM.
9. EXTERIOR STAIR. SEE STRUCTURAL DRAWINGS.
10. MECHANICAL EQUIPMENT. SEE MECHANICAL DRAWINGS.
11. LIGHTING FIXTURES, SEE ELECTRICAL DRAWINGS, TYP.
12. CABLE BUS WALL PENETRATION, SEE DETAIL 7/A-5006.
13. MECHANICAL OPENING, SEE MECHANICAL DRAWINGS, TYP.



EAST ELEVATION
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

ISSUED FOR BID

REVISIONS				
REV	ZONE	BY	DATE	DESCRIPTION
0		DRH	8/14/20	ISSUED FOR BID

BLACK & VEATCH
ARCHITECTS NEW JERSEY, L.L.C.

CDM Smith
110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE.
NEWARK, NEW JERSEY 07105
"Protecting Public Health and the Environment"

STANDBY POWER GENERATION FACILITY
NEWARK, NEW JERSEY

ARCHITECTURAL
EAST ELEVATION

DESIGNED BY:	RAB
DRAWN BY:	DGD
CHECKED BY:	DRH
APPROVED BY:	DRH

I hereby certify that this document was prepared by me or under my supervision and that I am a duly registered architect under the laws of the state of New Jersey.

DUANE R. HICKS
Architect

DATE

N.J. Registered Architect Lic. No. 21A102098000
COA No. 21AC00101700

Date: 8/14/2020
Scale: 1/8" = 1'-0" SHEET 73 OF 536

D CONTRACT No: B040 COST CENTER: 6310-2685

DWG No: A-2003 REV. 0

* THIS IS A COMPUTER GENERATED DRAWING DO NOT MAKE CHANGES MANUALLY

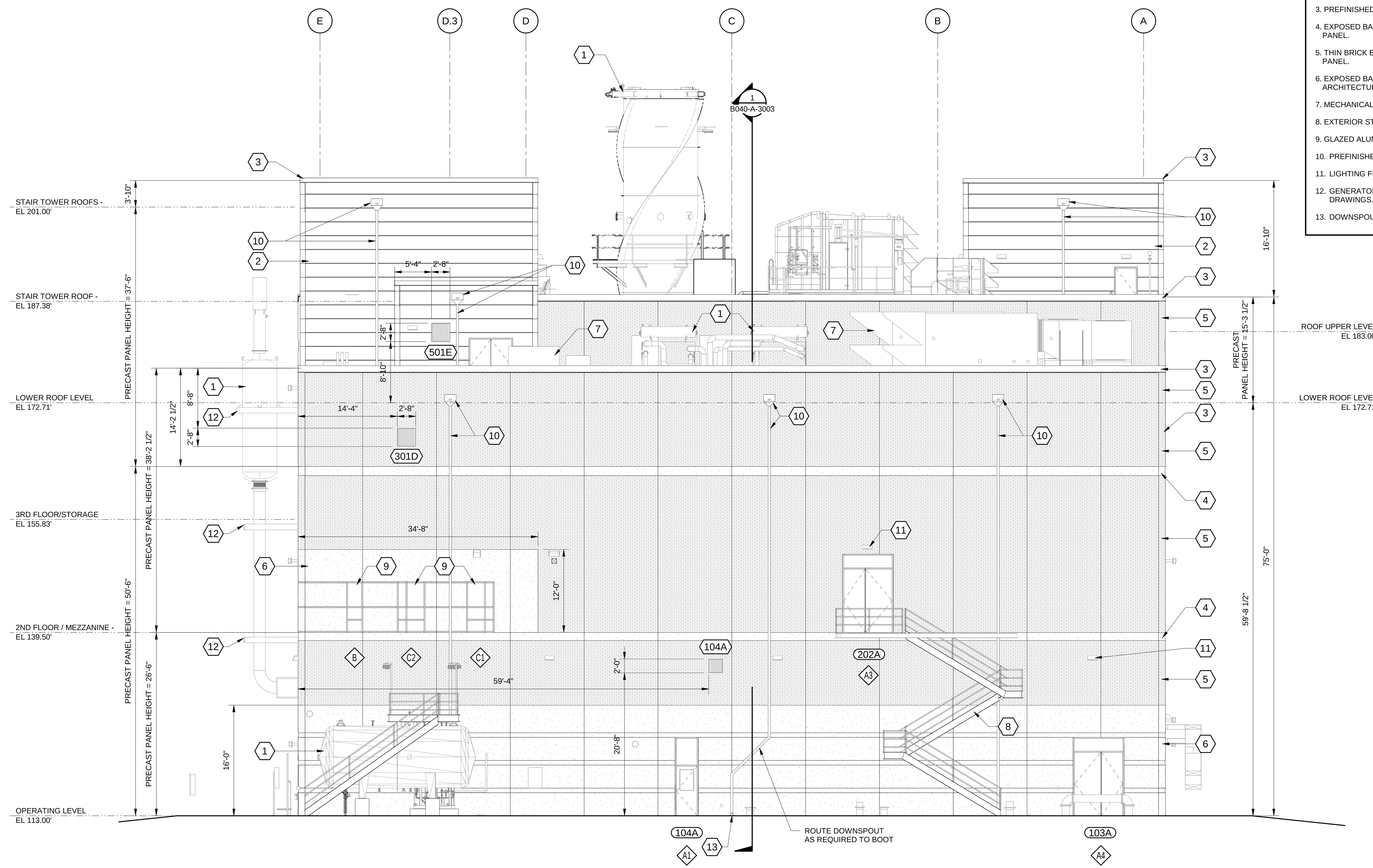
PLOTTED: 9/2/2020 11:23:53 PM

GENERAL SHEET NOTES

NOT USED.

SHEET KEYNOTES

1. PROCESS MECHANICAL EQUIPMENT. SEE PROCESS MECHANICAL DRAWINGS.
2. INSULATED METAL WALL PANELS.
3. PREFINISHED METAL COPING, TYP.
4. EXPOSED BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
5. THIN BRICK BAND ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
6. EXPOSED BAND WITH REVEALS ON INSULATED PRECAST ARCHITECTURAL WALL PANEL.
7. MECHANICAL EQUIPMENT. SEE MECHANICAL SHEETS.
8. EXTERIOR STAIR. SEE STRUCTURAL DRAWINGS.
9. GLAZED ALUMINUM WINDOW SYSTEM.
10. PREFINISHED SCUPPER AND DOWNSPOUT, TYPICAL.
11. LIGHTING FIXTURES, SEE ELECTRICAL DRAWINGS.
12. GENERATOR EXHAUST SUPPORTS, SEE STRUCTURAL DRAWINGS.
13. DOWNSPOUT BOOT.



SOUTH ELEVATION

1/8" = 1'-0"

8' 4' 0' 8' 16'

1/8" = 1'-0"

REVISIONS

REV	ZONE	BY	DATE	DESCRIPTION
0		DRH	8/14/20	ISSUED FOR BID

BLACK & VEATCH

ARCHITECTS NEW JERSEY, L.L.C.

CDM Smith

110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION

600 WILSON AVE.
NEWARK, NEW JERSEY 07105

"Protecting Public Health and the Environment"

STANDBY POWER
GENERATION FACILITY
NEWARK, NEW JERSEY

ARCHITECTURAL
SOUTH ELEVATION

DESIGNED BY:	RAB
DRAWN BY:	DGD
CHECKED BY:	DRH
APPROVED BY:	DRH

I hereby certify that this document was prepared by me or under my supervision and that I am a duly registered architect under the laws of the state of New Jersey.

DUANE R. HICKS
Architect

DATE

N.J. Registered Architect Lic. No. 21A102098000
COA No. 21AC00101700

Date: 8/14/2020

Scale: 1/8" = 1'-0" SHEET 74 OF 536

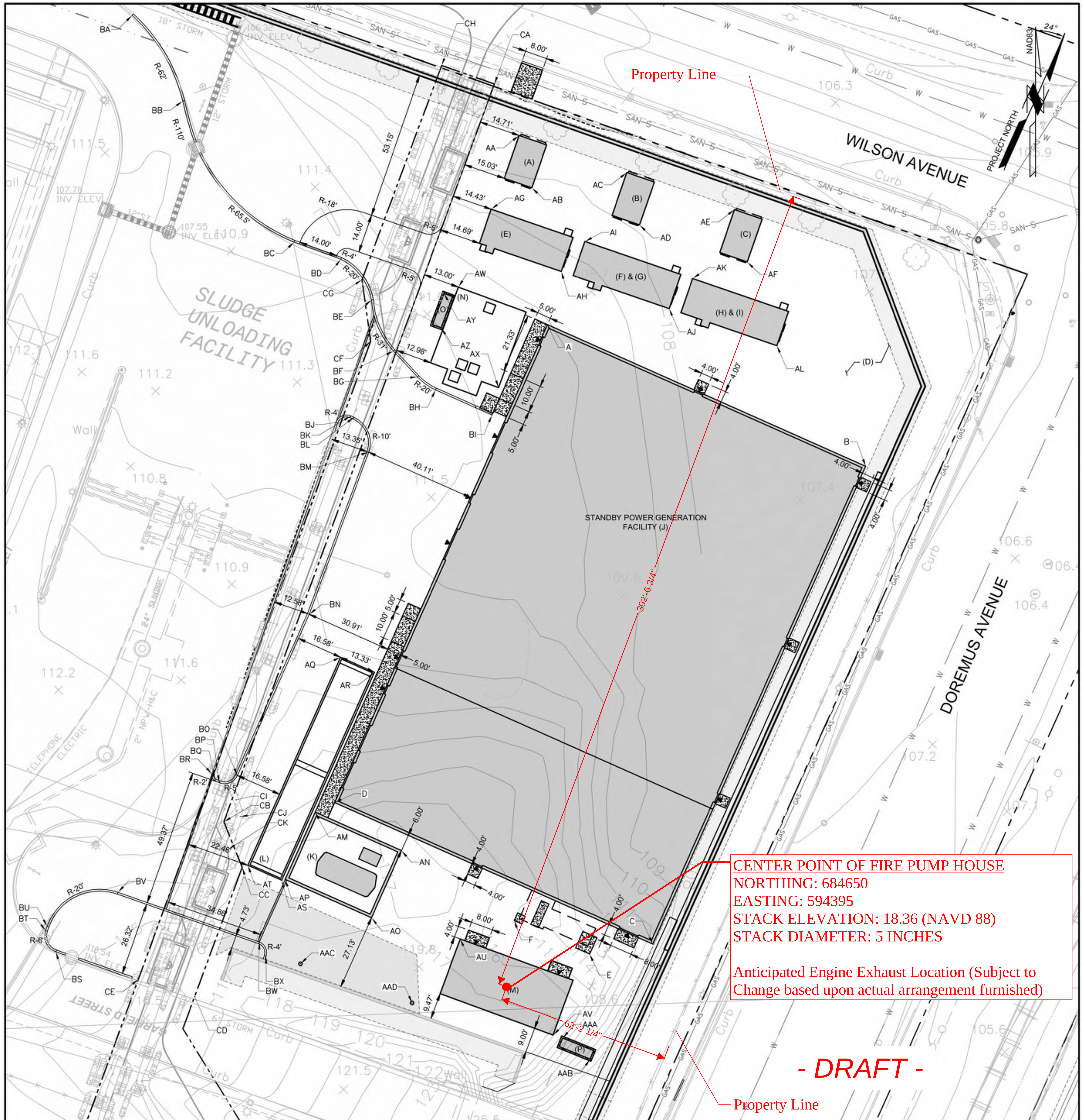
D CONTRACT No: B040 COST CENTER: 6310-2685

DWG No: A-2004 REV. 0

ISSUED FOR BID

* THIS IS A COMPUTER GENERATED DRAWING
DO NOT MAKE CHANGES MANUALLY

PLOTTED: 9/2/2020 11:24:49 PM



PLAN
1" = 20'

NORTHING AND EASTING SUMMARY			
POINT NO.	NORTHING	EASTING	DESCRIPTION
1	684888.09	594409.19	A
2	684837.11	594523.68	B
3	684665.06	594447.08	C
4	684716.04	594332.58	D
5	684661.50	594424.34	E
6	684673.57	594397.23	F

NORTHING AND EASTING SUMMARY			
POINT NO.	NORTHING	EASTING	DESCRIPTION
7	684956.22	594398.96	AA
8	684937.35	594403.56	AB
9	684942.87	594437.72	AC
10	684924.00	594442.33	AD
11	684929.52	594476.49	AE
12	684910.66	594481.10	AF
13	684929.66	594388.93	AG
14	684907.22	594414.17	AH
15	684918.05	594422.65	AI
16	684893.88	594452.93	AJ
17	684904.70	594461.42	AK
18	684880.53	594491.70	AL
19	684712.59	594325.58	AM
20	684698.76	594356.64	AN
21	684674.55	594345.86	AO
22	684688.38	594314.80	AP
23	684768.36	594334.72	AQ
24	684762.94	594346.90	AR
25	684688.03	594313.55	AS
26	684693.45	594301.36	AT
27	684666.94	594377.78	AU
28	684632.34	594411.16	AV
29	684901.61	594377.13	AW
30	684865.42	594391.54	AX
31	684899.37	594371.94	AY
32	684886.96	594370.94	AZ
33	684631.26	594414.64	AAA
34	684623.67	594424.50	AAB
35	684657.97	594320.30	AAC
36	684643.88	594360.44	AAD

NORTHING AND EASTING SUMMARY			
POINT NO.	NORTHING	EASTING	DESCRIPTION
37	684999.50	594259.69	BA
38	684968.62	594277.91	BB
39	684917.80	594318.01	BC
40	684911.62	594334.87	BD
41	684896.99	594345.82	BE
42	684878.57	594353.74	BF
43	684869.25	594362.41	BG
44	684864.61	594368.91	BH
45	684855.56	594389.23	BI
46	684852.88	594333.03	BJ
47	684855.22	594338.44	BK
48	684854.74	594339.52	BL
49	684842.17	594344.84	BM
50	684783.82	594323.45	BN
51	684725.77	594297.61	BO
52	684723.24	594291.00	BP
53	684723.90	594289.52	BQ
54	684726.39	594288.45	BR
55	684662.28	594232.26	BS
56	684669.93	594228.59	BT
57	684671.48	594229.14	BU
58	684683.71	594254.64	BV
59	684665.82	594305.48	BW
60	684660.72	594307.93	BX

NORTHING AND EASTING SUMMARY			
POINT NO.	NORTHING	EASTING	DESCRIPTION
61	684974.72	594390.08	CA
62	684709.11	594292.73	CB
63	684692.71	594299.30	CC
64	684646.24	594282.25	CD
65	684652.42	594261.98	CE
66	684882.13	594345.53	CF
67	684904.26	594342.44	CG
68	684981.41	594371.11	CH
69	684717.03	594297.14	CI
70	684711.04	594298.60	CJ
71	684699.22	594294.36	CK

NORTHING AND EASTING SUMMARY NOTES:

1. POINT NO.'S 1 - 6 (DESCRIPTION A - F): STANDBY POWER FACILITY BUILDING LIMITS.
2. POINT NO.'S 7 - 36 (DESCRIPTION AA - AAD): SITE ACCESSORY STRUCTURES (SEE STRUCTURE IDENTIFICATION CHART).
3. POINT NO.'S 37 - 60 (DESCRIPTION BA - BX): FACE OF PROPOSED CURB LOCATIONS.
4. POINT NO.'S 61 - 71 (DESCRIPTION CA - CK): PSE&G DUCT BANK EASEMENT LIMITS.
5. POINT NO.'S 69, 70 & 71 (DESCRIPTION CI, CJ, CK): PSE&G DUCT BANK STRUCTURE LIMITS LOCATED OUTSIDE OF THE EASEMENT LIMITS.
6. POINTS NO.'S 35 & 36 (DESCRIPTION AAC & AAD): EXTERIOR LIGHT POSTS

STRUCTURE IDENTIFICATION

ITEM #	DESCRIPTION
(A)	FUEL GAS COOLER 1
(B)	FUEL GAS COOLER 2
(C)	FUEL GAS COOLER 3
(D)	GAS YARD
(E)	FUEL GAS COMPRESSOR 1
(F)	FUEL GAS FILTER 1
(G)	FUEL GAS COMPRESSOR 2
(H)	FUEL GAS FILTER 2
(I)	FUEL GAS COMPRESSOR 3
(J)	STANDBY POWER BUILDING
(K)	AMMONIA CONTAINMENT AREA
(L)	AMMONIA TRUCK UNLOADING FACILITY
(M)	FIRE PUMP HOUSE
(N)	OIL-WATER BURIED STORAGE RESERVOIR
(O)	BACK FLOW PREVENTER STRUCTURE
(P)	BACK FLOW PREVENTER STRUCTURE

PRELIMINARY - NOT FOR CONSTRUCTION

REVISIONS

REV	ZONE	BY	DATE	DESCRIPTION

BLACK & VEATCH
489 Fifth Ave NY, NY 10017; COA No. 24GA27981200

CDM Smith
110 Fieldcrest Avenue #8
Edison, NJ 08837
Tel: (732) 225-7000
COA No. 24GA28020200

KEYPLAN

ALL DIMENSIONS, EQUIPMENT, DEVICES AND LOCATIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY P.V.S.C. OF ANY ERRORS, CONFLICTS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONTRACT.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS (SUBJECT TO VERIFICATION BY CONTRACTOR AS NOTED ABOVE). DO NOT SCALE DRAWING TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF P.V.S.C. IS PROHIBITED.

PASSAIC VALLEY SEWERAGE COMMISSION
600 WILSON AVE.
NEWARK, NEW JERSEY 07105
"Protecting Public Health and the Environment"

STANDBY POWER GENERATION FACILITY
NEWARK, NEW JERSEY

POWER GENERATION BUILDING

SITE LAYOUT PLAN

DESIGNED BY:	C. VANDER FLIET
DRAWN BY:	C. VANDER FLIET
CHECKED BY:	M. YOUNG

APPROVED BY:

TIMOTHY J. DUPUIS
CIVIL ENGINEER
DATE
N.J. Professional Engineer Lic. No. 24GE05246800

Date:	6/9/20
Scale: 1" = 20'	SHEET 1 OF 1
D — CONTRACT No: B040	COST CENTER: 6310-2685
DWG No: C-1004	REV. 1

* THIS IS A COMPUTER GENERATED DRAWING
DO NOT MAKE CHANGES MANUALLY

APPENDIX B
Emission Rate Calculations

PVSC Standby Power Generation Facility (SPGF)
TOTAL Project Estimated Emission Rates

Total Maximum Potential to Emit

Pollutant	Proposed New Units[1]				Existing Facility (ton/yr)	Total Facility After Project Addition (ton/yr)	Reporting Threshold	Significant Increase Threshold (ton/yr) [2]	Major Source Threshold (ton/yr) [3]
	Three Combustion Turbine Generators (ton/yr)	Two Black Start Generators (ton/yr)	Two Fire Pump Engines (ton/yr)	TOTAL Emissions (ton/yr)					
CO	3.92	0.33	0.13	4.37	103.5	107.9	0.05 lb/hr	100	100
NOx	1.96	0.16	0.14	2.27	72.0	74.3	0.05 lb/hr	25	25
PM-10	2.83	0.016	0.0077	2.86	14.8	17.7	0.05 lb/hr	15	100
SO2	0.69	0.0012	0.000077	0.69	24.9	25.6	0.05 lb/hr	40	100
TSP	2.83	0.034	0.0077	2.87	13.8	16.7	0.05 lb/hr	25	100
VOC	1.27	0.11	0.0072	1.39	81.2	82.5	0.05 lb/hr	25	25
NH3	1.35	---	---	1.35	---	1.35	0.05 lb/hr	---	100
Acrolein	0.0014	0.010	---	0.011	---	0.011	1 lb/yr	---	10
Ethylene dibromide	---	0.000091	---	0.000091	---	0.000091	0.08 lb/yr	---	10
Formaldehyde	0.15	0.117	---	0.26	0.25	0.51	3.5 lb/yr	---	10
HAPs (Total)	0.147	0.127	---	0.27	15.63	15.9	---	---	25
GHG CO2e	23,669	219	25	23,913	287,000	310,913	---	---	---

Notes:

[1] Turbine emission rates are with SCR and oxidation catalyst.

[2] Significant Net Emissions Increase, as defined in N.J.A.C. 7:27-18.1, for major modification applicability.

[3] PVSC is currently a major (Subchapter 22) source with an approved Title V operating permit.

Passaic Valley Sewerage Commission
Standby Power Generation Facility (SPGF)
Title V Significant Modification Permit Application
Combustion Turbine Generators (CTGs) Operating Scenarios and Proposed Annual Hours of Operatior

3 CTGs, 28 MW each maximum gross output
Only 2 CTGs would operate at a time; the third would be standby.
Operating hours for emergencies are unrestricted.
Non-Emergency Maximum Potential Operating Hours:
1,284 hours/year maximum potential SPGF total facility operation is based on:
592 hours/year for each of 2 CTGs (includes 100 hours/year each for testing/maintenance), plus
100 hours/year for testing/maintenance of the 3rd CTG

	Maximum Potential Non-Emergency Operating Hours for One CTG	
Scenario	Revised (Hours/Year)	Basis
Readiness Testing and Maintenance		
Startup	5.0	12 startups/year at 25 minutes each.
Shutdown	2.0	12 shutdowns/year at 10 minutes each.
Steady State	93.0	Testing/maintenance would be conducted once/month, 12 times/year. Each run would take about 6 hours. Value revised to be calculated as difference between 100 hours/year and 7 hours/year for startup/shutdown.
Subtotal	**100**	
PJM Demand Response		
PJM Called Event	10	Estimated at one called event per year and 10 hours/event.
PJM Performance Tests	2	Up to two 1-hour performance tests per year could be required by PJM.
Startup	1.25	3 startups/year at 25 minutes each.
Shutdown	0.5	3 shutdowns/year at 10 minutes each.
Steady State	10.25	Difference between 12 hours/year and time needed for startup and shutdown.
Subtotal	**12**	
Storm Preparation Mode		
Startup	4.17	10 startups/year at 25 minutes each.
Shutdown	1.67	10 shutdowns/year at 10 minutes each.
Steady State	474.2	Difference between 480 hours/year and time needed for startup and shutdown.
Subtotal	**480**	SPGF would be started 48 hours in advance of up to 10 storms per year.
Grand Total	**592**	

Operating Hours

Facility Total	**One CTG**	**Three CTGs**
Steady State	577.42	1247.83
Startup	10.42	25.83
Shutdown	4.17	10.33
Total	**592.00**	**1284.00**

RADIUS Permit Application	**Maximum Operating Hours**	**Notes**
OS1 - Turbine 1 - Testing & M. - Maint./S.S.	93.0	
OS2 - Turbine 1 - Startup	10.4	
OS3 - Turbine 1 - Shutdown	4.2	
OS4 - Turbine 1 - Demand Res. - S.S.	10.3	Demand response max hrs would not be reached by all 3. Limit by permit requirement (Any one turbine can reach the individual max, but not all 3 in the same year.
OS5 - Turbine 2 - Testing & M. - Maint./S.S.	93.0	
OS6 - Turbine 2 - Startup	10.4	
OS7 - Turbine 2 - Shutdown	4.2	
OS8 - Turbine 2 - Demand Res. - S.S.	10.3	Demand response max hrs would not be reached by all 3. Limit by permit requirement (Any one turbine can reach the individual max, but not all 3 in the same year.
OS9 - Turbine 3 - Testing & M. - Maint./S.S.	93.0	
OS10 - Turbine 3 - Startup	10.4	
OS11 - Turbine 3 - Shutdown	4.2	
OS12 - Turbine 3 - Demand Res. - S.S.	10.3	Demand response max hrs would not be reached by all 3. Limit by permit requirement (Any one turbine can reach the individual max, but not all 3 in the same year.
OS13 - Turbine 1 - Storm Prep. - S.S.	474.2	Storm preparation max hrs would not be reached by all 3. Limit by permit requirement (Any one turbine can reach the individual max, but not all 3 in the same year.
OS14 - Turbine 2 - Storm Prep. - S.S.	474.2	Storm preparation max hrs would not be reached by all 3. Limit by permit requirement (Any one turbine can reach the individual max, but not all 3 in the same year.
OS15 - Turbine 3 - Storm Prep. - S.S.	474.2	Storm preparation max hrs would not be reached by all 3. Limit by permit requirement (Any one turbine can reach the individual max, but not all 3 in the same year.
Total	**1284**	**Total excludes the following: for the third turbine - demand response and storm preparation operating hours (and related startup and shutdown hours). Limit by permit requirement.**

PVSC Standby Power Generation Facility (SPGF)

Combustion Turbine Generators (CTGs) - Maximum Potential Emission Rates

Information from Manufacturer:

Engine Make:	Siemens						
Engine Model:	SGT-600						
Fuel Type:	Natural Gas						
Conversion Factors:							
1 kW =		3412 BTU/hr					
Power Output:		28,000 kW	=	28 MW		Maximum operating hours for one turbine:	592 hr/yr
Heat input:		315,000,000 BTU/hr	=	315 MMBTU/hr		Total operating hours for all three turbines:	1,284 hr/yr

Operating Scenarios: Steady State

Maximum operating hours for one turbine	577.42 hr/yr		
Total operating hours for all three turbines:	1247.83 hr/yr		
Heat input (total for all three engines):	393,067,500,000 BTU/yr	=	393,068 MMBTU/yr
Fuel heating value:	1020 BTU/scf		
Fuel usage (not used for emission calcs):	385,360,294 scf/yr	=	385.36 MMscf/yr

Pollutant	Emission Factor – Before Controls lb/MMBtu	Emission Factor – Before Controls Source	Emission Factor – After Controls lb/MMBtu	Emission Factor – After Controls Source	Hourly Emission Rate – One Turbine – Before Controls lb/hr	Hourly Emission Rate – One Turbine – After Controls lb/hr	Reporting Threshold lb/hr	Above Reporting Threshold?	Yearly Emission Rate – One Turbine – Before Controls ton/yr	Before Controls lb/yr	After Controls ton/yr	After Controls lb/yr
CO	0.178	Vendor Estimate	0.0068	Vendor Estimate	56.07	2.14	0.05	Yes	16.19	---	0.62	---
NOx	0.0909	Vendor Estimate	0.0093	Vendor Estimate	28.63	2.93	0.05	Yes	8.27	---	0.85	---
PM-10	0.014	Vendor Estimate	0.014	Vendor Estimate	4.41	4.41	0.05	Yes	1.27	---	1.27	---
SO2	0.0034	AP-42 (17% higher than vendor est)	0.0034	AP-42 (17% higher than vendor est)	1.07	1.07	0.05	Yes	0.31	---	0.31	---
TSP	0.014	Vendor Estimate	0.014	Vendor Estimate	4.41	4.41	0.05	Yes	1.27	---	1.27	---
VOC	0.0052	Vendor Estimate	0.0052	Vendor Estimate	1.64	1.64	0.05	Yes	0.47	---	0.47	---
NH3	---	---	---	Vendor Estimate, based on lb/hr	---	2.10	0.05	Yes	---	---	0.61	---
Hazardous Air Pollutants (HAPs)												
1,3-Butadiene	4.73E-07	AP-42 plus 10% safety factor	4.73E-07	Calculated based on vendor assumption	1.49E-04	1.49E-04	---	---	4.30E-05	0.09	4.30E-05	0.09
Acetaldehyde	4.40E-05	AP-42 plus 10% safety factor	2.64E-05	Calculated based on vendor assumption	1.39E-02	8.32E-03	---	---	4.00E-03	8.0	2.40E-03	4.8
Acrolein	7.04E-06	AP-42 plus 10% safety factor	7.04E-06	Calculated based on vendor assumption	2.22E-03	**2.2176E-03**	---	---	6.40E-04	1.28	6.40E-04	1.28
Benzene	1.32E-05	AP-42 plus 10% safety factor	1.32E-05	Calculated based on vendor assumption	4.16E-03	4.16E-03	---	---	1.20E-03	2.4	1.20E-03	2.4
Ethylbenzene	3.52E-05	AP-42 plus 10% safety factor	3.52E-05	Calculated based on vendor assumption	1.11E-02	1.11E-02	---	---	3.20E-03	6.4	3.20E-03	6.4
Formaldehyde	--	Use lb/hr value from Vendor	--	Calculated based on vendor assumption	1.33E+00	**1.5000E-01**	---	---	3.85E-01	769.89	4.33E-02	86.61
Naphthalene	1.43E-06	AP-42 plus 10% safety factor	1.43E-06	Calculated based on vendor assumption	4.50E-04	4.50E-04	---	---	1.30E-04	0.26	1.30E-04	0.26
PAHs	2.42E-06	AP-42 plus 10% safety factor	2.42E-06	Calculated based on vendor assumption	7.62E-04	7.62E-04	---	---	2.20E-04	0.44	2.20E-04	0.44
Propylene oxide	3.19E-05	AP-42 plus 10% safety factor	3.19E-05	Calculated based on vendor assumption	1.00E-02	1.00E-02	---	---	2.90E-03	5.8	2.90E-03	5.8
Toluene	1.43E-04	AP-42 plus 10% safety factor	1.43E-04	Calculated based on vendor assumption	4.50E-02	4.50E-02	---	---	1.30E-02	26.01	1.30E-02	26.01
Xylenes	7.04E-05	AP-42 plus 10% safety factor	7.04E-05	Calculated based on vendor assumption	2.22E-02	2.22E-02	---	---	6.40E-03	12.8	6.40E-03	12.8
Total HAPs	---		---		1.336E+00	1.52E-01	---	---	---	---	---	---
Greenhouse Gas (GHG)	**kg/MMBTU**		**kg/MMBTU**		**kg/hr**	**kg/hr**			**MT/yr**		**MT/yr**	
CO_2	53.06	40 CFR 98	53.06	Assume no control	16,714	16,714	---	---	9651		9651	---
CH_4	1.00E-03	40 CFR 98	1.00E-03	Assume no control	0.32	0.32	---	---	0.18		0.18	---
CH_4 (CO2e) [1]	2.50E-02	Calculated	2.50E-02	Assume no control	7.88	7.88	---	---	4.55		4.55	---
N_2O	1.00E-04	40 CFR 98	1.00E-04	Assume no control	0.032	0.032	---	---	0.018		0.018	---
N_2O (CO2e) [1]	2.98E-02	Calculated	2.98E-02	Assume no control	9.39	9.39	---	---	5.42		5.42	---
Total GHG (CO2e)	53.1148	Calculated	53.115	Assume no control	16,731	16,731	---	---	9,661		9,661	---
Electric Power Grid [2] GHG	**lb/MWh**		**lb/MWh**		**lb/hr**	**lb/hr**						
CO2e	1646.7	U.S. EPA eGRID	1646.7	Assume no control	4.61E+04	4.61E+04	---	---				

Notes:

[1] Global Warming Potentials (40 CFR 98, Table A-1):

CH4: 25

N2O: 298

[2] U.S. EPA, Emissions & Generation Resource Integrated Database, eGRID2019, released on February 23, 2021. Available at https://www.epa.gov/egrid.

Greenhouse gas emission rates are for the Pennsylvania Jersey Maryland (PJM) Interconnection power pool. PJM is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. Non-baseload output emission rates (for peaking power plants on the grid) were selected. The grid transmission loss of 5.1% was used.

PVSC Standby Power Generation Facility (SPGF)

Combustion Turbine Generators (CTGs) - Maximum Potential Emission Rates

Operating Scenarios: Start Up

Maximum operating hours for one turbine	10.42	hr/yr				
Total operating hours for all three turbines:	25.83	hr/yr				
Heat input (total for all three engines):	8,137,500,000	BTU/yr	=	8,138	MMBTU/yr	0.1254
Fuel heating value:	1020	BTU/scf				0.009570313
Fuel usage (not used for emission calcs):	7,977,941	scf/yr	=	7.98	MMscf/yr	

Pollutant	Emission Factor: Before Controls lb/MMBtu	Before Controls Source	After Controls lb/MMBtu	After Controls Source	Hourly Emission Rate, One Turbine: Before Controls lb/hr (25 min/event)	After Controls lb/hr (25 min/event)	Reporting Threshold lb/hr	Above Reporting Threshold?	Annual Emission Rate, One Turbine: Before Controls ton/yr (based on # of events/yr)	Before Controls lb/yr (based on # of events/yr)	After Controls ton/yr (based on # of events/yr)	After Controls lb/yr (based on # of events/yr)
CO	--	Vendor Estimate, based on lb/hr	--	Vendor Estimate, based on lb/hr	63.20	63.20	0.05	Yes	0.79	---	0.79	---
NOx	--	Vendor Estimate, based on lb/hr	--	Vendor Estimate, based on lb/hr	2.90	2.90	0.05	Yes	0.04	---	0.04	---
PM-10	0.014	Vendor Estimate	0.014	Vendor Estimate	1.84	1.84	0.05	Yes	0.02	---	0.02	---
SO2	0.0034	AP-42 (17% higher than vendor est)	0.0034	AP-42 (17% higher than vendor est)	0.45	0.45	0.05	Yes	0.01	---	0.01	---
TSP	0.014	Vendor Estimate	0.014	Vendor Estimate	1.84	1.84	0.05	Yes	0.02	---	0.02	---
VOC	--	Vendor Estimate, based on lb/hr	--	Vendor Estimate, based on lb/hr	4.40	4.40	0.05	Yes	0.06	---	0.06	---
NH3	---	Vendor Estimate, based on lb/hr	---	Vendor Estimate, based on lb/hr	---	0.88	0.05	Yes	---	---	0.01	---
Hazardous Air Pollutants (HAPs)												
1,3-Butadiene	4.73E-07	AP-42 plus 10% safety factor	4.73E-07	Calculated based on vendor assumption	6.21E-05	6.21E-05	---	---	7.76E-07	0.002	7.76E-07	0.002
Acetaldehyde	4.40E-05	AP-42 plus 10% safety factor	2.64E-05	Calculated based on vendor assumption	5.78E-03	3.47E-03	---	---	7.22E-05	0.14	4.33E-05	0.09
Acrolein	7.04E-06	AP-42 plus 10% safety factor	7.04E-06	Calculated based on vendor assumption	9.24E-04	**9.24E-04**	---	---	1.16E-05	0.02	1.16E-05	0.02
Benzene	1.32E-05	AP-42 plus 10% safety factor	1.32E-05	Calculated based on vendor assumption	1.73E-03	1.73E-03	---	---	2.17E-05	0.04	2.17E-05	0.04
Ethylbenzene	3.52E-05	AP-42 plus 10% safety factor	3.52E-05	Calculated based on vendor assumption	4.62E-03	4.62E-03	---	---	5.78E-05	0.12	5.78E-05	0.12
Formaldehyde	--	Use lb/hr value from Vendor	--	Calculated based on vendor assumption	0.88	**8.8000E-01**	---	---	1.10E-02	22.0	1.10E-02	22.0
Naphthalene	1.43E-06	AP-42 plus 10% safety factor	1.43E-06	Calculated based on vendor assumption	1.88E-04	1.88E-04	---	---	2.35E-06	0.005	2.35E-06	0.005
PAHs	2.42E-06	AP-42 plus 10% safety factor	2.42E-06	Calculated based on vendor assumption	3.18E-04	3.18E-04	---	---	3.97E-06	0.01	3.97E-06	0.01
Propylene oxide	3.19E-05	AP-42 plus 10% safety factor	3.19E-05	Calculated based on vendor assumption	4.19E-03	4.19E-03	---	---	5.23E-05	0.105	5.23E-05	0.105
Toluene	1.43E-04	AP-42 plus 10% safety factor	1.43E-04	Calculated based on vendor assumption	1.88E-02	1.88E-02	---	---	2.35E-04	0.47	2.35E-04	0.47
Xylenes	7.04E-05	AP-42 plus 10% safety factor	7.04E-05	Calculated based on vendor assumption	9.24E-03	9.24E-03	---	---	1.16E-04	0.23	1.16E-04	0.23
Total HAPs	---		---		8.81E-01	8.81E-01	---	---	---	---	---	---
Greenhouse Gas (GHG)	**kg/MMBTU**		**kg/MMBTU**		**kg/hr**	**kg/hr**			**MT/yr**		**MT/yr**	
CO_2	53.06	40 CFR 98	53.06	Assume no control	6,964	6,964	---	---	174	---	174	---
CH_4	1.00E-03	40 CFR 98	1.00E-03	Assume no control	0.13	0.13	---	---	0.00	---	0.00	---
CH_4 (CO2e) [1]	2.50E-02	Calculated	2.50E-02	Assume no control	3.28	3.28	---	---	0.08	---	0.08	---
N_2O	1.00E-04	40 CFR 98	1.00E-04	Assume no control	0.013	0.013	---	---	0.000	---	0.000	---
N_2O (CO2e) [1]	2.98E-02	Calculated	2.98E-02	Assume no control	3.91	3.91	---	---	0.10	---	0.10	---
Total GHG (CO2e)	53.1148	Calculated	53.115	Assume no control	6,971	6,971	---	---	174	---	174	---
Electric Power Grid [2] GHG					**lb/hr**	**lb/hr**						
CO2e					4.61E+04	4.61E+04	---	---				

Notes:

PVSC Standby Power Generation Facility (SPGF)
Combustion Turbine Generators (CTGs) - Maximum Potential Emission Rates

Operating Scenarios: Shut Down

Maximum operating hours for one turbine	4.17 hr/yr			
Total operating hours for all three turbines:	10.33 hr/yr			
Heat input (total for all three engines):	3,255,000,000 BTU/yr	=	3,255	MMBTU/yr
Fuel heating value:	1020 BTU/scf			
Fuel usage (not used for emission calcs):	3,191,176 scf/yr	=	3.19	MMscf/yr

Pollutant	Emission Factor – Before Controls – lb/MMBtu	Emission Factor – Before Controls – Source	Emission Factor – After Controls – lb/MMBtu	Emission Factor – After Controls – Source	Hourly Emission Rate – One Turbine – Before Controls – lb/hr (10 min/event)	Hourly Emission Rate – One Turbine – After Controls – lb/hr (10 min/event)	Reporting Threshold lb/hr	Above Reporting Threshold?	Yearly Emission Rate – One Turbine – Before Controls – ton/yr (based on # of events/yr)	Before Controls – lb/yr (based on # of events/yr)	After Controls – ton/yr (based on # of events/yr)	After Controls – lb/yr (based on # of events/yr)
CO	--	Vendor Estimate, based on lb/hr	--	Vendor Estimate, based on lb/hr	20.00	20.00	0.05	Yes	0.25	---	0.25	---
NOx	--	Vendor Estimate, based on lb/hr	--	Vendor Estimate, based on lb/hr	1.40	1.40	0.05	Yes	0.02	---	0.02	---
PM-10	0.014	Vendor Estimate	0.014	Vendor Estimate	0.74	0.74	0.05	Yes	0.01	---	0.01	---
SO2	0.0034	AP-42 (17% higher than vendor est)	0.0034	AP-42 (17% higher than vendor est)	0.18	0.18	0.05	Yes	0.002	---	0.002	---
TSP	0.014	Vendor Estimate	0.014	Vendor Estimate	0.74	0.74	0.05	Yes	0.01	---	0.01	---
VOC	--	Vendor Estimate, based on lb/hr	--	Vendor Estimate, based on lb/hr	3.50	3.50	0.05	Yes	0.04	---	0.04	---
NH3	---	---	---	Vendor Estimate, based on lb/hr	---	0.35	0.05	Yes	---	---	0.00	---
Hazardous Air Pollutants (HAPs)												
1,3-Butadiene	4.73E-07	AP-42 plus 10% safety factor	4.73E-07	Calculated based on vendor assumption	2.48E-05	2.48E-05	---	---	3.10E-07	0.0006	3.10E-07	0.0006
Acetaldehyde	4.40E-05	AP-42 plus 10% safety factor	2.64E-05	Calculated based on vendor assumption	2.31E-03	1.39E-03	---	---	2.89E-05	0.058	1.73E-05	0.035
Acrolein	7.04E-06	AP-42 plus 10% safety factor	7.04E-06	Calculated based on vendor assumption	3.70E-04	**3.6960E-04**	---	---	4.62E-06	0.009	4.62E-06	0.009
Benzene	1.32E-05	AP-42 plus 10% safety factor	1.32E-05	Calculated based on vendor assumption	6.93E-04	6.93E-04	---	---	8.66E-06	0.017	8.66E-06	0.017
Ethylbenzene	3.52E-05	AP-42 plus 10% safety factor	3.52E-05	Calculated based on vendor assumption	1.85E-03	1.85E-03	---	---	2.31E-05	0.046	2.31E-05	0.046
Formaldehyde	--	Use lb/hr value from Vendor	--	Calculated based on vendor assumption	0.81	**8.0500E-01**	---	---	1.01E-02	20.13	1.01E-02	20.13
Naphthalene	1.43E-06	AP-42 plus 10% safety factor	1.43E-06	Calculated based on vendor assumption	7.51E-05	7.51E-05	---	---	9.38E-07	0.002	9.38E-07	0.002
PAHs	2.42E-06	AP-42 plus 10% safety factor	2.42E-06	Calculated based on vendor assumption	1.27E-04	1.27E-04	---	---	1.59E-06	0.003	1.59E-06	0.003
Propylene oxide	3.19E-05	AP-42 plus 10% safety factor	3.19E-05	Calculated based on vendor assumption	1.67E-03	1.67E-03	---	---	2.09E-05	0.042	2.09E-05	0.042
Toluene	1.43E-04	AP-42 plus 10% safety factor	1.43E-04	Calculated based on vendor assumption	7.51E-03	7.51E-03	---	---	9.38E-05	0.188	9.38E-05	0.188
Xylenes	7.04E-05	AP-42 plus 10% safety factor	7.04E-05	Calculated based on vendor assumption	3.70E-03	3.70E-03	---	---	4.62E-05	0.092	4.62E-05	0.092
Total HAPs	---		---		8.05E-01	8.05E-01	---	---	---	---	---	---
Greenhouse Gas (GHG)	**kg/MMBTU**		**kg/MMBTU**		**kg/hr**	**kg/hr**			**MT/yr**		**MT/yr**	
CO_2	53.06	40 CFR 98	53.06	Assume no control	2,786	2,786	---	---	70		70	---
CH_4	1.00E-03	40 CFR 98	1.00E-03	Assume no control	0.05	0.05	---	---	0.001		0.001	---
CH_4 (CO2e) [1]	2.50E-02	Calculated	2.50E-02	Assume no control	1.31	1.31	---	---	0.03		0.03	---
N_2O	1.00E-04	40 CFR 98	1.00E-04	Assume no control	0.005	0.005	---	---	0.0001		0.0001	---
N_2O (CO2e) [1]	2.98E-02	Calculated	2.98E-02	Assume no control	1.56	1.56	---	---	0.04		0.04	---
Total GHG (CO2e)	53.1148	Calculated	53.115	Assume no control	2,789	2,789	---	---	70		70	---
Electric Power Grid [2] GHG					**lb/hr**	**lb/hr**						
CO2e					4.61E+04	4.61E+04	---	---				

Notes:

PVSC Standby Power Generation Facility (SPGF)
Combustion Turbine Generators (CTGs) - Maximum Potential Emission Rates

	Compare with SOTA and Reporting Threshold								**Maximum Annual Potential to Emit**	
	One Turbine								**Three Turbines**	
	Before Controls		**After Controls**		**SOTA Threshold**		**Reporting Threshold**		**Before Controls**	**After Controls**
Pollutant	**ton/yr**	**lb/yr**	**ton/yr**	**lb/yr**	**ton/yr**	**Above SOTA Threshold?**	**lb/yr**	**Above Reporting Threshold?**	**ton/yr**	**ton/yr**
CO	17.23	---	1.66	---	5	No	---	---	37.56	3.92
NOx	8.32	---	0.90	---	5	No	---	---	18.00	1.96
PM-10	1.31	---	1.31	---	5	No	---	---	2.83	2.83
SO2	0.32	---	0.32	---	5	No	---	---	0.69	0.69
TSP	1.31	---	1.31	---	5	No	---	---	2.83	2.83
VOC	0.57	---	0.57	---	5	No	---	---	1.27	1.27
NH3	---	---	0.62	---	---	---	---	---	---	1.35
Hazardous Air Pollutants (HAPs)					**(lb/yr)**		**(lb/yr)**			
1,3-Butadiene	4.41E-05	0.088	4.41E-05	0.088	140	No	1.5	No	9.57E-05	9.57E-05
Acetaldehyde	4.10E-03	8.2	2.46E-03	4.9	10000	No	21	No	8.90E-03	5.34E-03
Acrolein	6.56E-04	1.3	**6.5641E-04**	1.3	80	No	1	**Yes**	1.42E-03	1.42E-03
Benzene	1.23E-03	2.5	1.23E-03	2.5	4000	No	6	No	2.67E-03	2.67E-03
Ethylbenzene	3.28E-03	6.6	3.28E-03	6.6	10000	No	19	No	7.12E-03	7.12E-03
Formaldehyde	4.06E-01	810.0	**6.4369E-02**	130.0	4000	No	3.5	**Yes**	8.84E-01	1.46E-01
Naphthalene	1.33E-04	0.27	1.33E-04	0.27	10000	No	1.4	No	2.89E-04	2.89E-04
PAHs	2.26E-04	0.45	2.26E-04	0.45	20	No	2	No	4.89E-04	4.89E-04
Propylene oxide	2.97E-03	5.9	2.97E-03	5.9	10000	No	12	No	6.45E-03	6.45E-03
Toluene	1.33E-02	27.0	1.33E-02	27.0	10000	No	2000	No	2.89E-02	2.89E-02
Xylenes	6.56E-03	13.0	6.56E-03	13.0	10000	No	2000	No	1.42E-02	1.42E-02
Total HAPs			0.065		---	---	---	---	0.886	**0.147**
Greenhouse Gas (GHG)	**ton/yr**		**ton/yr**						**ton/yr**	**ton/yr**
CO_2	10,907	---	10,907	---	---	---	---	---	23,656	23,656
CH_4	0.21	---	0.21	---	5	No	---	---	0.45	0.45
CH_4 (CO2e) [1]	5.1	---	5.1	---	---	---	---	---	11.15	11.15
N_2O	0.02	---	0.02	---	---	---	---	---	0.045	0.045
N_2O (CO2e) [1]	6.1	---	6.1	---	---	---	---	---	1.11	1.11
Total GHG (CO2e)	10,918	---	10,918	---	---	---	---	---	23,669	23,669
Electric Power Grid [2] GHG	**ton/year**		**ton/year**							
CO2e	13,648		13,648			---	---	---	29,601	29,601

Notes:

PVSC Standby Power Generation Facility (SPGF)
NOx and VOC RACT

NOx

N.J.A.C 19.5:	Control and Prohibition of Air Pollution from Oxides of Nitrogen	
	Stationary combustion turbines	
Limit:	2.2	lb/MWh
Steady-state emissions:	2.93	lb/hr
	28	MW
	0.10	lb/MWh
	We meet the limit at steady-state	
Startup emissions:	2.90	lb/hr
	0.10	lb/MWh
	We meet the limit at startup	
Shutdown emissions:	1.40	lb/hr
	0.05	lb/MWh
	We meet the limit at shutdown	

VOC

N.J.A.C 16.9:	Control and Prohibition of Air Pollution by Volatile Organic Compounds	
	Stationary combustion turbines	
Limit:	50	ppmvd at 15% O2
Steady-state emissions:	4	ppmvd at 15% O2
	0.0052	lb/MMBTU
	We meet the limit at steady-state; does not apply for emergency operation per N.J.A.C. 7:27-19(a)	
Startup emissions:	4.40	lb/hr (for an averaging period of 1 hour)
Heat Imput:	315	MMBTU/hr
Emission Factor:	0.014	lb/MMBTU
	10.7	ppmvd
	We meet the limit at startup	
Shutdown emissions:	3.50	lb/hr (for an averaging period of 1 hour)
Heat Imput:	315	MMBTU/hr
Emission Factor:	0.011	lb/MMBTU
	8.5	ppmvd at 15% O2
	We meet the limit at shutdown	

CO

N.J.A.C 16.9:	Control and Prohibition of Air Pollution by Volatile Organic Compounds	
	Stationary combustion turbines	
Limit:	250	ppmvd at 15% O2
Steady-state emissions:	3	ppmvd at 15% O2
	0.0068	lb/MMBTU
	We meet the limit at steady-state; does not apply for emergency operation per N.J.A.C. 7:27-19(a)	
Startup emissions:	63.20	lb/hr (for an averaging period of 1 hour)
Heat Imput:	315	MMBTU/hr
Emission Factor:	0.201	lb/MMBTU
	88.5	ppmvd
	We meet the limit at startup	
Shutdown emissions:	20.00	lb/hr (for an averaging period of 1 hour)
Heat Imput:	315	MMBTU/hr
Emission Factor:	0.063	lb/MMBTU
	28.0	ppmvd at 15% O2
	We meet the limit at shutdown	

PVSC Standby Power Generation Facility (SPGF)

Two Natural Gas Black Start Generators (BSGs) - Maximum Potential Emission Rates

Information from Manufacturer:

Engine Make:	Caterpillar	
Engine Model:	G3520	
Fuel Type:	Natural Gas	

Conversion Factors:

1 kW	=	3412	BTU/hr		
Engine Power at max rating:		2953	bhp		
Genset Electrical Power Output:		2,000	kW		
Heat Input:		18,700,000	BTU/hr	=	18.70 MMBTU/hr
Maximum Operating Hours (One Engine):		100	hr/yr (Testing and Maintenance Only)		
Maximum Operating Hours (Two Engines Total):		200	hr/yr		
Heat Input:		3,740,000,000	BTU/yr	=	3740.00 MMBTU/yr
Fuel Heating Value:		1020	BTU/scf		
Fuel Usage (not used for emission calcs):		3,666,667	scf/yr	=	3.67 MMscf/yr

Pollutant	Emission Factor			Hourly Emission Rate			Maximum Annual Potential to Emit						
				One Engine	Reporting Threshold	Above Reporting Threshold?	One Engine		SOTA Threshold	Above SOTA Threshold?	Reporting Threshold	Above Reporting Threshold?	Two Engines
	lb/MMBtu	Source	g/HP-hr	lb/hr	lb/hr		ton/yr	lb/yr	ton/yr		lb/yr		ton/yr
CO	0.174	Vendor Estimate	4	3.25	0.05	Yes	0.16	325	5	No	---	---	0.325
NOx	0.087	Vendor Estimate	2	1.63	0.05	Yes	0.1	163	5	No	---	---	0.163
PM-10	0.0087	Vendor Estimate	--	0.163	0.05	Yes	0.008	16	5	No	---	---	0.0163
SO2	6.47E-04	AP-42 plus 10% safety factor	--	0.0121	0.05	No	6.05E-04	1.2	5	No	---	---	0.00121
TSP	0.018	Vendor Estimate	--	0.337	0.05	Yes	0.017	34	5	No	---	---	0.0337
VOC	0.061	Vendor Estimate	1	1.14	0.05	Yes	0.06	114	5	No	---	---	0.114
Hazardous Air Pollutants (HAPs)									(lb/yr)		(lb/yr)		
1,1,2,2-Tetrachloroethane	4.40E-05	AP-42 plus 10% safety factor	---	8.23E-04	---	---	4.11E-05	0.082	600	No	0.8	No	8.23E-05
1,1,2-Trichloroethane	3.50E-05	AP-42 plus 10% safety factor	---	6.54E-04	---	---	3.27E-05	0.065	2000	No	3.0	No	6.54E-05
1,3-Butadiene	2.94E-04	AP-42 plus 10% safety factor	---	5.49E-03	---	---	2.75E-04	0.55	140	No	1.5	No	5.49E-04
1,3-Dichloropropene	2.90E-05	AP-42 plus 10% safety factor	---	5.43E-04	---	---	2.72E-05	0.054	2000	No	11.5	No	5.43E-05
2,2,4-Trimethylpentane	2.75E-04	AP-42 plus 10% safety factor	---	5.14E-03	---	---	2.57E-04	0.51	10000	No	1000.0	No	5.14E-04
Acetaldehyde	9.20E-03	AP-42 plus 10% safety factor	---	1.72E-01	---	---	8.60E-03	17.0	10000	No	21.0	No	1.72E-02
Acrolein	5.14E-03	AP-42 per vendor's email	---	9.61E-02	---	---	4.81E-03	9.6	80	No	1.0	Yes	**0.010**
Benzene	4.84E-04	AP-42 plus 10% safety factor	---	9.05E-03	---	---	4.53E-04	0.91	4000	No	6.0	No	9.05E-04
Benzo(b)fluoranthene	1.83E-07	AP-42 plus 10% safety factor	---	3.41E-06	---	---	1.71E-07	0.00034	20	No	0.4	No	3.41E-07
Biphenyl	2.33E-04	AP-42 plus 10% safety factor	---	4.36E-03	---	---	2.18E-04	0.44	10000	No	18.0	No	4.36E-04
Carbon tetrachloride	4.04E-05	AP-42 plus 10% safety factor	---	7.55E-04	---	---	3.77E-05	0.075	2000	No	8.0	No	7.55E-05
Chlorobenzene	3.34E-05	AP-42 plus 10% safety factor	---	6.25E-04	---	---	3.13E-05	0.063	10000	No	2000.0	No	6.25E-05
Chloroform	3.14E-05	AP-42 plus 10% safety factor	---	5.86E-04	---	---	2.93E-05	0.059	1800	No	2.0	No	5.86E-05
Chrysene	7.62E-07	AP-42 plus 10% safety factor	---	1.43E-05	---	---	7.13E-07	0.0014	20	No	2.0	No	1.43E-06
Ethyl chloride	2.06E-06	AP-42 plus 10% safety factor	---	3.85E-05	---	---	1.92E-06	0.0038	10000	No	2000.0	No	3.85E-06
Ethylene dibromide	4.87E-05	AP-42 plus 10% safety factor	---	9.11E-04	---	---	4.56E-05	0.091	200	No	0.08	Yes	**9.11E-05**
Ethylene dichloride	2.60E-05	AP-42 plus 10% safety factor	---	4.85E-04	---	---	2.43E-05	0.049	1600	No	1.8	No	4.85E-05
Formaldehyde	---	Vendor Estimate	1.80E-01	1.17E+00	---	---	5.86E-02	120.0	4000	No	3.5	Yes	**1.17E-01**
Hexane	1.22E-03	AP-42 plus 10% safety factor	---	2.28E-02	---	---	1.14E-03	2.3	10000	No	2000.0	No	2.28E-03
Methanol	2.75E-03	AP-42 plus 10% safety factor	---	5.14E-02	---	---	2.57E-03	5.1	10000	No	2000.0	No	5.14E-03
Methylene chloride	2.20E-05	AP-42 plus 10% safety factor	---	4.11E-04	---	---	2.06E-05	0.041	10000	No	2000.0	No	4.11E-05
Naphthalene	8.18E-05	AP-42 plus 10% safety factor	---	1.53E-03	---	---	7.65E-05	0.15	10000	No	1.4	No	1.53E-04
Polycyclic organic matter[1]	6.53E-05	Calculated (AP-42)	---	1.22E-03	---	---	6.10E-05	0.12	20	No	2.0	No	1.22E-04
Acenaphthene	1.38E-06	AP-42 plus 10% safety factor	---	2.57E-05	---	---	1.29E-06	0.0026	20	No	2.0	No	2.57E-06
Acenaphthylene	6.08E-06	AP-42 plus 10% safety factor	---	1.14E-04	---	---	5.69E-06	0.011	20	No	2.0	No	1.14E-05
Phenanthrene	1.14E-05	AP-42 plus 10% safety factor	---	2.14E-04	---	---	1.07E-05	0.021	20	No	2.0	No	2.14E-05

PVSC Standby Power Generation Facility (SPGF)
Two Natural Gas Black Start Generators (BSGs) - Maximum Potential Emission Rates

Information from Manufacturer:

Engine Make:	Caterpillar
Engine Model:	G3520
Fuel Type:	Natural Gas

Conversion Factors:

1 kW	=	3412	BTU/hr		
Engine Power at max rating:		2953	bhp		
Genset Electrical Power Output:		2,000	kW		
Heat Input:		18,700,000	BTU/hr	=	18.70 MMBTU/hr
Maximum Operating Hours (One Engine):		100	hr/yr (Testing and Maintenance Only)		
Maximum Operating Hours (Two Engines Total):		200	hr/yr		
Heat Input:		3,740,000,000	BTU/yr	=	3740.00 MMBTU/yr
Fuel Heating Value:		1020	BTU/scf		
Fuel Usage (not used for emission calcs):		3,666,667	scf/yr	=	3.67 MMscf/yr

Pollutant	Emission Factor			Hourly Emission Rate			Maximum Annual Potential to Emit						
				One Engine	Reporting Threshold	Above Reporting Threshold?	One Engine		SOTA Threshold	Above SOTA Threshold?	Reporting Threshold	Above Reporting Threshold?	Two Engines
	lb/MMBtu	Source	g/HP-hr	lb/hr	lb/hr		ton/yr	lb/yr	ton/yr		lb/yr		ton/yr
Benzo(e)pyrene	4.57E-07	AP-42 plus 10% safety factor	---	8.54E-06	---	---	4.27E-07	0.00085	20	No	2.0	No	8.54E-07
Benzo(g,h,I)perylene	4.55E-07	AP-42 plus 10% safety factor	---	8.52E-06	---	---	4.26E-07	0.00085	20	No	2.0	No	8.52E-07
Fluoranthene	1.22E-06	AP-42 plus 10% safety factor	---	2.28E-05	---	---	1.14E-06	0.0023	20	No	2.0	No	2.28E-06
Fluorene	6.24E-06	AP-42 plus 10% safety factor	---	1.17E-04	---	---	5.83E-06	0.012	20	No	2.0	No	1.17E-05
Pyrene	1.50E-06	AP-42 plus 10% safety factor	---	2.80E-05	---	---	1.40E-06	0.0028	20	No	2.0	No	2.80E-06
2-Methylnaphthalene	3.65E-05	AP-42 plus 10% safety factor	---	6.83E-04	---	---	3.41E-05	0.068	20	No	2.0	No	6.83E-05
Propylene dichloride	2.96E-05	AP-42 plus 10% safety factor	---	5.53E-04	---	---	2.77E-05	0.055	2000	No	4.5	No	5.53E-05
Phenol	2.64E-05	AP-42 plus 10% safety factor	---	4.94E-04	---	---	2.47E-05	0.049	200	No	2000.0	No	4.94E-05
Styrene	2.60E-05	AP-42 plus 10% safety factor	---	4.85E-04	---	---	2.43E-05	0.049	2000	No	80.0	No	4.85E-05
Toluene	4.49E-04	AP-42 plus 10% safety factor	---	8.39E-03	---	---	4.20E-04	0.84	10000	No	2000.0	No	8.39E-04
Vinyl chloride	1.64E-05	AP-42 plus 10% safety factor	---	3.06E-04	---	---	1.53E-05	0.031	400	No	5.0	No	3.06E-05
Xylenes	2.02E-04	AP-42 plus 10% safety factor	---	3.78E-03	---	---	1.89E-04	0.38	10000	No	2000.0	No	3.78E-04
Total HAPs	---	---	---	1.27E+00	---	---	---	---	---	---	---	---	**0.127**
Greenhouse Gas (GHG)	**kg/MMBTU**			**kg/hr**			**MT/year**						**ton/yr**
CO_2	53.06	40 CFR 98	---	9.92E+02	---	---	9.92E+01	---	---	---	---	---	2.19E+02
CH_4	1.00E-03	40 CFR 98	---	1.87E-02	---	---	1.87E-03	---	---	---	---	---	4.12E-03
CH_4 (CO2e) [2]	2.50E-02	Calculated (40 CFR 98)	---	4.68E-01	---	---	4.68E-02	---	---	---	---	---	1.03E-01
N_2O	1.00E-04	40 CFR 98	---	1.87E-03	---	---	1.87E-04	---	---	---	---	---	4.12E-04
N_2O (CO2e) [2]	2.98E-02	Calculated (40 CFR 98)	---	5.57E-01	---	---	5.57E-02	---	---	---	---	---	1.23E-01
Total GHG (CO2e)	53.1148	Calculated (40 CFR 98)	---	9.93E+02	---	---	9.93E+01	---	---	---	---	---	219.0

Notes:

[1] If a compound or subgroup is not individually listed, the threshold for the entire chemical group applies to each compound or subgroup included in the chemical group.

[2] Global Warming Potentials (40 CFR 98, Table A-1):

CH4:	25
N2O:	298

PVSC Standby Power Generation Facility (SPGF)

Two Diesel Fire Pump Engines (FPEs) - Maximum Potential Emission Rates

Information from Manufacturer:

Engine Make:	Clarke					
Engine Model:	JU6H-UFADP8					
Fuel Type:	Diesel					
Conversion Factors:						
	1 kW	=	3412	BTU/hr		
	1 L	=	0.264172	gal		
	1 lb	=	453.592	gram		
Fuel Heating Value:			137,030	BTU/gal		
Density of diesel:			7.10	lb/gal		
Brake-Specific Fuel Consumption:			7,000	Btu/hp-hr	AP-42 Table 3.3-1 for industrial diesel engines	
Maximum Operating Hours (One Engine):			100	hr/yr (Testing and Maintenance Only)		
Maximum Operating Hours (Two Engines Total):			200	hr/yr		
Power Output (**Alternative 1**):			117	kW	157 bhp	
Fuel Consumption (**Alternative 1**):			8.0	gal/hr		
Heat Input; hourly (**Alternative 1**):			1,099,000	BTU/hr	= 1.10	MMBTU/hr
Heat Input; yearly (**Alternative 1**):			219,800,000	BTU/yr	= 219.8	MMBTU/yr
Fuel Usage (not used for emission calcs) (**Alternative 1**):			802	gal/yr		
Power Output (**Alternative 2**):			164	kW	220 bhp	
Fuel Consumption (**Alternative 2**):			11.2	gal/hr	Note: fuel consumption of 11.2 gal/hr matches specification sheet.	
Heat Input; hourly (**Alternative 2**):			1,540,000	BTU/hr	= 1.54	MMBTU/hr
Heat Input; yearly (**Alternative 2**):			308,000,000	BTU/yr	= 308.0	MMBTU/yr
Fuel Usage (not used for emission calcs) (**Alternative 2**):			1,124	gal/yr		
Power Output (**Alternative 3**):			147	kW	197 bhp	
Fuel Consumption (**Alternative 3**):			10.1	gal/hr		
Heat Input; hourly (**Alternative 3**):			1,379,000	BTU/hr	= 1.38	MMBTU/hr
Heat Input; yearly (**Alternative 3**):			1,105,977,523	BTU/yr	= 1106.0	MMBTU/yr
Fuel Usage (not used for emission calcs) (**Alternative 3**):			1,006	gal/yr		

	Emission Factor		40 CFR 60 Subpart IIII Table 4			Hourly Emission Rate							Maximum Annual Potential to Emit						
			75<kW<130 Alternative 1	130<kW<225 Alternative 2	130<kW<225 Alternative 3	One Engine Alternative 1	One Engine Alternative 2	One Engine Alternative 3	One Engine Max of 3 Alternatives	One Engine Max of 3 Alternatives	Reporting Threshold	Above Reporting Threshold?	One Engine	One Engine	SOTA Threshold	Above SOTA Threshold?	Reporting Threshold	Above Reporting Threshold?	Two Engines
Pollutant	**lb/MMBtu**	**Source**	**g/kW-hr**	**g/kW-hr**	**g/kW-hr**	**g/hr**	**g/hr**	**g/hr**	**g/hr**	**lb/hr**	**lb/hr**		**ton/yr**	**lb/yr**	**ton/yr**		**lb/yr**		**ton/yr**
CO	---	NSPS Subpart IIII	5	3.5	3.5	585	574	515	585	1.29	0.05	Yes	0.064	129	5	No	---	---	0.129
NOx	---	NSPS Subpart IIII	4	4	4	468	656	588	656	1.45	0.05	Yes	0.072	145	5	No	---	---	0.145
PM-10	---	NSPS Subpart IIII	0.3	0.2	0.2	35.1	32.8	29.4	35.1	0.08	0.05	Yes	0.0039	8	5	No	---	---	0.0077
SO2	---	Based on fuel S content of 15 ppm	1.71E-03	2.14E-03	2.14E-03	0.20	0.35	0.31	0.35	0.001	0.05	No	3.87E-05	0.1	5	No	---	---	0.000077
TSP	---	NSPS Subpart IIII	0.3	0.2	0.2	35.1	32.8	29.4	35.1	0.08	0.05	Yes	0.0039	8	5	No	---	---	0.0077
VOC	---	Estimate based on Subpart IIII	0.2	0.2	0.2	23.4	32.8	29.4	32.8	0.07	0.05	Yes	0.0036	7	5	No	---	---	0.0072
Hazardous Air Pollutants (HAPs)		AP-42: Table 3.3-2													**(lb/yr)**		**(lb/yr)**		
1,3-Butadiene	4.30E-05	AP-42 plus 10% safety factor	---		---	---	---		---	6.62E-05	---	---	3.31E-06	0.0066	140	No	1.5	No	6.62E-06
Acetaldehyde	8.44E-04	AP-42 plus 10% safety factor	---		---	---	---		---	1.30E-03	---	---	6.50E-05	0.13	10000	No	21.0	No	1.30E-04
Acrolein	1.02E-04	AP-42 plus 10% safety factor	---		---	---	---		---	1.57E-04	---	---	7.83E-06	0.016	80	No	1.0	No	1.567E-05
Benzene	1.03E-03	AP-42 plus 10% safety factor	---		---	---	---		---	1.58E-03	---	---	7.90E-05	0.16	4000	No	6.0	No	1.58E-04
Chrysene	3.88E-07	AP-42 plus 10% safety factor	---		---	---	---		---	5.98E-07	---	---	2.99E-08	0.00006	20	No	2.0	No	5.98E-08
Formaldehyde	1.30E-03	AP-42 plus 10% safety factor	---		---	---	---		---	2.00E-03	---	---	9.99E-05	0.2	4000	No	3.5	No	1.999E-04
Naphthalene	9.33E-05	AP-42 plus 10% safety factor	---		---	---	---		---	1.44E-04	---	---	7.18E-06	0.014	10000	No	1.4	No	1.44E-05
Polycyclic organic matter[1]	9.12E-05	AP-42 plus 10% safety factor	---		---	---	---		---	1.40E-04	---	---	7.02E-06	0.014	20	No	2.0	No	1.40E-05
Acenaphthene	1.56E-06	AP-42 plus 10% safety factor	---		---	---	---		---	2.41E-06	---	---	1.20E-07	0.00024	20	No	2.0	No	2.41E-07
Acenaphthylene	5.57E-06	AP-42 plus 10% safety factor	---		---	---	---		---	8.57E-06	---	---	4.29E-07	0.00086	20	No	2.0	No	8.57E-07
Anthracene	2.06E-06	AP-42 plus 10% safety factor	---		---	---	---		---	3.17E-06	---	---	1.58E-07	0.00032	20	No	2.0	No	3.17E-07
Phenanthrene	3.23E-05	AP-42 plus 10% safety factor	---		---	---	---		---	4.98E-05	---	---	2.49E-06	0.005	20	No	2.0	No	4.98E-06
Benz(a)anthracene	1.85E-06	AP-42 plus 10% safety factor	---		---	---	---		---	2.85E-06	---	---	1.42E-07	0.00028	20	No	0.4	No	2.85E-07
Benzo(a)pyrene	2.07E-07	AP-42 plus 10% safety factor	---		---	---	---		---	3.18E-07	---	---	1.59E-08	0.00003	20	No	0.04	No	3.18E-08
Benzo(b)fluoranthene	1.09E-07	AP-42 plus 10% safety factor	---		---	---	---		---	1.68E-07	---	---	8.39E-09	0.00002	20	No	0.4	No	1.68E-08
Benzo(k)fluoranthene	1.71E-07	AP-42 plus 10% safety factor	---		---	---	---		---	2.63E-07	---	---	1.31E-08	0.00003	20	No	2.0	No	2.63E-08
Indeno(1,2,3-c,d)pyrene	4.13E-07	AP-42 plus 10% safety factor	---		---	---	---		---	6.35E-07	---	---	3.18E-08	0.00006	20	No	0.4	No	6.35E-08
Dibenz(a,h)anthracene	6.41E-07	AP-42 plus 10% safety factor	---		---	---	---		---	9.88E-07	---	---	4.94E-08	0.0001	20	No	0.04	No	9.88E-08
Benzo(g,h,I)perylene	5.38E-07	AP-42 plus 10% safety factor	---		---	---	---		---	8.28E-07	---	---	4.14E-08	0.00008	20	No	2.0	No	8.28E-08
Fluoranthene	8.37E-06	AP-42 plus 10% safety factor	---		---	---	---		---	1.29E-05	---	---	6.45E-07	0.0013	20	No	2.0	No	1.29E-06
Fluorene	3.21E-05	AP-42 plus 10% safety factor	---		---	---	---		---	4.95E-05	---	---	2.47E-06	0.0049	20	No	2.0	No	4.95E-06
Pyrene	5.26E-06	AP-42 plus 10% safety factor	---		---	---	---		---	8.10E-06	---	---	4.05E-07	0.00081	20	No	2.0	No	8.10E-07
Toluene	4.50E-04	AP-42 plus 10% safety factor	---		---	---	---		---	6.93E-04	---	---	3.46E-05	0.069	10000	No	2000.0	No	6.93E-05
Xylenes	3.14E-04	AP-42 plus 10% safety factor	---		---	---	---		---	4.83E-04	---	---	2.41E-05	0.048	10000	No	2000.0	No	4.83E-05
Total HAPs	---	---	---		---	---	---		---	6.70E-03	---	---	3.35E-04	---	---	---	---	---	---
Greenhouse Gas (GHG)	**kg/MMBTU**									**kg/hr**			**MT/year**						**ton/yr**
CO_2	73.96	40 CFR 98	---		---	---	---		---	1.14E+02	---	---	1.14E+01	---	---	---	---	---	2.51E+01
CH_4	3.00E-03	40 CFR 98	---		---	---	---		---	4.62E-03	---	---	4.62E-04	---	---	---	---	---	1.02E-03
CH_4 (CO2e) [2]	7.50E-02	Calculated (40 CFR 98)	---		---	---	---		---	1.16E-01	---	---	1.16E-02	---	---	---	---	---	2.55E-02
N_2O	6.00E-04	40 CFR 98	---		---	---	---		---	9.24E-04	---	---	9.24E-05	---	---	---	---	---	2.04E-04
N_2O (CO2e) [2]	1.79E-01	Calculated (40 CFR 98)	---		---	---	---		---	2.75E-01	---	---	2.75E-02	---	---	---	---	---	6.07E-02
Total GHG (CO2e)	74.2138	Calculated (40 CFR 98)	---		---	---	---		---	1.14E+02	---	---	1.14E+01	---	---	---	---	---	25.2

Notes:

[1] If a compound or subgroup is not individually listed, the threshold for the entire chemical group applies to each compound or subgroup included in the chemical group.

[2] Global Warming Potentials (40 CFR 98, Table A-1): CH4: 25

N2O: 298

PVSC Standby Power Generation Facility (SPGF)
Comparative Greenhouse Gas Emission Rates for Combustion Turbine Generators (CTGs)

Power Output:	28 MW	per turbine maximum	
Maximum operating hours for one turbine		592	hr/yr
Maximum total hours for all three turbines:		1,284	hr/yr (two turbines @ 592 hr/yr; one standby turbine @100 hr/yr)

Maximum Potential Carbon Dioxide Equivalent (CO2e) Greenhouse Gas Emission Rates

Case	Emission Factor (lb/MWh)	Power Generation (MWh/yr)	Total Emission Rate (tons/year)
SPGF [1]	1,317	35,952	23,681
PJM Grid [2]	1,647		29,601

Notes:

[1] Greenhouse gas emission factor is from U.S. EPA's Mandatory Greenhouse Gas Reporting Rule, 40 CFR 98, Tables C-1 and C-2 for natural gas combustion.

[2] U.S. EPA, Emissions & Generation Resource Integrated Database, eGRID2019, released on February 23, 2021. Available at https://www.epa.gov/egrid. Greenhouse gas emission rates are for the Pennsylvania Jersey Maryland (PJM) Interconnection power pool. PJM is the regional transmission organization (RTO) that coordinates the movement of wholesale electricity in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. Non-baseload output emission rates (for peaking power plants on the grid) were selected for the five eGRID Subregions that cover the PJM RTO area: RFC East, RFC Michigan, RFC West, SERC Tennessee Valley and SERC Virginia/Carolina. The grid transmission loss of 5.1% was used.

Calculation of PJM Grid Non-Baseload Greenhouse Gas Emission Rates:

eGRID Subregion	Net Generation (MWh)	Non-Baseload CO2e Emission Rates (lb/MWh)	Weighted Average Blended CO2e Emission Rate (lb/MWh)	Grid Loss (%)	Total Calculated PJM Grid CO2e Emission Factor (lb/MWh)
RFC East	296,156,271	1,243.8	1,566.8	5.1	1,646.7
RFC Michigan	97,428,154	1,778.8		5.1	
RFC West	514,164,802	1,843.7		5.1	
SERC Tenn Valley	216,125,641	1,574.6		5.1	
SERC Virginia/Carolina	328,960,224	1,356.9		5.1	
Total	1,452,835,092				

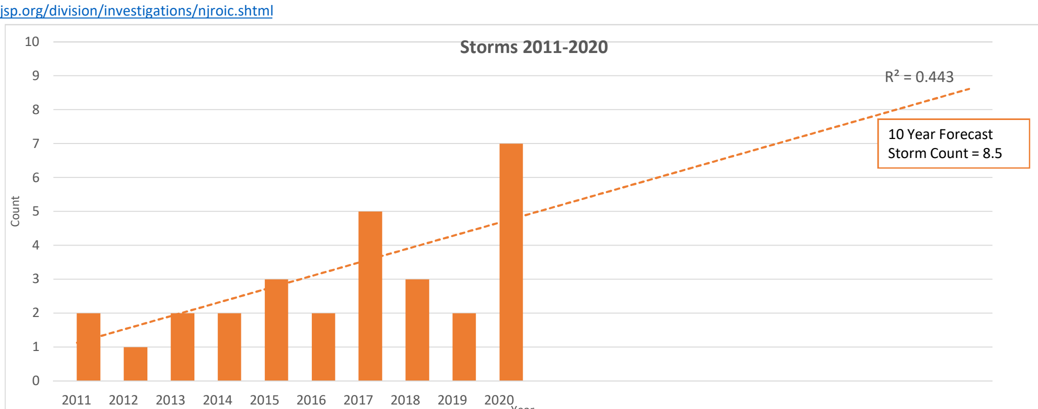
PVSC Standby Power Generation Facility (SPGF)
Storm Preparation Mode
Storms 2011-2020 and 10 Year Future Forecast

Date	**Year**	**Details**
8/27/2011	2011	Tropical Storm Irene made landfall in Brigantine as a strong tropical storm. The storm caused beach erosion, flooding, and sustained winds of 59 mph (94 km/h) in Cape May, where hurricane force gusts were also recorded.[92] Numerous reports of major flooding, downed trees, and power outages were reported. The storm caused just the third ever shutdown of Atlantic City casinos and also prompted residents of coastal communities to evacuate in advance of the storm. The storm kills a total of ten people in the state.
9/7/2011	2011	The remnants of Tropical Storm Lee causes heavy rain across all of the state. In Phillipsburg, 9.55 Inches of rain fell. Moderate to severe flooding occurred in Western portions of the state.
10/29/2012	2012	Hurricane Sandy reaches within 50 miles of the coastline before moving ashore in Brigantine as an extratropical cyclone. The storm brings hurricane-force winds, record low pressure, and a momentous storm surge along areas of the coast. The storm becomes the worst hurricane to affect the state on record, killing 37 and causing nearly $30 billion in damages. Widespread devastation is noted, particularly on Long Beach Island and the Barnegat Peninsula, where the Seaside Heights boardwalk collapses into the ocean. Further north, storm surge flooding causes massive destruction along the Raritan Bay and traps thousands in Hoboken. All of New Jersey Transit's commuter rail operations are affected, with some lines out of service for over a month, and inundation of rolling stock stored in NJ Transit's Meadowlands yard. Sandy also causes the worst power outage in state history, blacking out over 2 million households.
6/7/2013	2013	Tropical Storm Andrea passes through New Jersey as a post-tropical storm, causing heavy rainfall throughout the state and forcing an emergency plane landing at Newark Airport. Rainfal peaks at 5 inches in Oceanport.
10/6/2013	2013	Moisture associated with the remnants of Tropical Storm Karen drops locally heavy rains across New Jersey, causing minor street flooding
7/4/2014	2014	Hurricane Arthur passes to the east of New Jersey. The storm produces moderate rainfall along the coast, though winds remain generally below tropical storm force. Strong waves buffet the coastline, and some holiday celebrations in the state were cancelled or postponed.
8/28/2014	2014	Hurricane Cristobal passes well offshore of the state but generates strong waves and rip currents that kill 2 in Sandy Hook
6/21/2015	2015	The remnants of Tropical Storm Bill pass through the state, dropping heavy rain but causing no damage
10/1/2015	2015	Hurricane Joaquin briefly threatens to approach or strike New Jersey, forcing the state to begin storm preparations. Officials in Atlantic City discuss the possibility of evacuations, though ar order never materializes. Joaquin instead turns away long before affecting the shoreline.
10/28/2015	2015	The remnants of Hurricane Patricia pass through the Northeast. Inches of heavy rain and gusty winds cause downed tree limbs, power outages, and flooding throughout the state
9/5/2016	2016	Hurricane Hermine meanders off the coast as a powerful post-tropical cyclone. The state thoroughly prepares for the storm's arrival during the busy holiday weekend. Hermine moves further east than forecasted and impacts are much less than expected. Strong waves and minor coastal flooding occur along the coastline.
10/8/2016	2016	Hurricane Matthew interacts with a frontal system, bringing light rain to the state
6/24/2017	2017	The remnants of Tropical Storm Cindy bought strong winds to portions of New Jersey. Numerous powerlines and trees were downed in parts of southern and central parts of New Jersey. Two EF-0 tornadoes related to the system touched down in Howell Township, the first one touching down in the Fort Plains area damaging a Home Depot, Chase Bank, a strip mall, an ice cream parlor and downing trees and powerlines. The second one hit a park in the Oak Glen area.
9/3/2017	2017	The remnants of Hurricane Harvey hit New Jersey on Labor Day weekend, causing minimal damage
9/19/2017	2017	Large waves from Hurricane Jose cause beach erosion along the Jersey Shore. Moderate rainfall and winds of 25-40 mph also occur across the state
9/27/2017	2017	Hurricane Maria brings showers and some gusty winds to the shore.
10/29/2017	2017	A post-tropical system that was once Tropical Storm Philippe passes east of the shore and brings 1-4 inches of rain.[94] The winds occasionally gusted over 40 mph and sustained winds were 15-30 mph
9/8/2018	2018	The remnants of Tropical Storm Gordon affect the state for 3 days, dropping amounts of up to 3-6 inches in parts of the state, along with wind gusts reaching up to 40 mph
9/17/2018	2018	The remnants of Hurricane Florence brought light to moderate rainfall to the state, with South Jersey receiving up to 3 inches of rain
10/11/2018	2018	The remnants of Hurricane Michael brought flash flooding to parts of Northern New Jersey.
7/16/2019	2019	Hurricane Barry's remnant moisture brought severe thunderstorms to the region. Trees were reported down and power outages occurred in Ewing, New Jersey
9/6/2019	2019	Hurricane Dorian brought gusty winds and showers to the state, especially the Shore. Winds as high as 45 mph were reported, along with light rainfall and foggy, cloudy conditions.
7/10/2020	2020	Tropical Storm Fay made landfall just northeast of Atlantic City, New Jersey, with maximum sustained winds of 50 mph (85 km/h).[98] Four people drowned due to rip currents along the coast.[99] Fay was the first landfalling cyclone since Sandy in 2012 and the first fully tropical cyclone to make landfall in New Jersey since Irene in 2011.
8/4/2020	2020	Tropical Storm Isaias moved up the east coast of the United States, bringing wind gusts of 75 mph (120 km/h) to Cape May, as well as Berkeley Township.[101] Isaias spawned two tornadoes in the state.[105] A 21-year-old man drowned off the coast of Cape May, New Jersey due to strong rip currents and rough surf.[Rainfall reached 5.41 in (137 mm) in Logan Township.[102] Governor Phil Murphy of declared a state of emergency as 1.36 million people were reported without power throughout the state.
8/29/2020	2020	Hurricane Laura's remnant energy brought 4.92 in (125 mm) of rainfall and 33 mph (53 km/h) wind gusts to the state.
9/18/2020	2020	Hurricane Sally's remnants brought 0.74 in (19 mm) of rainfall and 35 mph (56 km/h) wind gusts to the state.
9/27/2020	2020	Tropical Storm Beta's remnants brought 0.51 in (13 mm) of rainfall and 29 mph (47 km/h) wind gusts to the state.
10/11/2020	2020	Hurricane Delta's remnants affect New Jersey and surrounding states. A peak rainfall amount of 3.67 inches (93 mm) was recorded in West Creek, and a top wind gust of 42 miles per hour (68 km/h) was recorded in Sea Girt.
10/29/2020	2020	Post-Tropical Storm Zeta passes through the state, bringing high winds and heavy rainfall. A peak rainfall amount of 4.06 in (103 mm) and a wind gust of 45 mph (72 km/h) were recorded. A low pressure of 29.30 inches of mercury (992 mbar) was also recorded

Data obtained from Wikipedia:
https://en.wikipedia.org/wiki/List_of_New_Jersey_hurricanes#2020s
Accessed March 22, 2021

PVSC Storm Anticipation Mode Protocol

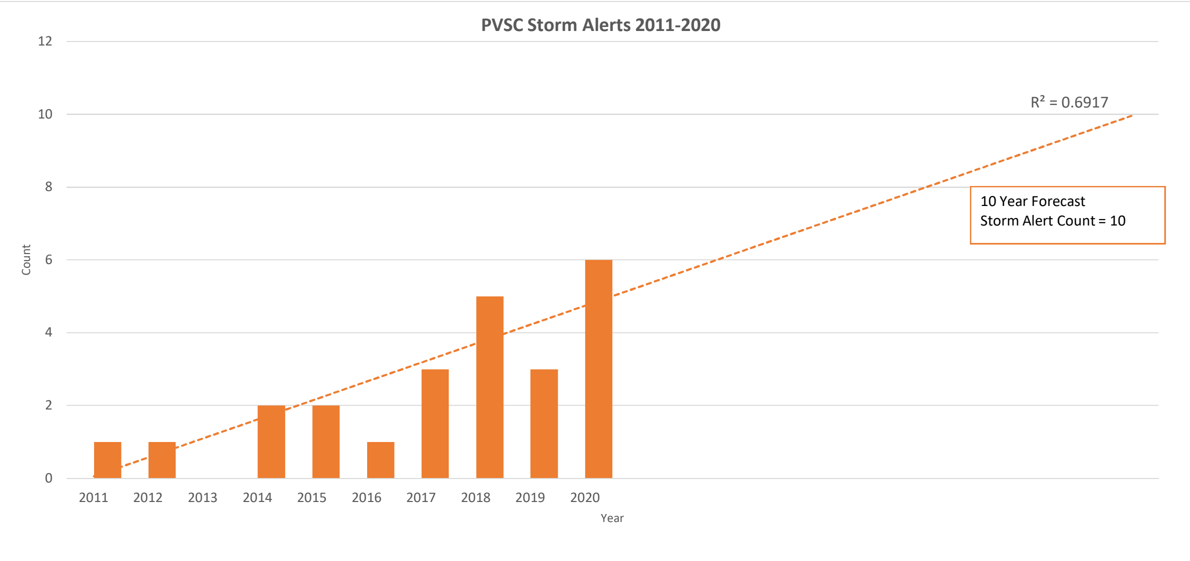
1) Montoring of weather from several different sources including the National Weather Service (NWS). PVSC is a Weather Ready Ambassador through NWS.
https://www.weather.gov/wrn/ambassadors
2) Phone call to the New Jersey Regional Operations & Intelligence Center (NJ ROIC) to get their input to help make the decision on triggering the storm anticipation mode
https://www.njsp.org/division/investigations/njroic.shtml



PVSC Standby Power Generation Facility (SPGF)
Storm Preparation Mode
Storm Alerts 2011-2020 and 10 Year Future Forecast

PASSAIC VALLEY SEWERAGE COMMISSION

ALERT DATE	STORM DATE(S)	STORM DESIGNATION	STORM NAME	IMPACT
8/24/2011	8/26/2011 - 8/27/2011	STORM	IRENE	LOCAL POWER LOSS WWPS & HEAD WORKS
10/25/2012	10/29/2012	HURRICANE	SANDY	UTILITY POWER LOSS - PLANTWIDE
9/25/2014	9/26/2014	TROPICAL DEPRESSION (FLOODING)	UNNAMED	NO IMPACT
10/15/2014	10/18/2014 - 10/19/2014	TROPICAL STORM	GONZALO	NO IMPACT (OUT TO SEA)
9/30/2015	10/1/2015 - 10/2/2015	HURRICANE	JOAQUIN	LOCAL POWER LOSS WWPS
12/28/2015	12/29/2015	WINTER STORM (ICE)	UNNAMED	NO IMPACT
9/29/2016	10/6/2016	HURRICANE	MATTHEW	NO IMPACT (OUT TO SEA)
3/13/2017	3/14/2017 - 3/15/2017	WINTER STORM	STELLA	LOCAL POWER LOSS - ADMIN/SECURITY
9/5/2017	9/14/2017	HURRICANE	IRMA	FLOODING - LOCAL POWER LOSS
9/18/2017	9/20/2017	TROPICAL STORM	JOSE	NO IMPACT
1/20/2018	1/22/2018 - 1/24/2018	WINTER STORM	JONAS	LOCAL POWER LOSS - SHT
3/5/2018	3/7/2018 - 3/8/2018	WINTER STORM	RILEY	LOCAL POWER LOSS - VARIOUS FACILITIES
3/20/2018	3/22/2018 - 3/23/2018	WINTER STORM	TOBY	NO IMPACT
10/10/2018	10/10/2018 - 10/11/2018	HURRICANE	MICHAEL	NO IMPACT (OUT TO SEA)
10/25/2018	10/26/2018 - 10/27/2018	HURRICANE	WILLA	NO IMPACT (OUT TO SEA)
1/16/2019	1/19/2019	WINTER STORM	HARPER	LOCAL POWER LOSS - WWPS
1/23/2019	1/30/2019	WINTER WEATHER	UNNAMED	NO IMPACT
12/1/2019	12/2/2019 - 12/3/2019	WINTER WEATHER	UNNAMED	NO IMPACT
1/6/2020	1/7/2020 - 1/8/2020	WINTER STORM	UNNAMED	NO IMPACT
7/31/2020	8/4/2020 - 8/5/2020	TROPICAL STORM	ISAIAS	LOCAL POWER LOSS - MULTIPLE FACILITIES
9/16/2020	9/20/2020	HURRICANE	TEDDY	NO IMPACT (OUT TO SEA)
10/19/2020	10/23/2020	TROPICAL STORM #27	UNNAMED	NO IMPACT (OUT TO SEA)
10/27/2020	10/30/2020 - 10/31/2020	TROPICAL DEPRESSION/STORM	ZETA	FLOODING
12/14/2020	12/16/2020 - 12/17/2020	WINTER STORM	GAIL	LOCAL POWER LOSS - VARIOUS FACILITIES
1/29/2021	2/2/2021 - 2/3/2021	WINTER STORM	ORLENA	NO IMPACT



APPENDIX C
Emission Netting Analysis

NJ01 - NETTING ANALYSIS RESULTS - Consistent with N.J.A.C. 7:27-18.7

Facility Information → Facility PI: 07349 Facility Name: PASSAIC VALLEY SEWERAGE COMMISSIONERS BOP Activity: 200003

Calculation of NI for this Permit Action - NO DATA ENTRY REQUIRED

This table is automatically populated after Table 1 and Table 2 below are completed.

Air Contaminant	IP Emission Increase from Permitted Sources	INP Emission Increase from Non-Permitted Sources	IF Emission Increase from Fugitive Emissions	IA Emission Increase from the Current Modification	DO Emission Decrease from Emission Offsets	DC Emission Decrease from Creditable Emission Reductions	NI Net Emission Increase at the Facility	Significant Net Emission Increase Thresholds (N.J.A.C. 7:27-18.7 Table 3)	Significant Net Emission Increase? Yes/No
VOC	0.00	0.00	0.00	1.39	0.00	0.00	1.39	25	No
NOx	0.00	0.00	0.00	2.27	0.00	0.00	2.27	25	No
CO	0.00	0.00	0.00	4.37	0.00	0.00	4.37	100	No
SO2	0.00	0.00	0.00	0.69	0.00	0.00	0.69	40	No
TSP	0.00	0.00	0.00	2.87	0.00	0.00	2.87	25	No
PM10	0.00	0.00	0.00	2.85	0.00	0.00	2.85	15	No
PM2.5	0.00	0.00	0.00	2.85	0.00	0.00	2.85	10	No

Table 1 - Calculation of Total IA for this Permit Action (Modification or GOP) - ENTER ALL DATA FOR THIS PERMIT ACTION

Equipment ID	Emission Unit / Batch Process	Equipment Description	Start of Constr. Date	Start of Operation Date	VOC TPY	NOx TPY	CO TPY	SO2 TPY	TSP TPY	PM10 TPY	PM2.5 TPY
E3001, E3002, and E3003	U301	28 MWe NG Turbine 1, 2, and 3	12/1/2021	12/1/2023	1.27	1.96	3.92	0.69	2.83	2.83	2.83
E3004, E3005	U304	2000 kW NG Black Start Engine 1 and 2	12/1/2021	12/1/2023	0.11	0.16	0.33	0.00	0.03	0.02	0.02
E3006, E3007	U306	Two Diesel Fire Pump Engines	12/1/2021	12/1/2023	0.01	0.15	0.13	0.00	0.01	0.01	0.01
				Totals for this Permit Action (IA):	1.39	2.27	4.37	0.69	2.87	2.85	2.85

Table 2 - Total IP, INP, IF, DO, & DC for the Contemporaneous Period – ENTER ALL DATA FOR THE CONTEMPORANEOUS PERIOD SHOWN BELOW

Contemporaneous Period Start:	1/1/2016	Contemporaneous Period End:	12/1/2023

Use the Equipment ID drop-down filter to uncheck blank rows before printing.

Equipment ID	Emission Unit / Batch Process	Equipment Description	BOP Activity	Permit Approval Date	Netting Term	VOC TPY	NOx TPY	CO TPY	SO2 TPY	TSP TPY	PM10 TPY	PM2.5 TPY

Equipment ID	Emission Unit / Batch Process	Equipment Description	BOP Activity	Permit Approval Date	Netting Term	VOC TPY	NOx TPY	CO TPY	SO2 TPY	TSP TPY	PM10 TPY	PM2.5 TPY

Equipment ID	Emission Unit / Batch Process	Equipment Description	BOP Activity	Permit Approval Date	Netting Term	VOC TPY	NOx TPY	CO TPY	SO2 TPY	TSP TPY	PM10 TPY	PM2.5 TPY

APPENDIX D
Vendor Provided Information

Combustion Turbine Generator Cut-Sheets

SIEMENS

Passaic Valley

Estimated SGT-600 Gas Turbine
Gas Turbine in Simple Cycle - DSCR

Estimated Emissions Data Sheet
December 12, 2019

SITE CONDITIONS:	**CASE 1**	**CASE 2**	**CASE 3**	**CASE 4**	**CASE 5**	**CASE 6**	**CASE 7**	**CASE 8**	**CASE 9**	**CASE 10**	**CASE 11**	**CASE 12**	**CASE 13**
FUEL TYPE	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
GT LOAD LEVEL	100%	100%	75%	50%	100%	75%	50%	100%	75%	50%	100%	75%	50%
NET FUEL HEATING VALUE, Btu/lb_m (LHV)	21,179	21,180	21,181	21,182	21,183	21,184	21,185	21,186	21,187	21,188	21,189	21,190	21,191
GROSS FUEL HEATING VALUE, Btu/lb_m (HHV)	23,460	23,510	23,511	23,512	23,513	23,514	23,515	23,516	23,518	23,519	23,520	23,521	23,522
AMBIENT DRY BULB TEMPERATURE, °F	59.0	99.0	99.0	99.0	55.0	55.0	55.0	17.0	17.0	17.0	-5.0	-5.0	-5.0
AMBIENT RELATIVE HUMIDITY, %	60	40	40	40	50	50	50	60	60	60	60	60	60
BAROMETRIC PRESSURE, psia	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69	14.69
GT FUEL FLOW, lb_m/hr	11,551	9,981	8,013	6,389	11,700	9,204	7,248	12,701	9,715	7,754	13,195	10,047	7,844
GT HEAT INPUT, MMBtu/hr (HHV)	271	235	188	150	275	216	170	299	228	182	310	236	185
GT EXHAUST FLOW, lb_m/hr	636,829	558,578	504,445	421,486	644,684	580,349	475,515	685,877	630,942	521,545	703,190	646,860	546,104
GT OUTPUT, kW	24,107	19,744	14,808	9,872	24,515	18,387	12,257	26,733	20,049	13,366	27,647	20,735	13,822
GAS TURBINE EXHAUST GAS (BEFORE COOLING)													
EXHAUST TEMPERATURE, °F	1,005	1,041	968	984	1,002	908	933	968	842	877	984	830	825
OXYGEN, Vol. %	13.77	13.67	14.36	14.63	13.82	14.69	14.92	13.77	14.96	15.16	13.70	14.93	15.38
CARBON DIOXIDE, Vol. %	3.24	3.17	2.83	2.70	3.24	2.84	2.73	3.31	2.77	2.67	3.36	2.79	2.59
WATER, Vol. %	7.20	8.53	7.87	7.62	6.94	6.16	5.95	6.56	5.50	5.31	6.52	5.42	5.03
NITROGEN, Vol. %	74.90	73.81	74.06	74.17	75.11	75.41	75.50	75.46	75.87	75.96	75.52	75.96	76.10
ARGON, Vol. %	0.89	0.88	0.88	0.88	0.89	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
MOLECULAR WEIGHT	28.46	28.33	28.35	28.37	28.49	28.54	28.56	28.54	28.61	28.62	28.55	28.62	28.64
GAS TURBINE EMISSIONS (Based on USEPA Test Methods):													
NO_X, ppmvd @ 15% O_2	9.0	9.0	9.0	15.0	9.0	9.0	15.0	9.0	9.0	15.0	9.0	9.0	25.0
NO_X, lb_m/hr as NO_2	8.9	7.6	6.2	8.2	9.0	7.1	9.3	9.8	7.5	10.0	10.2	7.8	16.8
NO_x, lb_m/MMBtu (HHV)	0.0329	0.0324	0.0328	0.0547	0.0328	0.0328	0.0547	0.0328	0.0328	0.0547	0.0328	0.0328	0.0909
CO, ppmvd @ 15% O_2	9	9	9	80	9	9	80	9	9	80	9	9	80
CO, lb_m/hr	5.4	4.6	3.8	26.7	5.5	4.3	30.3	6.0	4.6	32.4	6.2	4.7	32.7
CO, lb_m/MMBtu (HHV)	0.0200	0.0198	0.0199	0.1775	0.0200	0.0200	0.1775	0.0200	0.0200	0.1775	0.0200	0.0200	0.1771
VOC, ppmvd @ 15% O_2 as CH_4	1	1	1	4	1	1	4	1	1	4	1	1	4
VOC, lb_m/hr as CH_4	0.35	0.29	0.24	0.76	0.35	0.27	0.87	0.38	0.29	0.93	0.39	0.30	0.94
VOC, lb_m/MMBtu (HHV)	0.0013	0.0013	0.0013	0.0051	0.0013	0.0013	0.0052	0.0013	0.0013	0.0052	0.0013	0.0013	0.0052
SO2, lbm/MMBtu (HHV)	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0028	0.0028	0.0029	0.0029	0.0029	0.0029
PM10 Front and Back, lbm/MMBtu (HHV)	0.0122	0.0128	0.0132	0.0140	0.0121	0.0123	0.0132	0.0117	0.0116	0.0126	0.0114	0.0115	0.0124
STACK EXHAUST GAS	43.9	48.7	27.9	26.1	43.6	16.4	18.3	40.6	0.5	7.7	39.6	0	0
COOLING AIR FLOW, lbm/hr	158,040	175,320	100,440	93,960	156,960	59,040	65,880	146,160	1,800	27,720	142,560	0	0
STACK EXHAUST FLOW, lb_m/hr	794,869	733,898	604,885	515,446	801,644	639,389	541,395	832,037	632,742	549,265	845,750	646,860	546,104
STACK EXHAUST FLOW, dry scfm	168,089	153,965	127,072	108,545	169,774	135,552	115,107	176,525	134,220	116,946	179,435	137,283	116,276
EXHAUST TEMPERATURE, °F	840	840	840	840	840	840	840	840	840	840	840	830	825
OXYGEN, Vol. %	15.13	15.21	15.35	15.67	15.17	15.24	15.63	15.01	14.98	15.45	14.90	14.93	15.38
CARBON DIOXIDE, Vol. %	2.60	2.41	2.36	2.21	2.62	2.58	2.40	2.74	2.76	2.54	2.81	2.79	2.59
WATER, Vol. %	6.05	7.28	7.11	6.83	5.79	5.69	5.35	5.47	5.49	5.06	5.45	5.42	5.03
NITROGEN, Vol. %	75.31	74.21	74.30	74.41	75.53	75.58	75.71	75.88	75.88	76.05	75.93	75.96	76.10
ARGON, Vol. %	0.90	0.89	0.88	0.88	0.90	0.90	0.90	0.91	0.90	0.90	0.91	0.90	0.90
MOLECULAR WEIGHT	28.53	28.38	28.39	28.41	28.57	28.57	28.59	28.61	28.61	28.63	28.62	28.62	28.64
STACK EMISSIONS (Based on USEPA Test Methods):													
NO_X, ppmvd @ 15% O_2	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NO_X, lb_m/hr as NO_2	2.52	2.16	1.74	1.39	2.55	2.01	1.58	2.77	2.12	1.69	2.88	2.20	1.71
NO_x, lb_m/MMBtu (HHV)	0.0093	0.0092	0.0092	0.0092	0.0093	0.0093	0.0093	0.0093	0.0093	0.0093	0.0093	0.0093	0.0093
CO, ppmvd @ 15% O_2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO, lb_m/hr	1.84	1.58	1.27	1.01	1.86	1.47	1.15	2.02	1.55	1.24	2.11	1.60	1.25
CO, lb_m/MMBtu (HHV)	0.0068	0.0067	0.0067	0.0067	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068
VOC, ppmvd @ 15% O_2 as CH_4	1	1	1	4	1	1	4	1	1	4	1	1	4
VOC, lb_m/hr as CH_4	0.35	0.30	0.24	0.77	0.36	0.28	0.88	0.39	0.30	0.94	0.40	0.31	0.95
VOC, lb_m/MMBtu (HHV)	0.0013	0.0013	0.0013	0.0051	0.0013	0.0013	0.0052	0.0013	0.0013	0.0052	0.0013	0.0013	0.0052
UHC, ppmvd @ 15% O_2 as CH_4	3	3	3	10	3	3	10	3	3	10	3	3	10
UHC, lb_m/hr as CH_4	0.82	0.71	0.53	1.38	0.83	0.61	1.55	0.91	0.63	1.63	0.95	0.65	1.60
SO_2, lb_m/hr	0.78	0.67	0.54	0.43	0.79	0.62	0.49	0.85	0.65	0.52	0.89	0.68	0.53
SO_2, lb_m/MMBtu (HHV)	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0028	0.0028	0.0029	0.0029	0.0029	0.0029
Sulfur Mist, H_2SO_4, lb_m/hr	0.22	0.19	0.15	0.12	0.22	0.17	0.14	0.24	0.18	0.15	0.25	0.19	0.15
TSP Front and Back, lb_m/hr	3.3	3.0	2.5	2.1	3.3	2.7	2.2	3.5	2.7	2.3	3.6	2.7	2.3
PM_{10} Front and Back, lb_m/hr	3.3	3.0	2.5	2.1	3.3	2.7	2.2	3.5	2.7	2.3	3.6	2.7	2.3
PM_{10} Front and Back, lb_m/MMBtu (HHV)	0.0122	0.0128	0.0132	0.0140	0.0121	0.0123	0.0132	0.0117	0.0116	0.0126	0.0114	0.0115	0.0124
Opacity, %	10	10	10	10	10	10	10	10	10	10	10	10	10
NH_3 Slip, ppmvd @ 15% O_2	5	5	5	5	5	5	5	5	5	5	5	5	5
Formaldehyde (HCHO), ppb @ 15% O_2	200	200	200	200	200	200	200	200	200	200	200	200	200
Formaldehyde (HCHO), lb_m/hr	0.13	0.11	0.09	0.07	0.13	0.11	0.08	0.15	0.11	0.09	0.15	0.12	0.09
CO_2, lb_m/hr	32,836	28,249	22,789	18,175	33,329	26,176	20,603	36,118	27,669	22,086	37,644	28,587	22,384
Ammonia Flow, lb_m/hr	23	19	16	19	23	18	22	25	19	23	26	20	36
NH_3 Slip, lbs/hr	1.9	1.6	1.3	1.0	1.9	1.5	1.2	2.1	1.6	1.3	2.1	1.6	1.3

NOTES:

- ► Performance is based on new and clean condition. All data is estimated and not guaranteed.
- ► Max output 28MW. Max heat input 315 MMBtu/hr HHV.
- ► Fuel gas assumes 1 gr S/100SCF.
- ► VOC consist of total hydrocarbons excluding methane and ethane and are expressed in terms of methane (CH_4).
- ► Particulates are per US EPA Method 5/202 (front and back half).
- ► Ammonia Flow based on 19% aqueous ammonia.
- ► Emissions are for steady-state conditions.
- ► Data included in any permit application or Environmental Impact Statement are strictly the customer's responsibility. Siemens is available to review permit application data upon request.

Black Start Generator Cut-Sheets

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
G3520 NJ Project

CATERPILLAR®

GENSET APPLICATION

ENGINE SPEED (rpm):	1800
COMPRESSION RATIO:	11.5
AFTERCOOLER TYPE:	SCAC
AFTERCOOLER - STAGE 2 INLET (°F):	130
AFTERCOOLER - STAGE 1 INLET (°F):	192
JACKET WATER OUTLET (°F):	210
ASPIRATION:	TA
COOLING SYSTEM:	JW+OC+1AC, 2AC
CONTROL SYSTEM:	ADEM4 W/ IM
EXHAUST MANIFOLD:	DRY
COMBUSTION:	LOW EMISSION
SET POINT TIMING:	30

RATING STRATEGY:	EMERGENCY
RATING LEVEL:	STANDBY
FUEL SYSTEM:	CAT LOW PRESSURE WITH AIR FUEL RATIO CONTROL

SITE CONDITIONS:

FUEL:	Martin NJ Project Gas from Spec
FUEL PRESSURE RANGE(psig): (See note 1)	0.5-5.0
FUEL METHANE NUMBER:	86.1
FUEL LHV (Btu/scf):	936
ALTITUDE(ft):	12
INLET AIR TEMPERATURE(°F):	108
STANDARD RATED POWER:	2953 bhp@1800rpm
POWER FACTOR:	0.8
VOLTAGE(V):	440-13800

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
GENSET POWER	(WITHOUT FAN)	(2)(3)	ekW	2100	2100	1575	1050
GENSET POWER	(WITHOUT FAN)	(2)(3)	kVA	2625	2625	1968	1312
ENGINE POWER	(WITHOUT FAN)	(3)	bhp	2953	2953	2218	1491
INLET AIR TEMPERATURE			°F	108	108	108	108
GENERATOR EFFICIENCY		(2)	%	95.3	95.3	95.2	94.4
GENSET EFFICIENCY	(ISO 3046/1)	(4)(5)	%	39.3	39.3	38.4	36.0
THERMAL EFFICIENCY		(4)(6)	%	44.8	44.8	45.5	47.5
TOTAL EFFICIENCY		(4)(7)	%	84.1	84.1	83.9	83.5
ENGINE DATA							
GENSET FUEL CONSUMPTION	(ISO 3046/1)	(8)	Btu/ekW-hr	8684	8684	8887	9480
GENSET FUEL CONSUMPTION	(NOMINAL)	(8)	Btu/ekW-hr	8896	8896	9104	9711
ENGINE FUEL CONSUMPTION	(NOMINAL)	(8)	Btu/bhp-hr	6325	6325	6463	6836
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(9)	ft3/min	6464	6464	5043	3639
AIR FLOW	(WET)	(9)	lb/hr	27095	27095	21140	15254
FUEL FLOW (60ºF, 14.7 psia)			scfm	333	333	255	182
INLET MANIFOLD PRESSURE		(10)	in Hg(abs)	78.2	78.2	59.7	42.1
EXHAUST TEMPERATURE - ENGINE OUTLET		(11)	°F	881	881	889	920
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(12)	ft3/min	16371	16371	12837	9468
EXHAUST GAS MASS FLOW	(WET)	(12)	lb/hr	27969	27969	21812	15731
MAX INLET RESTRICTION		(13)	in H2O	10.04	10.04	10.04	10.04
MAX EXHAUST RESTRICTION		(13)	in H2O	20.07	20.07	20.07	20.07

REGULATORY INFORMATION

AGENCY	TIER/STAGE	REGULATION	LOCALITY		MAX LIMITS	YEAR IN	YEAR OUT
EPA		S.I. STATIONARY NON-EMERGENCY - NATURAL GAS	U.S. (EXCL CALIF)	(14)	g/bhp-hr - NOx: 1.0 CO: 2.0 VOC: 0.7	2011	----

EMISSIONS DATA - ENGINE OUT

HEAT REJECTION							
LHV INPUT		(15)	Btu/min	311310	311310	238938	169919
HEAT REJ. TO JACKET WATER (JW)		(16)	Btu/min	34240	34240	28890	23599
HEAT REJ. TO ATMOSPHERE	(INCLUDES GENERATOR)	(16)	Btu/min	15641	15641	13067	10828
HEAT REJ. TO LUBE OIL (OC)		(16)	Btu/min	9896	9896	8865	7605
HEAT REJECTION TO EXHAUST (LHV TO 248°F)		(16)	Btu/min	78962	78962	62318	47167
HEAT REJ. TO A/C - STAGE 1 (1AC)		(16)(18)	Btu/min	14706	14706	6788	888
HEAT REJ. TO A/C - STAGE 2 (2AC)		(16)(18)	Btu/min	12739	12739	8841	4814
PUMP POWER		(17)	Btu/min	1231	1231	1231	1231

COOLING SYSTEM SIZING CRITERIA				
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(19)	Btu/min	69449	69449
TOTAL AFTERCOOLER CIRCUIT (2AC)	(19)	Btu/min	14866	14866
HEAT REJECTION TO EXHAUST (LHV TO 248°F)	(19)	Btu/min	86858	86858
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.				
MINIMUM HEAT RECOVERY				
TOTAL JACKET WATER CIRCUIT (JW+OC+1AC)	(20)	Btu/min	52703	52703
TOTAL AFTERCOOLER CIRCUIT (2AC)	(20)	Btu/min	12102	12102
HEAT REJECTION TO EXHAUST (LHV TO 248°F)	(20)	Btu/min	65713	65713

CONDITIONS AND DEFINITIONS

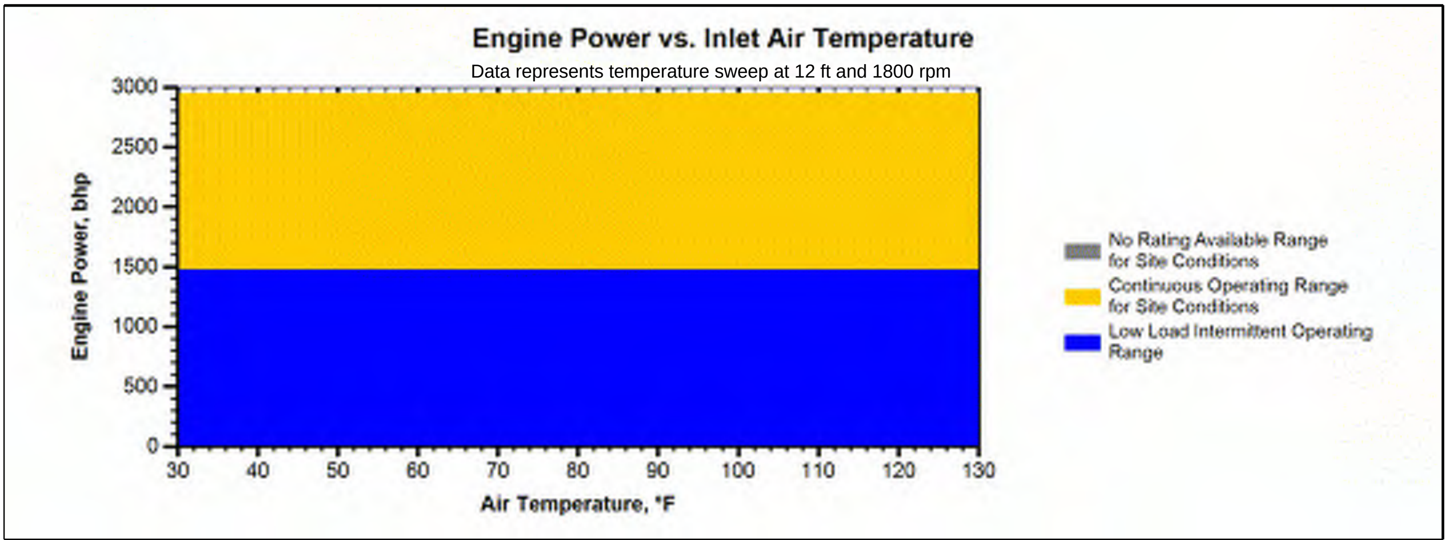
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.
*****WARNINGS ISSUED FOR THIS RATING CONSULT PAGE 3*****

PREPARED BY: ,
Data generated by GERP Web Version 0.09.03
Ref. Data Set EM4299-02-001, Printed 23Jul2019

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
G3520 NJ Project

CATERPILLAR®



NOTES:

1. Fuel pressure range specified is to the engine fuel control valve. Additional fuel train components should be considered in pressure and flow calculations.

2. Generator efficiencies, power factor, and voltage are based on specified generator. [Genset Power (ekW) is calculated as: Engine Power (bkW) x Generator Efficiency], [Genset Power (kVA) is calculated as: Engine Power (bkW) x Generator Efficiency / Power Factor]

3. Rating is with two engine driven water pumps. Tolerance is (+)3, (-)0% of full load.

4. Efficiency represents a Closed Crankcase Ventilation (CCV) system installed on the engine.

5. Genset Effieciency published in accordance with ISO 3046/1.

6. Thermal Efficiency is calculated based on energy recovery from the jacket water, lube oil, 1st stage aftercooler, and exhaust to 248ºF with engine operation at ISO 3046/1 Genset Efficiency, and assumes unburned fuel is converted in an oxidation catalyst.

7. Total efficiency is calculated as: Genset Efficiency + Thermal Efficiency. Tolerance is ±10% of full load data.

8. ISO 3046/1 Genset fuel consumption tolerance is (+)5, (-)0% at the specified power factor. Nominal genset and engine fuel consumption tolerance is ± 2.5% of full load data at the specified power factor.

9. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

10. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

11. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

12. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

13. Inlet and Exhaust Restrictions are maximum allowed values at the corresponding loads. Increasing restrictions beyond what is specified will result in a significant engine derate.

14. Gaseous emissions data measurements are consistent with those described in EPA 40 CFR PART 60 SUBPART JJJJ and ISO 8178 for measuring VOC, CO, and NOx. Gaseous emissions values are weighted cycle averages and are in compliance with the stationary regulations.

15. LHV rate tolerance is ± 2.5%.

16. Heat rejection values are representative of site conditions. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for atmosphere, ± 20% for lube oil circuit, ± 10% for exhaust, and ± 5% for aftercooler circuit.

17. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.

18. Aftercooler heat rejection is nominal for site conditions and does not include an aftercooler heat rejection factor. Aftercooler heat rejection values at part load are for reference only.

19. Cooling system sizing criteria represent the expected maximum circuit heat rejection for the ratings at site, with applied plus tolerances. Total circuit heat rejection is calculated using formulas referenced in the notes on the standard tech data sheet with the following qualifications. Aftercooler heat rejection data (1AC & 2AC) is based on the standard rating. Jacket Water (JW) and Oil Cooler (OC) heat rejection values are based on the respective site or maximum column. Aftercooler heat rejection factors (ACHRF) are specific for the site elevation and inlet air temperature specified in the site or maximum column, referenced from the table on the standard data sheet

20. Minimum heat recovery values represent the expected minimum heat recovery for the site, with applied minus tolerances. Do not use these values for cooling system sizing.

WARNING(S):

1. Continuous operation at rated power above 40C(104F) ambient air temperatures may contribute to faster degradation of generator insulation. Consult TMI for degradation curves.

G3520

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
G3520 NJ Project

CATERPILLAR®

GENSET APPLICATION

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	93.8800	93.8706
Ethane	C2H6	3.8900	3.8896
Propane	C3H8	0.1800	0.1800
Isobutane	iso-C4H10	0.0500	0.0500
Norbutane	nor-C4H10	0.0000	0.0000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.0000	0.0000
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.5400	0.5399
Carbon Dioxide	CO2	0.1000	0.1000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0200	0.0200
Hydrogen	H2	0.7300	0.7299
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.5300	0.5299
Propylene	C3H6	0.0900	0.0900
TOTAL (Volume %)		100.0100	99.9999

Fuel Makeup:	Martin NJ Project Gas from Spec
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	86.1
Lower Heating Value (Btu/scf):	936
Higher Heating Value (Btu/scf):	1038
WOBBE Index (Btu/scf):	1231
THC: Free Inert Ratio:	154.09
Total % Inerts (% N2, CO2, He):	0.6399%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.76
Stoich A/F Ratio (Mass/Mass):	16.89
Specific Gravity (Relative to Air):	0.578
Fuel Specific Heat Ratio (K):	1.310

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

WARNING(S):

1. Continuous operation at rated power above 40C(104F) ambient air temperatures may contribute to faster degradation of generator insulation. Consult TMI for degradation curves.

RECOMMENDED ACTION

PREPARED BY: ,
Data generated by GERP Web Version 0.09.03
Ref. Data Set EM4299-02-001, Printed 23Jul2019

Fire Pump Engine Cut-Sheets

CLARKE®

Rating Specific Emissions Data

Nameplate Rating Information

Clarke Model	**JU4H-UFADY8**
Power Rating (BHP/kW)	**157/117**
Certified Speed (RPM)	**1760**

Refer to **Rating Data** section on page 2 for emissions output values

Rating Specific Emissions Data - John Deere Power Systems

JOHN DEERE

Rating Data

Rating	4045HFC28A	
Certified Power(kW)	117	
Rated Speed	1760	
Vehicle Model Number	OEM (Clarke Fire Pump-Emergency)	
Units	g/kW-hr	g/hp-hr
NOx	3.70	2.76
HC	0.12	0.09
NOx + HC	N/A	N/A
Pm	0.12	0.09
CO	1.3	1.0

Certificate Data

Engine Model Year	2020
EPA Family Name	LJDXL04.5119
EPA JD Name	350HAJ
EPA Certificate Number	LJDXL04.5119-005
CARB Executive Order	
Parent of Family	4045HFG82A
Units	g/kW-hr
NOx	3.36
HC	0.15
NOx + HC	N/A
Pm	0.17
CO	1.3

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

This information is property of Deere & Company. It is provided solely for the purpose of obtaining certification or permits of Deere powered equipment. Unauthorized distribution of this information is prohibited.

Emissions Results by Rating run on Jan-13-2020

Rating Specific Emissions Data

Nameplate Rating Information

Clarke Model	**JU6H-UFADN0**
Power Rating (BHP/kW)	**197/147**
Certified Speed (RPM)	**1760**

Refer to **Rating Data** section on page 2 for emissions output values

Rating Specific Emissions Data - John Deere Power Systems

Rating Data

Rating	6068HFC28A	
Certified Power(kW)	177	
Rated Speed	1760	
Vehicle Model Number	OEM (Clarke Fire Pump-Emergency)	
Units	g/kW-hr	g/hp-hr
NOx	3.62	2.70
HC	0.16	0.12
NOx + HC	N/A	N/A
Pm	0.13	0.10
CO	1.2	0.9

Certificate Data

Engine Model Year	2020
EPA Family Name	LJDXL06.8120
EPA JD Name	350HAK
EPA Certificate Number	LJDXL06.8120-006
CARB Executive Order	
Parent of Family	6068HFG82A
Units	g/kW-hr
NOx	3.79
HC	0.12
NOx + HC	N/A
Pm	0.12
CO	1.2

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

This information is property of Deere & Company. It is provided solely for the purpose of obtaining certification or permits of Deere powered equipment. Unauthorized distribution of this information is prohibited.

Emissions Results by Rating run on Jan-13-2020

Rating Specific Emissions Data

Nameplate Rating Information

Clarke Model	**JU6H-UFADP8**
Power Rating (BHP/kW)	**220/164**
Certified Speed (RPM)	**1760**

Refer to **Rating Data** section on page 2 for emissions output values

Rating Specific Emissions Data - John Deere Power Systems

Rating Data

Rating	**6068HFC28A**	
Certified Power(kW)	**177**	
Rated Speed	**1760**	
Vehicle Model Number	**OEM (Clarke Fire Pump-Emergency)**	
Units	**g/kW-hr**	**g/hp-hr**
NOx	**3.62**	**2.70**
HC	**0.16**	**0.12**
NOx + HC	**N/A**	**N/A**
Pm	**0.13**	**0.10**
CO	**1.2**	**0.9**

Certificate Data

Engine Model Year	**2020**
EPA Family Name	**LJDXL06.8120**
EPA JD Name	**350HAK**
EPA Certificate Number	LJDXL06.8120-006
CARB Executive Order	
Parent of Family	**6068HFG82A**
Units	**g/kW-hr**
NOx	**3.79**
HC	**0.12**
NOx + HC	**N/A**
Pm	**0.12**
CO	**1.2**

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

This information is property of Deere & Company. It is provided solely for the purpose of obtaining certification or permits of Deere powered equipment. Unauthorized distribution of this information is prohibited.

Emissions Results by Rating run on Jan-13-2020

APPENDIX E
Photovoltaic System Analysis

PVSC Roof Mounted Solar Estimation - Updated May 2020

Location ID*	Description (nearest building)*	Gross Area*	Available PV Area*	Panel Quantity*	2012 Capacity (kW) (290W Panel) *	2020 Capacity (kW) (335W Panel)	2020 AC Energy (kWh)	2020 Cost Generated from Potential Solar Installations ****	Cost of Standard Solar Installation (2012)*	Cost of Electrical Infrastructure Upgrades (2012)*	2012 Structural Infrastructure*	Total Installation Cost from 2012 Report*	Cost of Standard Solar Installation (2020) **	2020 Electrical & Structural Infrastructure Cost ***	Total Installation Cost from 2020 Estimates	Annual Maintenance*	Simple Payback
R-1	Vehicle Maintenance	25,100	10,680	276	80.0	92.5	-	-	$ 560,280	$ 300,000	$ 426,700	1,286,980	$ 268,134	$ 920,562	$ 1,188,696	$ 3,602	-
R-2	Vehicle Storage #2	8,400	4,650	120	34.8	40.2	-	-	$ 243,600	$ 100,000	$ -	343,600	$ 116,580	$ 126,677	$ 243,257	$ 1,566	-
R-3	Vehicle Storage #3	8,400	4,020	104	30.2	34.8	-	-	$ 211,120	$ 100,000	$ -	311,120	$ 101,036	$ 126,677	$ 227,713	$ 1,357	-
R-5	Administration Building	11,900	3,480	90	26.1	30.2	-	-	$ 182,700	$ 50,000	$ -	232,700	$ 87,435	$ 63,339	$ 150,774	$ 1,175	-
R-6	Pollution & Industrial Control Building	9,800	1,320	34	9.9	11.4	-	-	$ 69,020	$ 20,000	$ 901,600	990,620	$ 33,031	$ 1,167,455	$ 1,200,486	$ 444	-
R-9	Influent Pumping Station (IPS)	6,600	2,720	70	20.3	23.5	-	-	$ 142,100	$ 30,000	$ 165,000	337,100	$ 68,005	$ 247,020	$ 315,025	$ 914	-
R-10	Grit & Screening Facility	6,400	800	20	5.8	6.7	-	-	$ 40,600	$ 15,000	$ 160,000	215,600	$ 19,430	$ 221,685	$ 241,115	$ 261	-
R-12	Wet Weather Pumping Station	23,000	5,420	140	40.6	46.9	-	-	$ 284,200	$ 75,000	$ 391,000	750,200	$ 136,010	$ 590,315	$ 726,325	$ 1,827	-
R-13	Warehouse Facility	42,700	25,920	670	194.3	224.5	-	-	$ 1,360,100	$ 200,000	$ 854,000	2,414,100	$ 516,235	$ 1,335,176	$ 1,851,411	$ 3,886	-
R-14	Oxygen Production Scrubber Building	5,300	1,180	30	8.7	10.1	-	-	$ 60,900	$ 20,000	$ 265,000	345,900	$ 29,145	$ 361,029	$ 390,174	$ 392	-
R-15	Oxygen Production Building	18,500	6,820	176	51.0	59.0	-	-	$ 357,280	$ 100,000	$ 314,500	771,780	$ 170,984	$ 525,076	$ 696,060	$ 2,297	-
R-17	OEM Building	18,800	3,420	88	25.5	29.5	-	-	$ 178,640	$ 50,000	$ 319,600	548,240	$ 85,492	$ 468,198	$ 553,690	$ 1,148	-
R-18	Switchgear Building #1	2,600	1,100	28	8.1	9.4	-	-	$ 56,840	$ 20,000	$ 65,000	141,840	$ 27,202	$ 107,675	$ 134,877	$ 365	-
R-22	Return Water Sludge Pump Station	2,600	500	11	3.2	3.7	-	-	$ 22,330	$ 5,000	$ 52,000	79,330	$ 10,687	$ 72,206	$ 82,892	$ 144	-
R-25	Oxygen Tanks Compressor Building	22,000	2,850	72	20.9	24.1	-	-	$ 146,160	$ 30,000	$ 440,000	616,160	$ 69,948	$ 595,382	$ 665,330	$ 940	-
R-29	Centrifuge Dewatering	11,500	6,550	168	48.7	56.3	-	-	$ 341,040	$ 80,000	$ -	421,040	$ 163,212	$ 101,342	$ 264,554	$ 2,192	-
R-30	Cake Storage	11,500	1,320	34	9.9	11.4	-	-	$ 69,020	$ 20,000	$ 1,150,000	1,239,020	$ 33,031	$ 1,482,121	$ 1,515,152	$ 444	-
R-31	Filter Press	12,000	520	12	3.5	4.0	-	-	$ 24,360	$ 5,000	$ 240,000	269,360	$ 11,658	$ 310,359	$ 322,017	$ 157	-
R-34	Sludge Thickeners Buildin	39,500	9,820	245	73.7	82.1	-	-	$ 515,900	$ 150,000	$ 413,470	1,079,370	$ 238,018	$ 713,787	$ 951,804	$ 3,315	-
R-35	Sludge Heat Treatment	75,000	5,550	142	41.2	47.6	-	-	$ 288,260	$ 10,000	$ 690,000	988,260	$ 137,953	$ 886,739	$ 1,024,692	$ 1,853	-
R-36	Wallington Line Pumping Statio	3,500	1,320	34	9.9	11.4	-	-	$ 69,020	$ 20,000	$ 70,000	159,020	$ 33,031	$ 114,009	$ 147,040	$ 444	-
		365,100	99,960	2,564	746	858.9	1,116,880.00	$ 82,424.00	$ 5,223,470	$ 1,400,000	$ 6,917,870	13,541,340	$ 2,356,256	$ 10,536,829	$ 12,893,085	$ 28,723	156.42

* All values in this column were taken from 2012 presentation by dlb associates

** Values for solar costs per installed watt were taken from page 29 of the "Tracking the Sun - 2019 Edition of Pricing and Design Trends for Distributed Photovoltaic Systems in the United States" produced by Lawrence Berkeley National Laboratory. $2.3/W for systems >= 100kW and $2.9/W for systems <100kW

*** Assumes 3% Cost Escalation of Installed Cost / yr since 2012

**** Assumed to be 7.4c/kWh

PVSC Ground Mounted Solar Estimation - Updated May 2020

Location ID*	Description (nearest building)*	Gross Area*	Available PV Area*	Panel Quantity*	2012 Capacity (kW) (290W Panel)*	2020 Capacity (kW) (335W Panel)	2020 AC Energy (kWh)	2020 Cost Generated from Potential Solar Installations ****	Cost of Standard Solar Installation (2012)*	Cost of Electrical Infrastructure Upgrades (2012)*	Total Installation Cost from 2012 Report	Cost of Standard Solar Installation (2020) **	2020 Electrical Infrastructure Cost ***	Total Installation Cost from 2020 Estimates	Annual Maintenance*	Simple Payback
G-1	Entrance Gate #5 - North	8,100	7,290	201	58.3	67.3	-	-	$ 408,240	$ 100,000	$ 508,240	$ 195,272	$ 126,677	$ 321,949	$ 2,624	
G-2	Entrance Gate #5 - South	12,500	11,250	349	101.2	116.9	-	-	$ 708,750	$ 150,000	$ 858,750	$ 268,905	$ 190,016	$ 458,920	$ 4,556	
G-3	Administration Building - South	19,100	17,190	533	154.6	178.6	-	-	$ 1,082,970	$ 200,000	$ 1,282,970	$ 410,677	$ 253,354	$ 664,031	$ 3,094	
G-4	Grit & Screening - East	5,950	5,355	166	48.1	55.6	-	-	$ 337,365	$ 100,000	$ 437,365	$ 161,269	$ 126,677	$ 287,946	$ 2,169	
G-5	Influent Pump Station - South	11,200	10,080	313	90.8	104.9	-	-	$ 635,040	$ 175,000	$ 810,040	$ 241,167	$ 221,685	$ 462,851	$ 4,082	
G-6	Venturi Building - Northeast	6,460	5,814	180	52.2	60.3	-	-	$ 366,282	$ 100,000	$ 466,282	$ 174,870	$ 126,677	$ 301,547	$ 2,355	
G-7	Wet Weather - Southeast	3,770	3,393	105	30.5	35.2	-	-	$ 213,759	$ 100,000	$ 313,759	$ 102,008	$ 126,677	$ 228,685	$ 1,374	
G-8	Elevator To Utility - North	12,000	10,800	335	97.2	112.2	-	-	$ 680,400	$ 150,000	$ 830,400	$ 258,118	$ 190,016	$ 448,133	$ 4,374	
G-9	Elevator To Utility - South	12,800	11,520	358	103.8	119.9	-	-	$ 725,760	$ 175,000	$ 900,760	$ 275,839	$ 221,685	$ 497,524	$ 4,666	
G-10	Oxygen Production - East	23,400	21,060	654	189.7	219.1	-	-	$ 1,326,780	$ 250,000	$ 1,576,780	$ 503,907	$ 316,693	$ 820,600	$ 3,791	
G-11	Supernatant Plant - North	26,500	23,850	740	214.6	247.9	-	-	$ 1,502,550	$ 300,000	$ 1,802,550	$ 570,170	$ 380,031	$ 950,201	$ 4,293	
G-14	South Property Lin	98,200	88,380	2,743	795.5	918.9	-	-	$ 5,567,940	$ 800,000	$ 6,367,940	$ 2,113,482	$ 1,013,416	$ 3,126,898	$ 35,794	
G-15	Wilson & Doremus Ave. - West	37,000	33,300	1,033	299.6	346.1	-	-	$ 2,097,900	$ 400,000	$ 2,497,900	$ 795,927	$ 506,708	$ 1,302,635	$ 13,487	
G-16	Electric Substation #1 - North	11,400	10,260	318	92.2	106.5	-	-	$ 646,380	$ 150,000	$ 796,380	$ 245,019	$ 190,016	$ 435,035	$ 4,155	
G-17	Wilson & Doremus Ave. - East	80,100	72,090	2,237	648.7	749.4	-	-	$ 4,541,670	$ 750,000	$ 5,291,670	$ 1,723,609	$ 950,078	$ 2,673,686	$ 29,196	
G-18	PVSC Driveway to Witco Property - South	9,810	8,829	274	79.5	91.8	-	-	$ 556,227	$ 200,000	$ 756,227	$ 266,191	$ 253,354	$ 519,545	$ 3,576	
G-22	Filter Press - South	17,000	15,300	475	137.8	159.1	-	-	$ 963,900	$ 25,000	$ 988,900	$ 365,988	$ 31,669	$ 397,657	$ 2,754	
G-24	Newark Bay Docks - North	7,340	6,606	205	59.5	68.7	-	-	$ 416,178	$ 150,000	$ 566,178	$ 199,158	$ 190,016	$ 389,173	$ 2,675	
G-25	Newark Bay Docks - South	76,500	68,850	2,137	619.7	715.9	-	-	$ 4,337,550	$ 800,000	$ 5,137,550	$ 1,646,559	$ 1,013,416	$ 2,659,975	$ 12,393	
G-26	Former Witco - East	284,000	255,600	7,932	2,300.3	2,657.2	-	-	$ 16,102,800	$ 2,000,000	$ 18,102,800	$ 6,111,606	$ 2,533,540	$ 8,645,146	$ 46,008	
G-27	Former Witco - West	133,800	120,420	3,737	1,083.7	1,251.9	-	-	$ 7,586,460	$ 1,000,000	$ 8,586,460	$ 2,879,359	$ 1,266,770	$ 4,146,129	$ 21,676	
G-28	PVSC Driveway to Witco Property - North	9,000	8,100	251	72.8	84.1	-	-	$ 510,300	$ 200,000	$ 710,300	$ 243,847	$ 253,354	$ 497,201	$ 3,281	
G-29	Vehicle Maintenance - North	10,400	9,360	290	84.1	97.2	-	-	$ 589,680	$ 150,000	$ 739,680	$ 281,735	$ 190,016	$ 471,751	$ 3,791	
		916,330	824,697	25,566	7,414	8,564.61	11,322,765.00	$ 835,620.00	$ 51,904,881	$ 8,425,000	$ 60,329,881	$ 20,034,675	$ 10,672,538	$ 30,707,213	$ 216,164	36.75

* All values in this column were taken from 2012 presentation by dlb associates

** Values for solar costs per installed watt were taken from page 29 of the "Tracking the Sun - 2019 Edition of Pricing and Design Trends for Distributed Photovoltaic Systems in the United States" produced by Lawrence Berkeley National Laboratory. $2.3/W for systems >= 100kW and $2.9/W for systems <100kW

*** Assumes 3% Cost Escalation of Installed Cost / yr since 2012

**** Assumed to be 7.4c/kWh

PVSC Parking Lot / Carport Canopy Solar Estimation - Updated May 2020

Location ID*	Description (nearest building)*	Gross Area*	Available PV Area*	Panel Quantity*	2012 Capacity (kW) (290W Panel)	2020 Capacity (kW) (335W Panel)	2020 AC Energy (kWh)	2020 Cost Generated from Potential Solar Installations ****	Cost of Standard Solar Installation (2012)*	Cost of Electrical Infrastructure Upgrades (2012)*	Total Installation Cost from 2012 Report	Cost of Standard Solar Installation (2020) **	2020 Electrical Infrastructure Cost ***	Total Installation Cost from 2020 Estimates	Annual Maintenance*	Simple Payback
C-1	Vehicle Maintenance - West	14,500	1,148	264	76.6	88.4			$ 689,040	$ 100,000	$ 789,040	$ 433,356	$ 126,677	$ 560,033	$ 3,445	
C-2	Entrance Gate #5 - North	8,500	1,053	242	70.2	81.1			$ 631,620	$ 100,000	$ 731,620	$ 397,243	$ 126,677	$ 523,920	$ 3,158	
C-3	Administration Building - West	9,000	622	143	41.5	47.9			$ 373,230	$ 75,000	$ 448,230	$ 234,735	$ 95,008	$ 329,742	$ 1,866	
C-4	Administration Building - North	7,000	526	121	35.1	40.5			$ 315,810	$ 75,000	$ 390,810	$ 198,622	$ 95,008	$ 293,629	$ 1,579	
C-5	Security Building - South	12,000	1,148	264	76.6	88.4			$ 689,040	$ 100,000	$ 789,040	$ 433,356	$ 126,677	$ 560,033	$ 3,445	
C-6	Pollution & Industrial Control - South	19,500	1,388	319	92.5	106.9			$ 832,590	$ 150,000	$ 982,590	$ 523,639	$ 190,016	$ 713,654	$ 4,163	
C-7	Influent Pump Station - West	5,000	479	110	31.9	36.9			$ 287,100	$ 100,000	$ 387,100	$ 180,565	$ 126,677	$ 307,242	$ 1,436	
C-9	Supernatant Plant - North	7,000	1,101	253	73.4	84.8			$ 660,330	$ 100,000	$ 760,330	$ 415,300	$ 126,677	$ 541,977	$ 3,302	
C-10	Warehouse Facility - South	14,000	1,483	341	98.9	114.2			$ 890,010	$ 250,000	$ 1,140,010	$ 559,752	$ 316,693	$ 876,444	$ 4,450	
C-11	OEM - West	45,000	3,493	803	232.9	269.0			$ 2,095,830	$ 250,000	$ 2,345,830	$ 1,318,125	$ 316,693	$ 1,634,817	$ 4,657	
C-12	Return Waste Sludge Pump - West	2,500	479	110	31.9	36.9			$ 287,100	$ 100,000	$ 387,100	$ 180,565	$ 126,677	$ 307,242	$ 1,436	
C-15	Filter Press - East	6,500	766	176	51.0	59.0			$ 459,360	$ 100,000	$ 559,360	$ 288,904	$ 126,677	$ 415,581	$ 2,297	
C-17	Decant Tanks - South	3,000	335	77	22.3	25.8			$ 200,970	$ 100,000	$ 300,970	$ 126,396	$ 126,677	$ 253,073	$ 1,005	
C-18	Sludge Storage Tanks - South	5,000	670	154	44.7	51.6			$ 401,940	$ 75,000	$ 476,940	$ 252,791	$ 95,008	$ 347,799	$ 2,010	
C-19	Wallington Pump Station - North	4,600	957	220	63.8	73.7			$ 574,200	$ 50,000	$ 624,200	$ 361,130	$ 63,339	$ 424,469	$ 2,871	
		163,100	15,648	3,597	1043.1	1,205.0	1,593,060.00	$ 117,567.00	$ 9,388,170	$ 1,725,000	$ 11,113,170	$ 5,904,476	$ 2,185,178	$ 8,089,654	$ 41,120	68.81

*	All values in this column were taken from 2012 presentation by dlb associates
**	Values for solar costs per installed watt were assumed to be $2.9/W plus a $2/W increase for increase in carport canopy
***	Assumes 3% Cost Escalation of Installed Cost / yr since 2012
****	Assumed to be 7.4c/kWh

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide

any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

YOU AGREE TO INDEMNIFY DOE/NREL/ALLIANCE, AND ITS AFFILIATES, OFFICERS, AGENTS, AND EMPLOYEES AGAINST ANY CLAIM OR DEMAND, INCLUDING REASONABLE ATTORNEYS' FEES, RELATED TO YOUR USE, RELIANCE, OR ADOPTION OF THE MODEL FOR ANY PURPOSE WHATSOEVER. THE MODEL IS PROVIDED BY DOE/NREL/ALLIANCE "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL DOE/NREL/ALLIANCE BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO CLAIMS ASSOCIATED WITH THE LOSS OF DATA OR PROFITS, WHICH MAY RESULT FROM ANY ACTION IN CONTRACT, NEGLIGENCE OR OTHER TORTIOUS CLAIM THAT ARISES OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE MODEL.

The energy output range is based on analysis of 30 years of historical weather data for nearby , and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

1,116,880 kWh/Year*

System output may range from 1,074,327 to 1,169,932 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Value ($)
January	2.86	63,202	4,664
February	3.88	75,599	5,579
March	4.86	103,819	7,662
April	5.47	105,724	7,802
May	5.84	115,027	8,489
June	6.35	116,642	8,608
July	6.43	120,123	8,865
August	5.88	110,127	8,127
September	5.39	100,784	7,438
October	4.13	83,046	6,129
November	3.22	65,465	4,831
December	2.62	57,321	4,230
Annual	**4.74**	**1,116,879**	**$ 82,424**

Location and Station Identification

Requested Location	newark, nj
Weather Data Source	Lat, Lon: 40.73, -74.18 0.3 mi
Latitude	40.73° N
Longitude	74.18° W

PV System Specifications *(Commercial)*

DC System Size	858.9 kW
Module Type	Standard
Array Type	Fixed (roof mount)
Array Tilt	20°
Array Azimuth	180°
System Losses	14.08%
Inverter Efficiency	96%
DC to AC Size Ratio	1.2

Economics

Average Retail Electricity Rate	0.074 $/kWh

Performance Metrics

Capacity Factor	14.8%

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide

any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

YOU AGREE TO INDEMNIFY DOE/NREL/ALLIANCE, AND ITS AFFILIATES, OFFICERS, AGENTS, AND EMPLOYEES AGAINST ANY CLAIM OR DEMAND, INCLUDING REASONABLE ATTORNEYS' FEES, RELATED TO YOUR USE, RELIANCE, OR ADOPTION OF THE MODEL FOR ANY PURPOSE WHATSOEVER. THE MODEL IS PROVIDED BY DOE/NREL/ALLIANCE "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL DOE/NREL/ALLIANCE BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO CLAIMS ASSOCIATED WITH THE LOSS OF DATA OR PROFITS, WHICH MAY RESULT FROM ANY ACTION IN CONTRACT, NEGLIGENCE OR OTHER TORTIOUS CLAIM THAT ARISES OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE MODEL.

The energy output range is based on analysis of 30 years of historical weather data for nearby , and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

11,322,767 kWh/Year*

System output may range from 10,891,370 to 11,860,598 kWh per year near this location.

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)	Value ($)
January	2.86	637,131	47,020
February	3.88	763,920	56,377
March	4.86	1,051,040	77,567
April	5.47	1,073,509	79,225
May	5.84	1,168,209	86,214
June	6.35	1,184,676	87,429
July	6.43	1,220,944	90,106
August	5.88	1,119,708	82,634
September	5.39	1,023,321	75,521
October	4.13	841,292	62,087
November	3.22	661,229	48,799
December	2.62	577,786	42,641
Annual	**4.74**	**11,322,765**	**$ 835,620**

Location and Station Identification

Requested Location	newark, nj
Weather Data Source	Lat, Lon: 40.73, -74.18 0.3 mi
Latitude	40.73° N
Longitude	74.18° W

PV System Specifications *(Commercial)*

DC System Size	8564.61 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°
System Losses	14.08%
Inverter Efficiency	96%
DC to AC Size Ratio	1.2

Economics

Average Retail Electricity Rate	0.074 $/kWh

Performance Metrics

Capacity Factor	15.1%

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

The expected range is based on 30 years of actual weather data at the given location and is intended to provide an indication of the variation you might see. For more information, please refer to this NREL report: The Error Report.

Disclaimer: The PVWatts® Model ("Model") is provided by the National Renewable Energy Laboratory ("NREL"), which is operated by the Alliance for Sustainable Energy, LLC ("Alliance") for the U.S. Department Of Energy ("DOE") and may be used for any purpose whatsoever.

The names DOE/NREL/ALLIANCE shall not be used in any representation, advertising, publicity or other manner whatsoever to endorse or promote any entity that adopts or uses the Model. DOE/NREL/ALLIANCE shall not provide

any support, consulting, training or assistance of any kind with regard to the use of the Model or any updates, revisions or new versions of the Model.

YOU AGREE TO INDEMNIFY DOE/NREL/ALLIANCE, AND ITS AFFILIATES, OFFICERS, AGENTS, AND EMPLOYEES AGAINST ANY CLAIM OR DEMAND, INCLUDING REASONABLE ATTORNEYS' FEES, RELATED TO YOUR USE, RELIANCE, OR ADOPTION OF THE MODEL FOR ANY PURPOSE WHATSOEVER. THE MODEL IS PROVIDED BY DOE/NREL/ALLIANCE "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. IN NO EVENT SHALL DOE/NREL/ALLIANCE BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, INCLUDING BUT NOT LIMITED TO CLAIMS ASSOCIATED WITH THE LOSS OF DATA OR PROFITS, WHICH MAY RESULT FROM ANY ACTION IN CONTRACT, NEGLIGENCE OR OTHER TORTIOUS CLAIM THAT ARISES OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE MODEL.

The energy output range is based on analysis of 30 years of historical weather data for nearby , and is intended to provide an indication of the possible interannual variability in generation for a Fixed (open rack) PV system at this location.

RESULTS

1,593,060 kWh/Year*

System output may range from 1,532,364 to 1,668,730 kWh per year near this location.

Month	Solar Radiation (kWh / m² / day)	AC Energy (kWh)	Value ($)
January	2.86	89,641	6,616
February	3.88	107,480	7,932
March	4.86	147,876	10,913
April	5.47	151,038	11,147
May	5.84	164,362	12,130
June	6.35	166,678	12,301
July	6.43	171,781	12,677
August	5.88	157,538	11,626
September	5.39	143,976	10,625
October	4.13	118,366	8,735
November	3.22	93,032	6,866
December	2.62	81,292	5,999
Annual	**4.74**	**1,593,060**	**$ 117,567**

Location and Station Identification

Requested Location	newark, nj
Weather Data Source	Lat, Lon: 40.73, -74.18 0.3 mi
Latitude	40.73° N
Longitude	74.18° W

PV System Specifications *(Commercial)*

DC System Size	1205 kW
Module Type	Standard
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°
System Losses	14.08%
Inverter Efficiency	96%
DC to AC Size Ratio	1.2

Economics

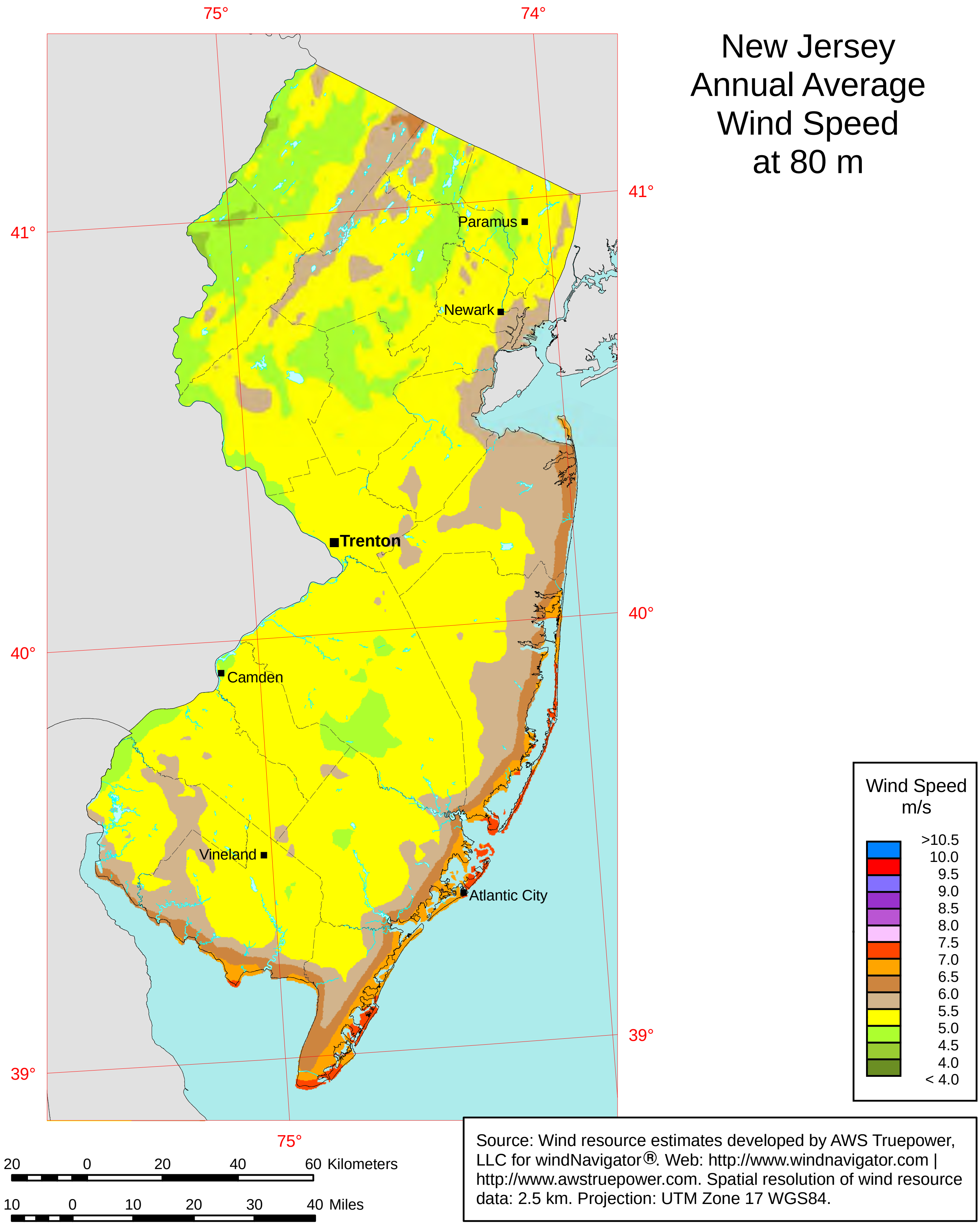
Average Retail Electricity Rate	0.074 $/kWh

Performance Metrics

Capacity Factor	15.1%

APPENDIX F
National Renewable Energy Laboratory (NREL) Wind Maps

New Jersey Annual Average Wind Speed at 80 m



Source: Wind resource estimates developed by AWS Truepower, LLC for windNavigator®. Web: http://www.windnavigator.com | http://www.awstruepower.com. Spatial resolution of wind resource data: 2.5 km. Projection: UTM Zone 17 WGS84.

AWS Truepower™ Where science delivers performance.

NREL NATIONAL RENEWABLE ENERGY LABORATORY

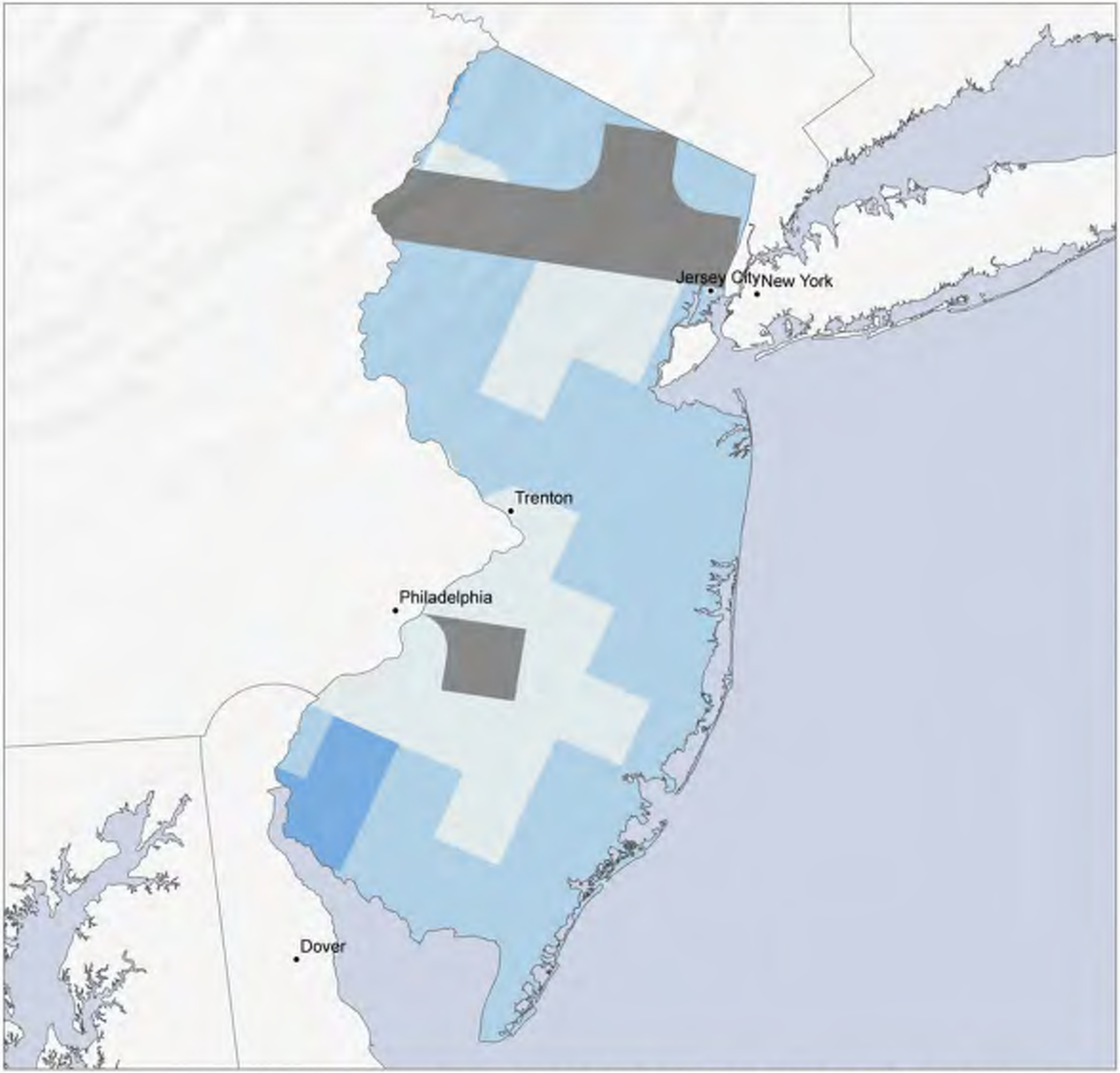
29-OCT-2010 1.1.1

Potential Wind Capacity at 110-Meters Hub Height

35% or Higher
Gross Capacity Factor

2014 U.S. Wind Industry
Average Turbine

New Jersey



Area (sq km)

- 0
- < 100
- 100 - 200
- 200 - 300
- 300 - 400
- > 400
- Land exclusions

This map was produced by the National Renewable Energy Laboratory for the Department of Energy. January 2015

AWS Truepower®

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

This map illustrates general wind resource potential only and is not suitable as a siting tool. More detailed site and wind speed data, as well as coordination with relevant authorities, are needed to thoroughly evaluate appropriate wind energy development at any given location. *Data sources: AWS Truepower, National Renewable Energy Laboratory*

APPENDIX G

Level One Health Risk Analysis Calculations

Combustion Turbine Generator – Steady State

NJDEP DIVISION OF AIR QUALITY RISK SCREENING WORKSHEET
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects
June 2020

Read the Instructions tab carefully before completing this spreadsheet.

Date	6/22/2021
Facility ID No.	07349
Activity ID No.	BOP 190002
Facility name	PVSC Emergency Power Plant - Turbine - Steady State - Level I
Facility location	Newark, NJ
File name (.xls)	Risk2020_Turbine_Level I-steadystate

Emission Unit/Batch Process ID No.	U301	Stack height[1]	106.0	ft
Emission Point ID No.	PT301/302/303	Distance to property line	93	ft
Equipment ID No(s).	E3001/3002/3003	**Annual air impact value, C'**	2.90766	**(ug/m^3)/(ton/yr)**
Operating Scenario(s)	OS1/4/5/8/9/12	**1-hour air impact value, C'$_{st}$**	167.5207	**(ug/m^3)/(lb/hr)**

KEY:

Long-Term Effects

Q = Annual emission rate (in tons per year) contributed from the source
C = C' x Q = Annual average ambient air concentration
URF = Unit risk factor (for carcinogenic risk)
IR = C x URF = Incremental risk (for carcinogen)
RfC = Reference concentration (for noncarcinogenic effects)
HQ = C/RfC = Hazard quotient (for noncarcinogenic risk)
Rslt = The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold)
FER = Further Evaluation Required (See Notes for thresholds)
Negl. = Negligible (See Notes for thresholds)

Short-Term Effects

Q$_h$ = Hourly emission rate (in pounds per hour)
C$_{st}$ = C'$_{st}$ x Q$_h$ = Short-term average ambient air concentration
RfC$_{st}$ = Short-term reference concentration (for noncarcinogenic effects)
HQ$_{st}$ = C$_{st}$/RfC$_{st}$ = Hazard quotient for short-term noncarcinogenic effects
Rslt = The result of comparing the HQ$_{st}$ to the negligible threshold (FER if > threshold, Negl. if <= threshold)
FER = Further Evaluation Required (See Notes for thresholds)
Negl. = Negligible (See Notes for thresholds)

[1] When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009.
Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

				LONG-TERM EFFECTS								SHORT-TERM EFFECTS				
	HAP	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m^3)	URF [(ug/m^3)$^{-1}$]	IR	Rslt	RfC (ug/m^3)	HQ	Rslt	Q$_h$ (lb/hr)	C$_{st}$ (ug/m^3)	RfC$_{st}$ (ug/m^3)	HQ$_{st}$	Rslt
1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	*	60355	Acetamide			2.0E-05										
3		67641	Acetone						31000					62000		
4		75865	Acetone cyanohydrin						2							
5	*	75058	Acetonitrile						60							
6	*	98862	Acetophenone						0.02							
7	*	53963	Acetylaminofluorene (2-)			1.3E-03										
8	*	107028	Acrolein	6.6E-04	1.9E-03				0.02	**9.5E-02**	**Negl.**	2.2E-03	0.371494	2.5	**1.5E-01**	**Negl.**
9	*	79061	Acrylamide			1.0E-04			6							
10	*	79107	Acrylic acid						1					6000		
11	*	107131	Acrylonitrile			6.8E-05			2							
12		309002	Aldrin			4.9E-03										
13	*	107051	Allyl chloride			6.0E-06			1							
14		117793	Aminoanthraquinone (2-)			9.4E-06										
15	*	92671	Aminobiphenyl (4-)			6.0E-03										
16		7664417	Ammonia						100					3200		
17	*	62533	Aniline			1.6E-06			1					3000		
18	*	90040	Anisidine (o-)			4.0E-05										
19	**	1309644	Antimony trioxide						0.2							
20		140578	Aramite			7.1E-06										
21	*		Arsenic (inorganic)			4.3E-03			0.015					0.2		
22	**	7784421	Arsine						0.05							
23	*	1332214	Asbestos			7.7E-03										
24		103333	Azobenzene			3.1E-05										
25			Barium											0.5		
26	*	71432	Benzene			7.8E-06			3					27		
27	*	92875	Benzidine			6.7E-02										
28	**	50328	Benzo(a)pyrene			6.0E-04			0.002							
29	*	98077	Benzotrichloride			3.7E-03										
30	*	100447	Benzyl chloride			4.9E-05								240		
31	*		Beryllium			2.4E-03			0.02							
32	*	92524	Biphenyl (1,1-)						0.4							
33		108601	Bis(2-chloroisopropyl)ether			1.0E-05										
34	*	117817	Bis(2-ethylhexyl)phthalate			2.4E-06										
35	*	542881	Bis(chloromethyl)ether			6.2E-02										
36		7440428	Boron (elemental)						20							
37		7637072	Boron trifluoride						0.7							
38		74975	Bromochloromethane						40							
39		75274	Bromodichloromethane			3.7E-05										
40	*	75252	Bromoform			1.1E-06										
41		106945	Bromopropane (1-)						101					5030		
42	*	106990	Butadiene (1,3-)			3.0E-05			2					660		
43	*		Cadmium			4.2E-03			0.02							
44		105602	Caprolactam						2.2					50		
45	*	133062	Captan			6.6E-07										
46	*	75150	Carbon disulfide						700					6200		
47	*	56235	Carbon tetrachloride			6.0E-06			40					1900		
48	*	463581	Carbonyl sulfide						10					660		
49	*	57749	Chlordane			1.0E-04			0.02							
50		108171262	Chlorinated paraffins			2.0E-05										
51	*	7782505	Chlorine						0.2					210		
52		10049044	Chlorine dioxide						0.2					28		
53		75683	Chloro-1,1-difluoroethane (1-) *(HCFC-142b)*						50000							
54	*	532274	Chloroacetophenone (2-)						0.03							
55	*	108907	Chlorobenzene						1000							
56	*	510156	Chlorobenzilate			3.1E-05										
57		75456	Chlorodifluoromethane *(HCFC-22)*						50000							
58	*	67663	Chloroform			2.3E-05			300					150		
59	*	107302	Chloromethyl methyl ether			6.9E-04										
60		95830	Chloro-o-phenylenediamine (4-)			4.6E-06										
61		95692	Chloro-o-toluidine (p-)			7.7E-05										
62		76062	Chloropicrin						0.4					29		
63	*	126998	Chloroprene			5.0E-04			20							
64		75296	Chloropropane (2-)						100							
65	**		Chromic acid mists (Cr VI)						0.008							
66	**	18540299	Chromium VI (total)			1.2E-02										
67	**		Chromium VI dissolved aerosols						0.008							
68	**		Chromium VI particulates						0.1							
69	*		Cobalt			9.0E-03			0.006							
70	*	8007452	Coke oven emissions			6.2E-04										
71			Copper											100		
72		120718	Cresidine (p-)			4.3E-05										
73	*		Cresol mixtures						600							
74		98828	Cumene						400							

75		135206	Cupferron			6.3E-05										
76		110827	Cyclohexane											6000		
77	*	72559	DDE			9.7E-05										
78		50293	DDT			9.7E-05										
79		615054	Diaminoanisole (2,4-)			6.6E-06										
80		124481	Dibromochloromethane			2.7E-05										
81	*	96128	Dibromo-3-chloropropane (1,2-)			2.0E-03			0.2							
82		764410	Dichloro-2-butene (1,4-)			4.2E-03										
83		95501	Dichlorobenzene (1,2-)						200							
84	*	106467	Dichlorobenzene (1,4-)			1.1E-05			800							
85	*	91941	Dichlorobenzidine (3,3'-)			3.4E-04										
86		75718	Dichlorodifluoromethane						100							
87	*	111444	Dichloroethyl ether			3.3E-04										
88	*	542756	Dichloropropene (1,3-)			4.0E-06			20							
89	*	62737	Dichlorvos			8.3E-05			0.5							
90		77736	Dicyclopentadiene						0.3							
91		60571	Dieldrin			4.6E-03										
92			Diesel particulate matter			3.0E-04			5							
93	*	111422	Diethanolamine						3							
94		112345	Diethylene glycol monobutyl ether						0.1							
95		75376	Difluoroethane (1,1-)						40000							
96	*	77781	Dimethyl sulfate			4.0E-03										
97	*	60117	Dimethylaminoazobenzene (4-)			1.3E-03										
98	*	79447	Dimethylcarbamyl chloride			3.7E-03										
99	*	68122	Dimethylformamide (N,N-)						30							
100	*	57147	Dimethylhydrazine (1,1-)						0.002							
101		540738	Dimethylhydrazine (1,2-)			1.6E-01										
102	*	121142	Dinitrotoluene (2,4-)			8.9E-05										
103	*	123911	Dioxane (1,4-)			5.0E-06			30					3000		
104	*		Dioxin						See footnote "a"							
105	*	122667	Diphenylhydrazine (1,2-)			2.2E-04										
106	*	106898	Epichlorohydrin			1.2E-06			1					1300		
107	*	106887	Epoxybutane (1,2-)						20							
108	*	140885	Ethyl acrylate						8							
109	*	100414	Ethylbenzene			2.5E-06								1000		
110	*	51796	Ethyl carbamate			2.9E-04										
111	*	75003	Ethyl chloride											10000		
112	*	106934	Ethylene dibromide			6.0E-04			0.8							
113	*	107062	Ethylene dichloride			2.6E-05			400							
114	*	107211	Ethylene glycol						400							
115		111762	Ethylene glycol monobutyl ether						82					4700		
116	**	110805	Ethylene glycol monoethyl ether						200					370		
117	**	111159	Ethylene glycol monoethyl ether acetate						300					140		
118	**	109864	Ethylene glycol monomethyl ether						20					93		
119	**	110496	Ethylene glycol monomethyl ether acetate						90							
120	*	75218	Ethylene oxide			5.0E-03			30					42		
121	*	96457	Ethylene thiourea			1.3E-05										
122	*	151564	Ethyleneimine			1.9E-02										
123	*	75343	Ethylidene dichloride			1.6E-06			500							
124		16984488	Fluoride						13							
125	*	50000	Formaldehyde	6.4E-02	1.9E-01	1.3E-05	**2.4E-06**	**FER**	9	**2.1E-02**	**Negl.**	1.5E-01	25.12811	55	**4.6E-01**	**Negl.**
126		98011	Furfural						50							
127			Gasoline vapors			1.0E-06			15							
128		111308	Glutaraldehyde						0.08					4.1		
129		765344	Glycidaldehyde						1							
130	*	76448	Heptachlor			1.3E-03										
131		1024573	Heptachlor epoxide			2.6E-03										
132	*	118741	Hexachlorobenzene			4.6E-04										
133	*	87683	Hexachlorobutadiene			2.2E-05										
134	**	319846	Hexachlorocyclohexane (alpha-)			1.8E-03										
135	**	319857	Hexachlorocyclohexane (beta-)			5.3E-04										
136	*	58899	Hexachlorocyclohexane (gamma-)			3.1E-04										
137	**	608731	Hexachlorocyclohexane (technical grade)			5.1E-04										
138	*	77474	Hexachlorocyclopentadiene						0.2							
139		19408743	Hexachlorodibenzo-p-dioxin, mixture			1.3E+00										
140	*	67721	Hexachloroethane			1.1E-05			30							
141	*	822060	Hexamethylene diisocyanate						0.01							
142	*	110543	Hexane (N-)						700							
143	*	302012	Hydrazine			4.9E-03			0.2					10		
144		10034932	Hydrazine sulfate			4.9E-03										
145	*	7647010	Hydrogen chloride						20					2100		
146	**	74908	Hydrogen cyanide						0.8					340		
147	*	7664393	Hydrogen fluoride						14					240		
148	**	7783075	Hydrogen selenide											5		
149		7783064	Hydrogen sulfide						2					98		
150	*	78591	Isophorone						2000							
151		67630	Isopropanol											3200		
152	*		Lead			1.2E-05								0.1		
153	*	108316	Maleic anhydride						0.7							
154	*		Manganese						0.05					0.17		
155	*		Mercury (elemental)						0.3							
156	*	7439976	Mercury (inorganic)						0.03					0.6		
157		126987	Methacrylonitrile						0.7							
158	*	67561	Methanol						4000					28000		
159	*	74839	Methyl bromide						5					3900		
160	*	74873	Methyl chloride			1.8E-06			90							
161	*	71556	Methyl chloroform						1000					9000		
162		78933	Methyl ethyl ketone						5000					13000		
163	*	108101	Methyl isobutyl ketone											3000		
164	*	624839	Methyl isocyanate						1							
165	*	80626	Methyl methacrylate						700							
166		25013154	Methyl styrene (mixed isomers)						40							
167	*	1634044	Methyl tert butyl ether			2.6E-07			3000							
168		108872	Methylcyclohexane						3000							
169	*	101144	Methylene bis(2-chloroaniline) (4,4'-)			4.3E-04										
170	*	75092	Methylene chloride			1.3E-08			600					14000		
171	*	101779	Methylenedianiline (4,4-)			4.6E-04			20							
172	*	101688	Methylenediphenyl diisocyanate (4,4'-)						0.08					12		
173	*	60344	Methylhydrazine			1.0E-03			0.02							
174		90948	Michler's ketone			2.5E-04										
175	*		Mineral fibers (<1% free silica)						24							
176	*	91203	Naphthalene			3.4E-05			3							
177	*		Nickel and compounds			4.8E-04			0.014					0.2		
178	**	1313991	Nickel oxide						0.02							
179	**		Nickel refinery dust			2.4E-04										
180	**		Nickel, soluble salts						0.2							
181	**	12035722	Nickel subsulfide			4.8E-04										
182		7697372	Nitric acid											86		
183		88744	Nitroaniline (o-)						0.05							

184	*	98953	Nitrobenzene			4.0E-05			9							
185	*	79469	Nitropropane (2-)			2.7E-03			20							
186		55185	Nitrosodiethylamine (N-)			4.3E-02										
187	*	62759	Nitrosodimethylamine (N-)			1.4E-02										
188		924163	Nitrosodi-n-butylamine (N-)			1.6E-03										
189		621647	Nitrosodi-n-propylamine (N-)			2.0E-03										
190		86306	Nitrosodiphenylamine (N-)			2.6E-06										
191		156105	Nitrosodiphenylamine (p-)			6.3E-06										
192		10595956	Nitrosomethylethylamine (N-)			6.3E-03										
193	*	59892	Nitrosomorpholine (N-)			1.9E-03										
194		759739	Nitroso-n-ethylurea (N-)			7.7E-03										
195	*	684935	Nitroso-n-methylurea (N-)			3.4E-02										
196		100754	Nitrosopiperidine (N-)			2.7E-03										
197		930552	Nitrosopyrrolidine (N-)			6.1E-04										
198	*	87865	Pentachlorophenol			5.1E-06										
199	*	108952	Phenol						200					5800		
200	*	75445	Phosgene						0.3					4		
201	*	7803512	Phosphine						0.3					70		
202	*	7664382	Phosphoric acid						10							
203	*		Phosphorus (white)						0.07							
204	*	85449	Phthalic anhydride						20							
205	*	1336363	Polychlorinated biphenyls (PCBs)			1.0E-04										
206	*		Polycylic aromatic hydrocarbons (PAHs)						See footnote "b"							
207	*		Polycylic organic matter (POM)													
208		7758012	Potassium bromate			1.4E-04										
209	*	1120714	Propane sultone (1,3-)			6.9E-04										
210	*	57578	Propiolactone (beta-)			4.0E-03										
211	*	123386	Propionaldehyde						8							
212		115071	Propylene						3000							
213	*	78875	Propylene dichloride			1.0E-05			4							
214		107982	Propylene glycol monomethyl ether						2000							
215	*	75569	Propylene oxide			3.7E-06			30					3100		
216	**		Selenium and compounds						20							
217		7631869	Silica (crystalline, respirable)						3							
218		1310732	Sodium hydroxide											8		
219	*	100425	Styrene			5.7E-07			1000					21000		
220	*	96093	Styrene oxide			4.6E-05										
221			Sulfates											120		
222		7664939	Sulfuric acid						1					120		
223	*	1746016	Tetrachlorodibenzo(p)dioxin (2,3,7,8-)			3.8E+01			0.00004							
224		630206	Tetrachloroethane (1,1,1,2-)			7.4E-06										
225	*	79345	Tetrachloroethane (1,1,2,2-)			5.8E-05										
226	*	127184	Tetrachloroethylene			6.1E-06			40					20000		
227		811972	Tetrafluoroethane (1,1,1,2-)						80000							
228		109999	Tetrahydrofuran						2000							
229		62555	Thioacetamide			1.7E-03										
230	*	7550450	Titanium tetrachloride						0.1							
231	*	108883	Toluene						3760					7520		
232	*	584849	Toluene diisocyanate (2,4-)			1.1E-05			0.008					2		
233	*	26471625	Toluene diisocyanate (2,4-/2,6-)			1.1E-05			0.008					2		
234	*	91087	Toluene diisocyanate (2,6-)			1.1E-05			0.008					2		
235	*	95807	Toluene-2,4-diamine			1.1E-03										
236	*	95534	Toluidine (o-)			5.1E-05										
237	*	8001352	Toxaphene			3.2E-04										
238		76131	Trichloro-1,2,2-trifluoroethane (1,1,2-)						30000							
239	*	120821	Trichlorobenzene (1,2,4-)						2							
240	*	79005	Trichloroethane (1,1,2-)			1.6E-05										
241	*	79016	Trichloroethylene			4.8E-06			2					2		
242		75694	Trichlorofluoromethane						700							
243	*	88062	Trichlorophenol (2,4,6-)			3.1E-06										
244	*	121448	Triethylamine						7					2800		
245	*	1582098	Trifluralin			2.2E-06										
246		526738	Trimethylbenzene (1,2,3-)						60							
247		95636	Trimethylbenzene (1,2,4-)						60							
248		108678	Trimethylbenzene (1,3,5-)						60							
249		25551137	Trimethylbenzene (1,2,3-/1,2,4-/1,3,5-)						60							
250		7440622	Vanadium						0.1					0.8		
251		1314621	Vanadium pentoxide											30		
252	*	108054	Vinyl acetate						200							
253	*	593602	Vinyl bromide			3.2E-05			3							
254	*	75014	Vinyl chloride			8.8E-06			100					180000		
255	*	75354	Vinylidene chloride						200							
256	*		Xylene (m-,o-,p-, or mixed isomers)						100					22000		

If any calculated long-term or short-term effects for an air toxic result in "Further Evaluation Required" (FER) on this Risk Screening Worksheet, a Refined Risk Assessment is required for that air toxic.

NOTE:

* **Clean Air Act hazardous air pollutant**

** **Clean Air Act hazardous air pollutant, but not listed individually (part of a group)**

a Dioxins may be considered to be all 2,3,7,8-tetrachlorodibenzo(p)dioxin), or separated into congeners (contact AQEv).

b PAH or POM may be considered to be all benzo(a)pyrene, or separated into individual PAHs (contact AQEv).

The results are determined by comparing the long-term and short-term effects to the single-source thresholds, listed below.
The threshold value of negligible risk for incremental risk (IR) is 1 in a million (1.0E-06). An IR value less than or equal to 1 in million is considered negligible.
The threshold value of negligible risk for long-term hazard quotient (HQ) for non-carcinogenic risk is 1.0. An HQ less than or equal to 1.0 is considered negligible.
The threshold value of negligible risk for short-term hazard quotient (HQ_{st}) for non-carcinogenic risk is 1.0. An HQ_{st} less than or equal to 1.0 is considered negligible.

Combustion Turbine Generator – Startup

NJDEP DIVISION OF AIR QUALITY RISK SCREENING WORKSHEET
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects
June 2020

Read the Instructions tab carefully before completing this spreadsheet.

Date	6/22/2021
Facility ID No.	07349
Activity ID No.	BOP 190002
Facility name	PVSC Emergency Power Plant - Turbine - Startup - Level I
Facility location	Newark, NJ
File name (.xls)	Risk2020_Turbine_Startup_Level I

Emission Unit/Batch Process ID No.	U301	Stack height[1]	106.0	ft
Emission Point ID No.	PT301/302/303	Distance to property line	93	ft
Equipment ID No(s).	E3001/3002/3003	**Annual air impact value, C'**	2.90766	**(ug/m³)/(ton/yr)**
Operating Scenario(s)	OS2/6/10	**1-hour air impact value, C'_{st}**	167.5207	**(ug/m³)/(lb/hr)**

KEY:

Long-Term Effects
- **Q =** Annual emission rate (in tons per year) contributed from the source
- **C =** C' x Q = Annual average ambient air concentration
- **URF =** Unit risk factor (for carcinogenic risk)
- **IR =** C x URF = Incremental risk (for carcinogen)
- **RfC =** Reference concentration (for noncarcinogenic effects)
- **HQ =** C/RfC = Hazard quotient (for noncarcinogenic risk)
- **Rslt =** The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold)
- **FER =** Further Evaluation Required (See Notes for thresholds)
- **Negl. =** Negligible (See Notes for thresholds)

Short-Term Effects
- **Q_h =** Hourly emission rate (in pounds per hour)
- **C_{st} =** C'_{st} x Q_h = Short-term average ambient air concentration
- **RfC_{st} =** Short-term reference concentration (for noncarcinogenic effects)
- **HQ_{st} =** C_{st}/RfC_{st} = Hazard quotient for short-term noncarcinogenic effects
- **Rslt =** The result of comparing the HQ_{st} to the negligible threshold (FER if > threshold, Negl. if <= threshold)
- **FER =** Further Evaluation Required (See Notes for thresholds)
- **Negl. =** Negligible (See Notes for thresholds)

[1] When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009.
Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

				LONG-TERM EFFECTS								SHORT-TERM EFFECTS				
	HAP	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m³)	URF [(ug/m³)⁻¹]	IR	Rslt	RfC (ug/m³)	HQ	Rslt	Q_h (lb/hr)	C_{st} (ug/m³)	RfC_{st} (ug/m³)	HQ_{st}	Rslt
1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	*	60355	Acetamide			2.0E-05										
3		67641	Acetone						31000					62000		
4		75865	Acetone cyanohydrin						2							
5	*	75058	Acetonitrile						60							
6	*	98862	Acetophenone						0.02							
7	*	53963	Acetylaminofluorene (2-)			1.3E-03										
8	*	107028	Acrolein	6.6E-04	1.9E-03				0.02	**9.5E-02**	**Negl.**	2.2E-03	0.371494	2.5	**1.5E-01**	**Negl.**
9	*	79061	Acrylamide			1.0E-04			6							
10	*	79107	Acrylic acid						1					6000		
11	*	107131	Acrylonitrile			6.8E-05			2							
12		309002	Aldrin			4.9E-03										
13	*	107051	Allyl chloride			6.0E-06			1							
14		117793	Aminoanthraquinone (2-)			9.4E-06										
15	*	92671	Aminobiphenyl (4-)			6.0E-03										
16		7664417	Ammonia						100					3200		
17	*	62533	Aniline			1.6E-06			1					3000		
18	*	90040	Anisidine (o-)			4.0E-05										
19	**	1309644	Antimony trioxide						0.2							
20		140578	Aramite			7.1E-06										
21	*		Arsenic (inorganic)			4.3E-03			0.015					0.2		
22	**	7784421	Arsine						0.05							
23	*	1332214	Asbestos			7.7E-03										
24		103333	Azobenzene			3.1E-05										
25			Barium											0.5		
26	*	71432	Benzene			7.8E-06			3					27		
27	*	92875	Benzidine			6.7E-02										
28	**	50328	Benzo(a)pyrene			6.0E-04			0.002							
29	*	98077	Benzotrichloride			3.7E-03										
30	*	100447	Benzyl chloride			4.9E-05								240		
31	*		Beryllium			2.4E-03			0.02							
32	*	92524	Biphenyl (1,1-)						0.4							
33		108601	Bis(2-chloroisopropyl)ether			1.0E-05										
34	*	117817	Bis(2-ethylhexyl)phthalate			2.4E-06										
35	*	542881	Bis(chloromethyl)ether			6.2E-02										
36		7440428	Boron (elemental)						20							
37		7637072	Boron trifluoride						0.7							
38		74975	Bromochloromethane						40							
39		75274	Bromodichloromethane			3.7E-05										
40	*	75252	Bromoform			1.1E-06										
41		106945	Bromopropane (1-)						101					5030		
42	*	106990	Butadiene (1,3-)			3.0E-05			2					660		
43	*		Cadmium			4.2E-03			0.02							
44		105602	Caprolactam						2.2					50		
45	*	133062	Captan			6.6E-07										
46	*	75150	Carbon disulfide						700					6200		
47	*	56235	Carbon tetrachloride			6.0E-06			40					1900		
48	*	463581	Carbonyl sulfide						10					660		
49	*	57749	Chlordane			1.0E-04			0.02							
50		108171262	Chlorinated paraffins			2.0E-05										
51	*	7782505	Chlorine						0.2					210		
52		10049044	Chlorine dioxide						0.2					28		
53		75683	Chloro-1,1-difluoroethane (1-) *(HCFC-142b)*						50000							
54	*	532274	Chloroacetophenone (2-)						0.03							
55	*	108907	Chlorobenzene						1000							
56	*	510156	Chlorobenzilate			3.1E-05										
57		75456	Chlorodifluoromethane *(HCFC-22)*						50000							
58	*	67663	Chloroform			2.3E-05			300					150		
59	*	107302	Chloromethyl methyl ether			6.9E-04										
60		95830	Chloro-o-phenylenediamine (4-)			4.6E-06										
61		95692	Chloro-o-toluidine (p-)			7.7E-05										
62		76062	Chloropicrin						0.4					29		
63	*	126998	Chloroprene			5.0E-04			20							
64		75296	Chloropropane (2-)						100							
65	**		Chromic acid mists (Cr VI)						0.008							
66	**	18540299	Chromium VI (total)			1.2E-02										
67	**		Chromium VI dissolved aerosols						0.008							
68	**		Chromium VI particulates						0.1							
69	*		Cobalt			9.0E-03			0.006							
70	*	8007452	Coke oven emissions			6.2E-04										
71			Copper											100		
72		120718	Cresidine (p-)			4.3E-05										
73	*		Cresol mixtures						600							
74		98828	Cumene						400							

75		135206	Cupferron			6.3E-05										
76		110827	Cyclohexane											6000		
77	*	72559	DDE			9.7E-05										
78		50293	DDT			9.7E-05										
79		615054	Diaminoanisole (2,4-)			6.6E-06										
80		124481	Dibromochloromethane			2.7E-05										
81	*	96128	Dibromo-3-chloropropane (1,2-)			2.0E-03			0.2							
82		764410	Dichloro-2-butene (1,4-)			4.2E-03										
83		95501	Dichlorobenzene (1,2-)						200							
84	*	106467	Dichlorobenzene (1,4-)			1.1E-05			800							
85	*	91941	Dichlorobenzidine (3,3'-)			3.4E-04										
86		75718	Dichlorodifluoromethane						100							
87	*	111444	Dichloroethyl ether			3.3E-04										
88	*	542756	Dichloropropene (1,3-)			4.0E-06			20							
89	*	62737	Dichlorvos			8.3E-05			0.5							
90		77736	Dicyclopentadiene						0.3							
91		60571	Dieldrin			4.6E-03										
92			Diesel particulate matter			3.0E-04			5							
93	*	111422	Diethanolamine						3							
94		112345	Diethylene glycol monobutyl ether						0.1							
95		75376	Difluoroethane (1,1-)						40000							
96	*	77781	Dimethyl sulfate			4.0E-03										
97	*	60117	Dimethylaminoazobenzene (4-)			1.3E-03										
98	*	79447	Dimethylcarbamyl chloride			3.7E-03										
99	*	68122	Dimethylformamide (N,N-)						30							
100	*	57147	Dimethylhydrazine (1,1-)						0.002							
101		540738	Dimethylhydrazine (1,2-)			1.6E-01										
102	*	121142	Dinitrotoluene (2,4-)			8.9E-05										
103	*	123911	Dioxane (1,4-)			5.0E-06			30					3000		
104	*		Dioxin						See footnote "a"							
105	*	122667	Diphenylhydrazine (1,2-)			2.2E-04										
106	*	106898	Epichlorohydrin			1.2E-06			1					1300		
107	*	106887	Epoxybutane (1,2-)						20							
108	*	140885	Ethyl acrylate						8							
109	*	100414	Ethylbenzene			2.5E-06								1000		
110	*	51796	Ethyl carbamate			2.9E-04										
111	*	75003	Ethyl chloride											10000		
112	*	106934	Ethylene dibromide			6.0E-04			0.8							
113	*	107062	Ethylene dichloride			2.6E-05			400							
114	*	107211	Ethylene glycol						400							
115		111762	Ethylene glycol monobutyl ether						82					4700		
116	**	110805	Ethylene glycol monoethyl ether						200					370		
117	**	111159	Ethylene glycol monoethyl ether acetate						300					140		
118	**	109864	Ethylene glycol monomethyl ether						20					93		
119	**	110496	Ethylene glycol monomethyl ether acetate						90							
120	*	75218	Ethylene oxide			5.0E-03			30					42		
121	*	96457	Ethylene thiourea			1.3E-05										
122	*	151564	Ethyleneimine			1.9E-02										
123	*	75343	Ethylidene dichloride			1.6E-06			500							
124		16984488	Fluoride						13							
125	*	50000	Formaldehyde	6.4E-02	1.9E-01	1.3E-05	**2.4E-06**	**FER**	9	**2.1E-02**	**Negl.**	9.7E-01	162.0763	55	**2.9E+00**	**FER**
126		98011	Furfural						50							
127			Gasoline vapors			1.0E-06			15							
128		111308	Glutaraldehyde						0.08					4.1		
129		765344	Glycidaldehyde						1							
130	*	76448	Heptachlor			1.3E-03										
131		1024573	Heptachlor epoxide			2.6E-03										
132	*	118741	Hexachlorobenzene			4.6E-04										
133	*	87683	Hexachlorobutadiene			2.2E-05										
134	**	319846	Hexachlorocyclohexane (alpha-)			1.8E-03										
135	**	319857	Hexachlorocyclohexane (beta-)			5.3E-04										
136	*	58899	Hexachlorocyclohexane (gamma-)			3.1E-04										
137	**	608731	Hexachlorocyclohexane (technical grade)			5.1E-04										
138	*	77474	Hexachlorocyclopentadiene						0.2							
139		19408743	Hexachlorodibenzo-p-dioxin, mixture			1.3E+00										
140	*	67721	Hexachloroethane			1.1E-05			30							
141	*	822060	Hexamethylene diisocyanate						0.01							
142	*	110543	Hexane (N-)						700							
143	*	302012	Hydrazine			4.9E-03			0.2					10		
144		10034932	Hydrazine sulfate			4.9E-03										
145	*	7647010	Hydrogen chloride						20					2100		
146	**	74908	Hydrogen cyanide						0.8					340		
147	*	7664393	Hydrogen fluoride						14					240		
148	**	7783075	Hydrogen selenide											5		
149		7783064	Hydrogen sulfide						2					98		
150	*	78591	Isophorone						2000							
151		67630	Isopropanol											3200		
152	*		Lead			1.2E-05								0.1		
153	*	108316	Maleic anhydride						0.7							
154	*		Manganese						0.05					0.17		
155	*		Mercury (elemental)						0.3							
156	*	7439976	Mercury (inorganic)						0.03					0.6		
157		126987	Methacrylonitrile						0.7							
158	*	67561	Methanol						4000					28000		
159	*	74839	Methyl bromide						5					3900		
160	*	74873	Methyl chloride			1.8E-06			90							
161	*	71556	Methyl chloroform						1000					9000		
162		78933	Methyl ethyl ketone						5000					13000		
163	*	108101	Methyl isobutyl ketone											3000		
164	*	624839	Methyl isocyanate						1							
165	*	80626	Methyl methacrylate						700							
166		25013154	Methyl styrene (mixed isomers)						40							
167	*	1634044	Methyl tert butyl ether			2.6E-07			3000							
168		108872	Methylcyclohexane						3000							
169	*	101144	Methylene bis(2-chloroaniline) (4,4'-)			4.3E-04										
170	*	75092	Methylene chloride			1.3E-08			600					14000		
171	*	101779	Methylenedianiline (4,4'-)			4.6E-04			20							
172	*	101688	Methylenediphenyl diisocyanate (4,4'-)						0.08					12		
173	*	60344	Methylhydrazine			1.0E-03			0.02							
174		90948	Michler's ketone			2.5E-04										
175	*		Mineral fibers (<1% free silica)						24							
176	*	91203	Naphthalene			3.4E-05			3							
177	*		Nickel and compounds			4.8E-04			0.014					0.2		
178	**	1313991	Nickel oxide						0.02							
179	**		Nickel refinery dust			2.4E-04										
180	**		Nickel, soluble salts						0.2							
181	**	12035722	Nickel subsulfide			4.8E-04										
182		7697372	Nitric acid											86		
183		88744	Nitroaniline (o-)						0.05							

184	*	98953	Nitrobenzene			4.0E-05			9							
185	*	79469	Nitropropane (2-)			2.7E-03			20							
186		55185	Nitrosodiethylamine (N-)			4.3E-02										
187	*	62759	Nitrosodimethylamine (N-)			1.4E-02										
188		924163	Nitrosodi-n-butylamine (N-)			1.6E-03										
189		621647	Nitrosodi-n-propylamine (N-)			2.0E-03										
190		86306	Nitrosodiphenylamine (N-)			2.6E-06										
191		156105	Nitrosodiphenylamine (p-)			6.3E-06										
192		10595956	Nitrosomethylethylamine (N-)			6.3E-03										
193	*	59892	Nitrosomorpholine (N-)			1.9E-03										
194		759739	Nitroso-n-ethylurea (N-)			7.7E-03										
195	*	684935	Nitroso-n-methylurea (N-)			3.4E-02										
196		100754	Nitrosopiperidine (N-)			2.7E-03										
197		930552	Nitrosopyrrolidine (N-)			6.1E-04										
198	*	87865	Pentachlorophenol			5.1E-06										
199	*	108952	Phenol						200					5800		
200	*	75445	Phosgene						0.3					4		
201	*	7803512	Phosphine						0.3					70		
202	*	7664382	Phosphoric acid						10							
203	*		Phosphorus (white)						0.07							
204	*	85449	Phthalic anhydride						20							
205	*	1336363	Polychlorinated biphenyls (PCBs)			1.0E-04										
206	*		Polycyclic aromatic hydrocarbons (PAHs)						See footnote "b"							
207	*		Polycylic organic matter (POM)													
208		7758012	Potassium bromate			1.4E-04										
209	*	1120714	Propane sultone (1,3-)			6.9E-04										
210	*	57578	Propiolactone (beta-)			4.0E-03										
211	*	123386	Propionaldehyde						8							
212		115071	Propylene						3000							
213	*	78875	Propylene dichloride			1.0E-05			4							
214		107982	Propylene glycol monomethyl ether						2000							
215	*	75569	Propylene oxide			3.7E-06			30					3100		
216	**		Selenium and compounds						20							
217		7631869	Silica (crystalline, respirable)						3							
218		1310732	Sodium hydroxide											8		
219	*	100425	Styrene			5.7E-07			1000					21000		
220	*	96093	Styrene oxide			4.6E-05										
221			Sulfates											120		
222		7664939	Sulfuric acid						1					120		
223	*	1746016	Tetrachlorodibenzo(p)dioxin (2,3,7,8-)			3.8E+01			0.00004							
224		630206	Tetrachloroethane (1,1,1,2-)			7.4E-06										
225	*	79345	Tetrachloroethane (1,1,2,2-)			5.8E-05										
226	*	127184	Tetrachloroethylene			6.1E-06			40					20000		
227		811972	Tetrafluoroethane (1,1,1,2-)						80000							
228		109999	Tetrahydrofuran						2000							
229		62555	Thioacetamide			1.7E-03										
230	*	7550450	Titanium tetrachloride						0.1							
231	*	108883	Toluene						3760					7520		
232	*	584849	Toluene diisocyanate (2,4-)			1.1E-05			0.008					2		
233	*	26471625	Toluene diisocyanate (2,4-/2,6-)			1.1E-05			0.008					2		
234	*	91087	Toluene diisocyanate (2,6-)			1.1E-05			0.008					2		
235	*	95807	Toluene-2,4-diamine			1.1E-03										
236	*	95534	Toluidine (o-)			5.1E-05										
237	*	8001352	Toxaphene			3.2E-04										
238		76131	Trichloro-1,2,2-trifluoroethane (1,1,2-)						30000							
239	*	120821	Trichlorobenzene (1,2,4-)						2							
240	*	79005	Trichloroethane (1,1,2-)			1.6E-05										
241	*	79016	Trichloroethylene			4.8E-06			2					2		
242		75694	Trichlorofluoromethane						700							
243	*	88062	Trichlorophenol (2,4,6-)			3.1E-06										
244	*	121448	Triethylamine						7					2800		
245	*	1582098	Trifluralin			2.2E-06										
246		526738	Trimethylbenzene (1,2,3-)						60							
247		95636	Trimethylbenzene (1,2,4-)						60							
248		108678	Trimethylbenzene (1,3,5-)						60							
249		25551137	Trimethylbenzene (1,2,3-/1,2,4-/1,3,5-)						60							
250		7440622	Vanadium						0.1					0.8		
251		1314621	Vanadium pentoxide											30		
252	*	108054	Vinyl acetate						200							
253	*	593602	Vinyl bromide			3.2E-05			3							
254	*	75014	Vinyl chloride			8.8E-06			100					180000		
255	*	75354	Vinylidene chloride						200							
256	*		Xylene (m-,o-,p-, or mixed isomers)						100					22000		

If any calculated long-term or short-term effects for an air toxic result in "Further Evaluation Required" (FER) on this Risk Screening Worksheet, a Refined Risk Assessment is required for that air toxic.

NOTE:

* **Clean Air Act hazardous air pollutant**

** **Clean Air Act hazardous air pollutant, but not listed individually (part of a group)**

a Dioxins may be considered to be all 2,3,7,8-tetrachlorodibenzo(p)dioxin), or separated into congeners (contact AQEv).

b PAH or POM may be considered to be all benzo(a)pyrene, or separated into individual PAHs (contact AQEv).

The results are determined by comparing the long-term and short-term effects to the single-source thresholds, listed below.
The threshold value of negligible risk for incremental risk (IR) is 1 in a million (1.0E-06). An IR value less than or equal to 1 in million is considered negligible.
The threshold value of negligible risk for long-term hazard quotient (HQ) for non-carcinogenic risk is 1.0. An HQ less than or equal to 1.0 is considered negligible.
The threshold value of negligible risk for short-term hazard quotient (HQ_{st}) for non-carcinogenic risk is 1.0. An HQ_{st} less than or equal to 1.0 is considered negligible.

Combustion Turbine Generator – Shutdown

NJDEP DIVISION OF AIR QUALITY RISK SCREENING WORKSHEET
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects
June 2020

Read the Instructions tab carefully before completing this spreadsheet.

Date	6/22/2021
Facility ID No.	07349
Activity ID No.	BOP 190002
Facility name	PVSC Emergency Power Plant - Turbine - Shutdown - Level I
Facility location	Newark, NJ
File name (.xls)	Risk2020_Turbine_Level I-shutdown

Emission Unit/Batch Process ID No.	U301	Stack height[1]	106.0	ft
Emission Point ID No.	PT301/302/303	Distance to property line	93	ft
Equipment ID No(s).	E3001/3002/3003	**Annual air impact value, C'**	2.90766	**(ug/m³)/(ton/yr)**
Operating Scenario(s)	OS3/7/11	**1-hour air impact value, C'_{st}**	167.5207	**(ug/m³)/(lb/hr)**

KEY:

Long-Term Effects

Q = Annual emission rate (in tons per year) contributed from the source
C = C' x Q = Annual average ambient air concentration
URF = Unit risk factor (for carcinogenic risk)
IR = C x URF = Incremental risk (for carcinogen)
RfC = Reference concentration (for noncarcinogenic effects)
HQ = C/RfC = Hazard quotient (for noncarcinogenic risk)
Rslt = The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold)
FER = Further Evaluation Required (See Notes for thresholds)
Negl. = Negligible (See Notes for thresholds)

Short-Term Effects

Q_h = Hourly emission rate (in pounds per hour)
C_{st} = C'_{st} x Q_h = Short-term average ambient air concentration
RfC_{st} = Short-term reference concentration (for noncarcinogenic effects)
HQ_{st} = C_{st}/RfC_{st} = Hazard quotient for short-term noncarcinogenic effects
Rslt = The result of comparing the HQ_{st} to the negligible threshold (FER if > threshold, Negl. if <= threshold)
FER = Further Evaluation Required (See Notes for thresholds)
Negl. = Negligible (See Notes for thresholds)

[1] When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009.
Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

				LONG-TERM EFFECTS								SHORT-TERM EFFECTS				
	H A P	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m³)	URF [(ug/m³)⁻¹]	IR	Rslt	RfC (ug/m³)	HQ	Rslt	Q_h (lb/hr)	C_{st} (ug/m³)	RfC_{st} (ug/m³)	HQ_{st}	Rslt
1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	*	60355	Acetamide			2.0E-05										
3		67641	Acetone						31000					62000		
4		75865	Acetone cyanohydrin						2							
5	*	75058	Acetonitrile						60							
6	*	98862	Acetophenone						0.02							
7	*	53963	Acetylaminofluorene (2-)			1.3E-03										
8	*	107028	Acrolein	6.6E-04	1.9E-03				0.02	**9.5E-02**	**Negl.**	2.2E-03	0.371494	2.5	**1.5E-01**	**Negl.**
9	*	79061	Acrylamide			1.0E-04			6							
10	*	79107	Acrylic acid						1					6000		
11	*	107131	Acrylonitrile			6.8E-05			2							
12		309002	Aldrin			4.9E-03										
13	*	107051	Allyl chloride			6.0E-06			1							
14		117793	Aminoanthraquinone (2-)			9.4E-06										
15	*	92671	Aminobiphenyl (4-)			6.0E-03										
16		7664417	Ammonia						100					3200		
17	*	62533	Aniline			1.6E-06			1					3000		
18	*	90040	Anisidine (o-)			4.0E-05										
19	**	1309644	Antimony trioxide						0.2							
20		140578	Aramite			7.1E-06										
21	*		Arsenic (inorganic)			4.3E-03			0.015					0.2		
22	**	7784421	Arsine						0.05							
23	*	1332214	Asbestos			7.7E-03										
24		103333	Azobenzene			3.1E-05										
25			Barium											0.5		
26	*	71432	Benzene			7.8E-06			3					27		
27	*	92875	Benzidine			6.7E-02										
28	**	50328	Benzo(a)pyrene			6.0E-04			0.002							
29	*	98077	Benzotrichloride			3.7E-03										
30	*	100447	Benzyl chloride			4.9E-05								240		
31	*		Beryllium			2.4E-03			0.02							
32	*	92524	Biphenyl (1,1-)						0.4							
33		108601	Bis(2-chloroisopropyl)ether			1.0E-05										
34	*	117817	Bis(2-ethylhexyl)phthalate			2.4E-06										
35	*	542881	Bis(chloromethyl)ether			6.2E-02										
36		7440428	Boron (elemental)						20							
37		7637072	Boron trifluoride						0.7							
38		74975	Bromochloromethane						40							
39		75274	Bromodichloromethane			3.7E-05										
40	*	75252	Bromoform			1.1E-06										
41		106945	Bromopropane (1-)						101					5030		
42	*	106990	Butadiene (1,3-)			3.0E-05			2					660		
43	*		Cadmium			4.2E-03			0.02							
44		105602	Caprolactam						2.2					50		
45	*	133062	Captan			6.6E-07										
46	*	75150	Carbon disulfide						700					6200		
47	*	56235	Carbon tetrachloride			6.0E-06			40					1900		
48	*	463581	Carbonyl sulfide						10					660		
49	*	57749	Chlordane			1.0E-04			0.02							
50		108171262	Chlorinated paraffins			2.0E-05										
51	*	7782505	Chlorine						0.2					210		
52		10049044	Chlorine dioxide						0.2					28		
53		75683	Chloro-1,1-difluoroethane (1-) *(HCFC-142b)*						50000							
54	*	532274	Chloroacetophenone (2-)						0.03							
55	*	108907	Chlorobenzene						1000							
56	*	510156	Chlorobenzilate			3.1E-05										
57		75456	Chlorodifluoromethane *(HCFC-22)*						50000							
58	*	67663	Chloroform			2.3E-05			300					150		
59	*	107302	Chloromethyl methyl ether			6.9E-04										
60		95830	Chloro-o-phenylenediamine (4-)			4.6E-06										
61		95692	Chloro-o-toluidine (p-)			7.7E-05										
62		76062	Chloropicrin						0.4					29		
63	*	126998	Chloroprene			5.0E-04			20							
64		75296	Chloropropane (2-)						100							
65	**		Chromic acid mists (Cr VI)						0.008							
66	**	18540299	Chromium VI (total)			1.2E-02										
67	**		Chromium VI dissolved aerosols						0.008							
68	**		Chromium VI particulates						0.1							
69	*		Cobalt			9.0E-03			0.006							
70	*	8007452	Coke oven emissions			6.2E-04										
71			Copper											100		
72		120718	Cresidine (p-)			4.3E-05										
73	*		Cresol mixtures						600							
74		98828	Cumene						400							

75		135206	Cupferron			6.3E-05										
76		110827	Cyclohexane											6000		
77	*	72559	DDE			9.7E-05										
78		50293	DDT			9.7E-05										
79		615054	Diaminoanisole (2,4-)			6.6E-06										
80		124481	Dibromochloromethane			2.7E-05										
81	*	96128	Dibromo-3-chloropropane (1,2-)			2.0E-03			0.2							
82		764410	Dichloro-2-butene (1,4-)			4.2E-03										
83		95501	Dichlorobenzene (1,2-)						200							
84	*	106467	Dichlorobenzene (1,4-)			1.1E-05			800							
85	*	91941	Dichlorobenzidine (3,3'-)			3.4E-04										
86		75718	Dichlorodifluoromethane						100							
87	*	111444	Dichloroethyl ether			3.3E-04										
88	*	542756	Dichloropropene (1,3-)			4.0E-06			20							
89	*	62737	Dichlorvos			8.3E-05			0.5							
90		77736	Dicyclopentadiene						0.3							
91		60571	Dieldrin			4.6E-03										
92			Diesel particulate matter			3.0E-04			5							
93	*	111422	Diethanolamine						3							
94		112345	Diethylene glycol monobutyl ether						0.1							
95		75376	Difluoroethane (1,1-)						40000							
96	*	77781	Dimethyl sulfate			4.0E-03										
97	*	60117	Dimethylaminoazobenzene (4-)			1.3E-03										
98	*	79447	Dimethylcarbamyl chloride			3.7E-03										
99	*	68122	Dimethylformamide (N,N-)						30							
100	*	57147	Dimethylhydrazine (1,1-)						0.002							
101		540738	Dimethylhydrazine (1,2-)			1.6E-01										
102	*	121142	Dinitrotoluene (2,4-)			8.9E-05										
103	*	123911	Dioxane (1,4-)			5.0E-06			30					3000		
104	*		Dioxin						See footnote "a"							
105	*	122667	Diphenylhydrazine (1,2-)			2.2E-04										
106	*	106898	Epichlorohydrin			1.2E-06			1					1300		
107	*	106887	Epoxybutane (1,2-)						20							
108	*	140885	Ethyl acrylate						8							
109	*	100414	Ethylbenzene			2.5E-06								1000		
110	*	51796	Ethyl carbamate			2.9E-04										
111	*	75003	Ethyl chloride											10000		
112	*	106934	Ethylene dibromide			6.0E-04			0.8							
113	*	107062	Ethylene dichloride			2.6E-05			400							
114	*	107211	Ethylene glycol						400							
115		111762	Ethylene glycol monobutyl ether						82					4700		
116	**	110805	Ethylene glycol monoethyl ether						200					370		
117	**	111159	Ethylene glycol monoethyl ether acetate						300					140		
118	**	109864	Ethylene glycol monomethyl ether						20					93		
119	**	110496	Ethylene glycol monomethyl ether acetate						90							
120	*	75218	Ethylene oxide			5.0E-03			30					42		
121	*	96457	Ethylene thiourea			1.3E-05										
122	*	151564	Ethyleneimine			1.9E-02										
123	*	75343	Ethylidene dichloride			1.6E-06			500							
124		16984488	Fluoride						13							
125	*	50000	Formaldehyde	6.4E-02	1.9E-01	1.3E-05	**2.4E-06**	**FER**	9	**2.1E-02**	**Negl.**	9.3E-01	155.7943	55	**2.8E+00**	**FER**
126		98011	Furfural						50							
127			Gasoline vapors			1.0E-06			15							
128		111308	Glutaraldehyde						0.08					4.1		
129		765344	Glycidaldehyde						1							
130	*	76448	Heptachlor			1.3E-03										
131		1024573	Heptachlor epoxide			2.6E-03										
132	*	118741	Hexachlorobenzene			4.6E-04										
133	*	87683	Hexachlorobutadiene			2.2E-05										
134	**	319846	Hexachlorocyclohexane (alpha-)			1.8E-03										
135	**	319857	Hexachlorocyclohexane (beta-)			5.3E-04										
136	*	58899	Hexachlorocyclohexane (gamma-)			3.1E-04										
137	**	608731	Hexachlorocyclohexane (technical grade)			5.1E-04										
138	*	77474	Hexachlorocyclopentadiene						0.2							
139		19408743	Hexachlorodibenzo-p-dioxin, mixture			1.3E+00										
140	*	67721	Hexachloroethane			1.1E-05			30							
141	*	822060	Hexamethylene diisocyanate						0.01							
142	*	110543	Hexane (N-)						700							
143	*	302012	Hydrazine			4.9E-03			0.2					10		
144		10034932	Hydrazine sulfate			4.9E-03										
145	*	7647010	Hydrogen chloride						20					2100		
146	**	74908	Hydrogen cyanide						0.8					340		
147	*	7664393	Hydrogen fluoride						14					240		
148	**	7783075	Hydrogen selenide											5		
149		7783064	Hydrogen sulfide						2					98		
150	*	78591	Isophorone						2000							
151		67630	Isopropanol											3200		
152	*		Lead			1.2E-05								0.1		
153	*	108316	Maleic anhydride						0.7							
154	*		Manganese						0.05					0.17		
155	*		Mercury (elemental)						0.3							
156	*	7439976	Mercury (inorganic)						0.03					0.6		
157		126987	Methacrylonitrile						0.7							
158	*	67561	Methanol						4000					28000		
159	*	74839	Methyl bromide						5					3900		
160	*	74873	Methyl chloride			1.8E-06			90							
161	*	71556	Methyl chloroform						1000					9000		
162		78933	Methyl ethyl ketone						5000					13000		
163	*	108101	Methyl isobutyl ketone											3000		
164	*	624839	Methyl isocyanate						1							
165	*	80626	Methyl methacrylate						700							
166		25013154	Methyl styrene (mixed isomers)						40							
167	*	1634044	Methyl tert butyl ether			2.6E-07			3000							
168		108872	Methylcyclohexane						3000							
169	*	101144	Methylene bis(2-chloroaniline) (4,4'-)			4.3E-04										
170	*	75092	Methylene chloride			1.3E-08			600					14000		
171	*	101779	Methylenedianiline (4,4'-)			4.6E-04			20							
172	*	101688	Methylenediphenyl diisocyanate (4,4'-)						0.08					12		
173	*	60344	Methylhydrazine			1.0E-03			0.02							
174		90948	Michler's ketone			2.5E-04										
175	*		Mineral fibers (<1% free silica)						24							
176	*	91203	Naphthalene			3.4E-05			3							
177	*		Nickel and compounds			4.8E-04			0.014					0.2		
178	**	1313991	Nickel oxide						0.02							
179	**		Nickel refinery dust			2.4E-04										
180	**		Nickel, soluble salts						0.2							
181	**	12035722	Nickel subsulfide			4.8E-04										
182		7697372	Nitric acid											86		
183		88744	Nitroaniline (o-)						0.05							

184	*	98953	Nitrobenzene			4.0E-05			9							
185	*	79469	Nitropropane (2-)			2.7E-03			20							
186		55185	Nitrosodiethylamine (N-)			4.3E-02										
187	*	62759	Nitrosodimethylamine (N-)			1.4E-02										
188		924163	Nitrosodi-n-butylamine (N-)			1.6E-03										
189		621647	Nitrosodi-n-propylamine (N-)			2.0E-03										
190		86306	Nitrosodiphenylamine (N-)			2.6E-06										
191		156105	Nitrosodiphenylamine (p-)			6.3E-06										
192		10595956	Nitrosomethylethylamine (N-)			6.3E-03										
193	*	59892	Nitrosomorpholine (N-)			1.9E-03										
194		759739	Nitroso-n-ethylurea (N-)			7.7E-03										
195	*	684935	Nitroso-n-methylurea (N-)			3.4E-02										
196		100754	Nitrosopiperidine (N-)			2.7E-03										
197		930552	Nitrosopyrrolidine (N-)			6.1E-04										
198	*	87865	Pentachlorophenol			5.1E-06										
199	*	108952	Phenol						200					5800		
200	*	75445	Phosgene						0.3					4		
201	*	7803512	Phosphine						0.3					70		
202	*	7664382	Phosphoric acid						10							
203	*		Phosphorus (white)						0.07							
204	*	85449	Phthalic anhydride						20							
205	*	1336363	Polychlorinated biphenyls (PCBs)			1.0E-04										
206	*		Polycylic aromatic hydrocarbons (PAHs)						See footnote "b"							
207	*		Polycylic organic matter (POM)													
208		7758012	Potassium bromate			1.4E-04										
209	*	1120714	Propane sultone (1,3-)			6.9E-04										
210	*	57578	Propiolactone (beta-)			4.0E-03										
211	*	123386	Propionaldehyde						8							
212		115071	Propylene						3000							
213	*	78875	Propylene dichloride			1.0E-05			4							
214		107982	Propylene glycol monomethyl ether						2000							
215	*	75569	Propylene oxide			3.7E-06			30					3100		
216	**		Selenium and compounds						20							
217		7631869	Silica (crystalline, respirable)						3							
218		1310732	Sodium hydroxide											8		
219	*	100425	Styrene			5.7E-07			1000					21000		
220	*	96093	Styrene oxide			4.6E-05										
221			Sulfates											120		
222		7664939	Sulfuric acid						1					120		
223	*	1746016	Tetrachlorodibenzo(p)dioxin (2,3,7,8-)			3.8E+01			0.00004							
224		630206	Tetrachloroethane (1,1,1,2-)			7.4E-06										
225	*	79345	Tetrachloroethane (1,1,2,2-)			5.8E-05										
226	*	127184	Tetrachloroethylene			6.1E-06			40					20000		
227		811972	Tetrafluoroethane (1,1,1,2-)						80000							
228		109999	Tetrahydrofuran						2000							
229		62555	Thioacetamide			1.7E-03										
230	*	7550450	Titanium tetrachloride						0.1							
231	*	108883	Toluene						3760					7520		
232	*	584849	Toluene diisocyanate (2,4-)			1.1E-05			0.008					2		
233	*	26471625	Toluene diisocyanate (2,4-/2,6-)			1.1E-05			0.008					2		
234	*	91087	Toluene diisocyanate (2,6-)			1.1E-05			0.008					2		
235	*	95807	Toluene-2,4-diamine			1.1E-03										
236	*	95534	Toluidine (o-)			5.1E-05										
237	*	8001352	Toxaphene			3.2E-04										
238		76131	Trichloro-1,2,2-trifluoroethane (1,1,2-)						30000							
239	*	120821	Trichlorobenzene (1,2,4-)						2							
240	*	79005	Trichloroethane (1,1,2-)			1.6E-05										
241	*	79016	Trichloroethylene			4.8E-06			2					2		
242		75694	Trichlorofluoromethane						700							
243	*	88062	Trichlorophenol (2,4,6-)			3.1E-06										
244	*	121448	Triethylamine						7					2800		
245	*	1582098	Trifluralin			2.2E-06										
246		526738	Trimethylbenzene (1,2,3-)						60							
247		95636	Trimethylbenzene (1,2,4-)						60							
248		108678	Trimethylbenzene (1,3,5-)						60							
249		25551137	Trimethylbenzene (1,2,3-/1,2,4-/1,3,5-)						60							
250		7440622	Vanadium						0.1					0.8		
251		1314621	Vanadium pentoxide											30		
252	*	108054	Vinyl acetate						200							
253	*	593602	Vinyl bromide			3.2E-05			3							
254	*	75014	Vinyl chloride			8.8E-06			100					180000		
255	*	75354	Vinylidene chloride						200							
256	*		Xylene (m-,o-,p-, or mixed isomers)						100					22000		

If any calculated long-term or short-term effects for an air toxic result in "Further Evaluation Required" (FER) on this Risk Screening Worksheet, a Refined Risk Assessment is required for that air toxic.

NOTE:

* **Clean Air Act hazardous air pollutant**

** **Clean Air Act hazardous air pollutant, but not listed individually (part of a group)**

a Dioxins may be considered to be all 2,3,7,8-tetrachlorodibenzo(p)dioxin), or separated into congeners (contact AQEv).

b PAH or POM may be considered to be all benzo(a)pyrene, or separated into individual PAHs (contact AQEv).

The results are determined by comparing the long-term and short-term effects to the single-source thresholds, listed below.
The threshold value of negligible risk for incremental risk (IR) is 1 in a million (1.0E-06). An IR value less than or equal to 1 in million is considered negligible.
The threshold value of negligible risk for long-term hazard quotient (HQ) for non-carcinogenic risk is 1.0. An HQ less than or equal to 1.0 is considered negligible.
The threshold value of negligible risk for short-term hazard quotient (HQ_{st}) for non-carcinogenic risk is 1.0. An HQ_{st} less than or equal to 1.0 is considered negligible.

Black Start Generator

NJDEP DIVISION OF AIR QUALITY RISK SCREENING WORKSHEET
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects

June 2020

Read the Instructions tab carefully before completing this spreadsheet.

Date	7/9/2020
Facility ID No.	07349
Activity ID No.	BOP 190002
Facility name	PVSC Emergency Power Plant - Black Start Generator - Level I
Facility location	Newark, NJ
File name (.xls)	Risk2020_BSG_Level_I

Emission Unit/Batch Process ID No.	U401	Stack height[1]	78.0	ft
Emission Point ID No.	PT41/42	Distance to property line	151	ft
Equipment ID No(s).	E4001/4002	**Annual air impact value, C'**	3.87936	**(ug/m³)/(ton/yr)**
Operating Scenario(s)	OS1/2	**1-hour air impact value, C'_{st}**	289.7318	**(ug/m³)/(lb/hr)**

KEY:

Long-Term Effects

- **Q =** Annual emission rate (in tons per year) contributed from the source
- **C =** C' x Q = Annual average ambient air concentration
- **URF =** Unit risk factor (for carcinogenic risk)
- **IR =** C x URF = Incremental risk (for carcinogen)
- **RfC =** Reference concentration (for noncarcinogenic effects)
- **HQ =** C/RfC = Hazard quotient (for noncarcinogenic risk)
- **Rslt =** The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold)
- **FER =** Further Evaluation Required (See Notes for thresholds)
- **Negl. =** Negligible (See Notes for thresholds)

Short-Term Effects

- **Q_h =** Hourly emission rate (in pounds per hour)
- **C_{st} =** C'_{st} x Q_h = Short-term average ambient air concentration
- **RfC_{st} =** Short-term reference concentration (for noncarcinogenic effects)
- **HQ_{st} =** C_{st}/RfC_{st} = Hazard quotient for short-term noncarcinogenic effects
- **Rslt =** The result of comparing the HQ_{st} to the negligible threshold (FER if > threshold, Negl. if <= threshold)
- **FER =** Further Evaluation Required (See Notes for thresholds)
- **Negl. =** Negligible (See Notes for thresholds)

[1] When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009.
Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

				LONG-TERM EFFECTS								SHORT-TERM EFFECTS				
	HAP	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m³)	URF [(ug/m³)⁻¹]	IR	Rslt	RfC (ug/m³)	HQ	Rslt	Q_h (lb/hr)	C_{st} (ug/m³)	RfC_{st} (ug/m³)	HQ_{st}	Rslt
1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	*	60355	Acetamide			2.0E-05										
3		67641	Acetone						31000					62000		
4		75865	Acetone cyanohydrin						2							
5	*	75058	Acetonitrile						60							
6	*	98862	Acetophenone						0.02							
7	*	53963	Acetylaminofluorene (2-)			1.3E-03										
8	*	107028	Acrolein	4.8E-03	1.9E-02				0.02	**9.3E-01**	**Negl.**	9.6E-02	27.84844	2.5	**1.1E+01**	**FER**
9	*	79061	Acrylamide			1.0E-04			6							
10	*	79107	Acrylic acid						1					6000		
11	*	107131	Acrylonitrile			6.8E-05			2							
12		309002	Aldrin			4.9E-03										
13	*	107051	Allyl chloride			6.0E-06			1							
14		117793	Aminoanthraquinone (2-)			9.4E-06										
15	*	92671	Aminobiphenyl (4-)			6.0E-03										
16		7664417	Ammonia						100					3200		
17	*	62533	Aniline			1.6E-06			1					3000		
18	*	90040	Anisidine (o-)			4.0E-05										
19	**	1309644	Antimony trioxide						0.2							
20		140578	Aramite			7.1E-06										
21	*		Arsenic (inorganic)			4.3E-03			0.015					0.2		
22	**	7784421	Arsine						0.05							
23	*	1332214	Asbestos			7.7E-03										
24		103333	Azobenzene			3.1E-05										
25			Barium											0.5		
26	*	71432	Benzene			7.8E-06			3					27		
27	*	92875	Benzidine			6.7E-02										
28	**	50328	Benzo(a)pyrene			6.0E-04			0.002							
29	*	98077	Benzotrichloride			3.7E-03										
30	*	100447	Benzyl chloride			4.9E-05								240		
31	*		Beryllium			2.4E-03			0.02							
32	*	92524	Biphenyl (1,1-)						0.4							
33		108601	Bis(2-chloroisopropyl)ether			1.0E-05										
34	*	117817	Bis(2-ethylhexyl)phthalate			2.4E-06										
35	*	542881	Bis(chloromethyl)ether			6.2E-02										
36		7440428	Boron (elemental)						20							
37		7637072	Boron trifluoride						0.7							
38		74975	Bromochloromethane						40							
39		75274	Bromodichloromethane			3.7E-05										
40	*	75252	Bromoform			1.1E-06										
41		106945	Bromopropane (1-)						101					5030		
42	*	106990	Butadiene (1,3-)			3.0E-05			2					660		
43	*		Cadmium			4.2E-03			0.02							
44		105602	Caprolactam						2.2					50		
45	*	133062	Captan			6.6E-07										
46	*	75150	Carbon disulfide						700					6200		
47	*	56235	Carbon tetrachloride			6.0E-06			40					1900		
48	*	463581	Carbonyl sulfide						10					660		
49	*	57749	Chlordane			1.0E-04			0.02							
50		108171262	Chlorinated paraffins			2.0E-05										
51	*	7782505	Chlorine						0.2					210		
52		10049044	Chlorine dioxide						0.2					28		
53		75683	Chloro-1,1-difluoroethane (1-) *(HCFC-142b)*						50000							
54	*	532274	Chloroacetophenone (2-)						0.03							
55	*	108907	Chlorobenzene						1000							
56	*	510156	Chlorobenzilate			3.1E-05										
57		75456	Chlorodifluoromethane *(HCFC-22)*						50000							
58	*	67663	Chloroform			2.3E-05			300					150		
59	*	107302	Chloromethyl methyl ether			6.9E-04										
60		95830	Chloro-o-phenylenediamine (4-)			4.6E-06										
61		95692	Chloro-o-toluidine (p-)			7.7E-05										
62		76062	Chloropicrin						0.4					29		
63	*	126998	Chloroprene			5.0E-04			20							
64		75296	Chloropropane (2-)						100							
65	**		Chromic acid mists (Cr VI)						0.008							
66	**	18540299	Chromium VI (total)			1.2E-02										
67	**		Chromium VI dissolved aerosols						0.008							
68	**		Chromium VI particulates						0.1							
69	*		Cobalt			9.0E-03			0.006							
70	*	8007452	Coke oven emissions			6.2E-04										
71			Copper											100		
72		120718	Cresidine (p-)			4.3E-05										
73	*		Cresol mixtures						600							
74		98828	Cumene						400							

75		135206	Cupferron			6.3E-05										
76		110827	Cyclohexane											6000		
77	*	72559	DDE			9.7E-05										
78		50293	DDT			9.7E-05										
79		615054	Diaminoanisole (2,4-)			6.6E-06										
80		124481	Dibromochloromethane			2.7E-05										
81	*	96128	Dibromo-3-chloropropane (1,2-)			2.0E-03			0.2							
82		764410	Dichloro-2-butene (1,4-)			4.2E-03										
83		95501	Dichlorobenzene (1,2-)						200							
84	*	106467	Dichlorobenzene (1,4-)			1.1E-05			800							
85	*	91941	Dichlorobenzidine (3,3'-)			3.4E-04										
86		75718	Dichlorodifluoromethane						100							
87	*	111444	Dichloroethyl ether			3.3E-04										
88	*	542756	Dichloropropene (1,3-)			4.0E-06			20							
89	*	62737	Dichlorvos			8.3E-05			0.5							
90		77736	Dicyclopentadiene						0.3							
91		60571	Dieldrin			4.6E-03										
92			Diesel particulate matter			3.0E-04			5							
93	*	111422	Diethanolamine						3							
94		112345	Diethylene glycol monobutyl ether						0.1							
95		75376	Difluoroethane (1,1-)						40000							
96	*	77781	Dimethyl sulfate			4.0E-03										
97	*	60117	Dimethylaminoazobenzene (4-)			1.3E-03										
98	*	79447	Dimethylcarbamyl chloride			3.7E-03										
99	*	68122	Dimethylformamide (N,N-)						30							
100	*	57147	Dimethylhydrazine (1,1-)						0.002							
101		540738	Dimethylhydrazine (1,2-)			1.6E-01										
102	*	121142	Dinitrotoluene (2,4-)			8.9E-05										
103	*	123911	Dioxane (1,4-)			5.0E-06			30					3000		
104	*		Dioxin						See footnote "a"							
105	*	122667	Diphenylhydrazine (1,2-)			2.2E-04										
106	*	106898	Epichlorohydrin			1.2E-06			1					1300		
107	*	106887	Epoxybutane (1,2-)						20							
108	*	140885	Ethyl acrylate						8							
109	*	100414	Ethylbenzene			2.5E-06								1000		
110	*	51796	Ethyl carbamate			2.9E-04										
111	*	75003	Ethyl chloride											10000		
112	*	106934	Ethylene dibromide	4.6E-05	1.8E-04	6.0E-04	**1.1E-07**	**Negl.**	0.8	**2.2E-04**	**Negl.**	9.1E-04	0.264018			
113	*	107062	Ethylene dichloride			2.6E-05			400							
114	*	107211	Ethylene glycol						400							
115		111762	Ethylene glycol monobutyl ether						82					4700		
116	**	110805	Ethylene glycol monoethyl ether						200					370		
117	**	111159	Ethylene glycol monoethyl ether acetate						300					140		
118	**	109864	Ethylene glycol monomethyl ether						20					93		
119	**	110496	Ethylene glycol monomethyl ether acetate						90							
120	*	75218	Ethylene oxide			5.0E-03			30					42		
121	*	96457	Ethylene thiourea			1.3E-05										
122	*	151564	Ethyleneimine			1.9E-02										
123	*	75343	Ethylidene dichloride			1.6E-06			500							
124		16984488	Fluoride						13							
125	*	50000	Formaldehyde	5.9E-02	2.3E-01	1.3E-05	**3.0E-06**	**FER**	9	**2.5E-02**	**Negl.**	1.2E+00	338.9862	55	**6.2E+00**	**FER**
126		98011	Furfural						50							
127			Gasoline vapors			1.0E-06			15							
128		111308	Glutaraldehyde						0.08					4.1		
129		765344	Glycidaldehyde						1							
130	*	76448	Heptachlor			1.3E-03										
131		1024573	Heptachlor epoxide			2.6E-03										
132	*	118741	Hexachlorobenzene			4.6E-04										
133	*	87683	Hexachlorobutadiene			2.2E-05										
134	**	319846	Hexachlorocyclohexane (alpha-)			1.8E-03										
135	**	319857	Hexachlorocyclohexane (beta-)			5.3E-04										
136	*	58899	Hexachlorocyclohexane (gamma-)			3.1E-04										
137	**	608731	Hexachlorocyclohexane (technical grade)			5.1E-04										
138	*	77474	Hexachlorocyclopentadiene						0.2							
139		19408743	Hexachlorodibenzo-p-dioxin, mixture			1.3E+00										
140	*	67721	Hexachloroethane			1.1E-05			30							
141	*	822060	Hexamethylene diisocyanate						0.01							
142	*	110543	Hexane (N-)						700							
143	*	302012	Hydrazine			4.9E-03			0.2					10		
144		10034932	Hydrazine sulfate			4.9E-03										
145	*	7647010	Hydrogen chloride						20					2100		
146	**	74908	Hydrogen cyanide						0.8					340		
147	*	7664393	Hydrogen fluoride						14					240		
148	**	7783075	Hydrogen selenide											5		
149		7783064	Hydrogen sulfide						2					98		
150	*	78591	Isophorone						2000							
151		67630	Isopropanol											3200		
152	*		Lead			1.2E-05								0.1		
153	*	108316	Maleic anhydride						0.7							
154	*		Manganese						0.05					0.17		
155	*		Mercury (elemental)						0.3							
156	*	7439976	Mercury (inorganic)						0.03					0.6		
157		126987	Methacrylonitrile						0.7							
158	*	67561	Methanol						4000					28000		
159	*	74839	Methyl bromide						5					3900		
160	*	74873	Methyl chloride			1.8E-06			90							
161	*	71556	Methyl chloroform						1000					9000		
162		78933	Methyl ethyl ketone						5000					13000		
163	*	108101	Methyl isobutyl ketone											3000		
164	*	624839	Methyl isocyanate						1							
165	*	80626	Methyl methacrylate						700							
166		25013154	Methyl styrene (mixed isomers)						40							
167	*	1634044	Methyl tert butyl ether			2.6E-07			3000							
168		108872	Methylcyclohexane						3000							
169	*	101144	Methylene bis(2-chloroaniline) (4,4'-)			4.3E-04										
170	*	75092	Methylene chloride			1.3E-08			600					14000		
171	*	101779	Methylenedianiline (4,4-)			4.6E-04			20							
172	*	101688	Methylenediphenyl diisocyanate (4,4'-)						0.08					12		
173	*	60344	Methylhydrazine			1.0E-03			0.02							
174		90948	Michler's ketone			2.5E-04										
175	*		Mineral fibers (<1% free silica)						24							
176	*	91203	Naphthalene			3.4E-05			3							
177	*		Nickel and compounds			4.8E-04			0.014					0.2		
178	**	1313991	Nickel oxide						0.02							
179	**		Nickel refinery dust			2.4E-04										
180	**		Nickel, soluble salts						0.2							
181	**	12035722	Nickel subsulfide			4.8E-04										
182		7697372	Nitric acid											86		
183		88744	Nitroaniline (o-)						0.05							

184	*	98953	Nitrobenzene			4.0E-05			9							
185	*	79469	Nitropropane (2-)			2.7E-03			20							
186		55185	Nitrosodiethylamine (N-)			4.3E-02										
187	*	62759	Nitrosodimethylamine (N-)			1.4E-02										
188		924163	Nitrosodi-n-butylamine (N-)			1.6E-03										
189		621647	Nitrosodi-n-propylamine (N-)			2.0E-03										
190		86306	Nitrosodiphenylamine (N-)			2.6E-06										
191		156105	Nitrosodiphenylamine (p-)			6.3E-06										
192		10595956	Nitrosomethylethylamine (N-)			6.3E-03										
193	*	59892	Nitrosomorpholine (N-)			1.9E-03										
194		759739	Nitroso-n-ethylurea (N-)			7.7E-03										
195	*	684935	Nitroso-n-methylurea (N-)			3.4E-02										
196		100754	Nitrosopiperidine (N-)			2.7E-03										
197		930552	Nitrosopyrrolidine (N-)			6.1E-04										
198	*	87865	Pentachlorophenol			5.1E-06										
199	*	108952	Phenol						200					5800		
200	*	75445	Phosgene						0.3					4		
201	*	7803512	Phosphine						0.3					70		
202	*	7664382	Phosphoric acid						10							
203	*		Phosphorus (white)						0.07							
204	*	85449	Phthalic anhydride						20							
205	*	1336363	Polychlorinated biphenyls (PCBs)			1.0E-04										
206	*		Polycyclic aromatic hydrocarbons (PAHs)						See footnote "b"							
207	*		Polycylic organic matter (POM)													
208		7758012	Potassium bromate			1.4E-04										
209	*	1120714	Propane sultone (1,3-)			6.9E-04										
210	*	57578	Propiolactone (beta-)			4.0E-03										
211	*	123386	Propionaldehyde						8							
212		115071	Propylene						3000							
213	*	78875	Propylene dichloride			1.0E-05			4							
214		107982	Propylene glycol monomethyl ether						2000							
215	*	75569	Propylene oxide			3.7E-06			30					3100		
216	**		Selenium and compounds						20							
217		7631869	Silica (crystalline, respirable)						3							
218		1310732	Sodium hydroxide											8		
219	*	100425	Styrene			5.7E-07			1000					21000		
220	*	96093	Styrene oxide			4.6E-05										
221			Sulfates											120		
222		7664939	Sulfuric acid						1					120		
223	*	1746016	Tetrachlorodibenzo(p)dioxin (2,3,7,8-)			3.8E+01			0.00004							
224		630206	Tetrachloroethane (1,1,1,2-)			7.4E-06										
225	*	79345	Tetrachloroethane (1,1,2,2-)			5.8E-05										
226	*	127184	Tetrachloroethylene			6.1E-06			40					20000		
227		811972	Tetrafluoroethane (1,1,1,2-)						80000							
228		109999	Tetrahydrofuran						2000							
229		62555	Thioacetamide			1.7E-03										
230	*	7550450	Titanium tetrachloride						0.1							
231	*	108883	Toluene						3760					7520		
232	*	584849	Toluene diisocyanate (2,4-)			1.1E-05			0.008					2		
233	*	26471625	Toluene diisocyanate (2,4-/2,6-)			1.1E-05			0.008					2		
234	*	91087	Toluene diisocyanate (2,6-)			1.1E-05			0.008					2		
235	*	95807	Toluene-2,4-diamine			1.1E-03										
236	*	95534	Toluidine (o-)			5.1E-05										
237	*	8001352	Toxaphene			3.2E-04										
238		76131	Trichloro-1,2,2-trifluoroethane (1,1,2-)						30000							
239	*	120821	Trichlorobenzene (1,2,4-)						2							
240	*	79005	Trichloroethane (1,1,2-)			1.6E-05										
241	*	79016	Trichloroethylene			4.8E-06			2					2		
242		75694	Trichlorofluoromethane						700							
243	*	88062	Trichlorophenol (2,4,6-)			3.1E-06										
244	*	121448	Triethylamine						7					2800		
245	*	1582098	Trifluralin			2.2E-06										
246		526738	Trimethylbenzene (1,2,3-)						60							
247		95636	Trimethylbenzene (1,2,4-)						60							
248		108678	Trimethylbenzene (1,3,5-)						60							
249		25551137	Trimethylbenzene (1,2,3-/1,2,4-/1,3,5-)						60							
250		7440622	Vanadium						0.1					0.8		
251		1314621	Vanadium pentoxide											30		
252	*	108054	Vinyl acetate						200							
253	*	593602	Vinyl bromide			3.2E-05			3							
254	*	75014	Vinyl chloride			8.8E-06			100					180000		
255	*	75354	Vinylidene chloride						200							
256	*		Xylene (m-,o-,p-, or mixed isomers)						100					22000		

If any calculated long-term or short-term effects for an air toxic result in "Further Evaluation Required" (FER) on this Risk Screening Worksheet, a Refined Risk Assessment is required for that air toxic.

NOTE:

* **Clean Air Act hazardous air pollutant**

** **Clean Air Act hazardous air pollutant, but not listed individually (part of a group)**

a Dioxins may be considered to be all 2,3,7,8-tetrachlorodibenzo(p)dioxin), or separated into congeners (contact AQEv).

b PAH or POM may be considered to be all benzo(a)pyrene, or separated into individual PAHs (contact AQEv).

The results are determined by comparing the long-term and short-term effects to the single-source thresholds, listed below.
The threshold value of negligible risk for incremental risk (IR) is 1 in a million (1.0E-06). An IR value less than or equal to 1 in million is considered negligible.
The threshold value of negligible risk for long-term hazard quotient (HQ) for non-carcinogenic risk is 1.0. An HQ less than or equal to 1.0 is considered negligible.
The threshold value of negligible risk for short-term hazard quotient (HQ_{st}) for non-carcinogenic risk is 1.0. An HQ_{st} less than or equal to 1.0 is considered negligible.

APPENDIX H

Draft Air Quality Modeling Protocol

Table of Contents

List of Figures

List of Tables

CDM Smith

Appendix H

PVSC SPGF Draft Dispersion Modeling Protocol

H.1 Purpose

Passaic Valley Sewerage Commission (PVSC) is applying for a pre-construction permit to install three (3) combustion turbine generators (CTGs) each with a maximum gross output of 28 MW and two (2) 2,000 kW standby natural gas-fired generators (stationary combustion engines) black start generators (BSGs). Pursuant to N.J.A.C. 7:27-8.5(b), all preconstruction applications require a health risk assessment if the maximum potential of emit for the Hazardous Air Pollutants (HAPs) exceeds the reporting thresholds in Subchapter 17 for each new or modified equipment for the proposed project.

As shown in the **Appendix B**, maximum potential to emit calculations, the maximum potential of emit for formaldehyde and acrolein exceed the reporting thresholds in N.J.A.C. 7:27-17 for each CTG for steady-state, startup and shutdown conditions. A Level 1 Risk Analysis was conducted using the NJDEP's "Risk Screening Worksheet for Carcinogenic and Non carcinogenic Effects and Short-term Effects" updated June 2020. As shown in **Appendix H**, a negligible risk was determined for acrolein for CTGs. However, further evaluation is required for formaldehyde for CTGs for when operating in steady-state, startup and shutdown.

Similarly, the maximum potential to emit for acrolein, formaldehyde and ethylene dibromide exceed the reporting thresholds in N.J.A. C. 7:27-17 for each BSG. A Level 1 risk analysis was conducted using the NJDEP's "Risk Screening Worksheet for Carcinogenic and Non carcinogenic Effects and Short-term Effects" updated June 2020. As shown in **Appendix H**, a negligible risk was determined for ethylene dibromide for BSGs. However, further evaluation is required for formaldehyde and acrolein for BSGs.

A refined dispersion modeling is required for those Hazardous Air Pollutants (HAPs) that did not pass the Level 1 risk analysis and were determined as "Further Evaluation Required" (FER). These pollutants that did not pass would have to undergo refined modeling to demonstrate the project's compliance with NJDEP's requirement for negligible risk. Level 2 risk analysis requires that the risk resulting from the maximum ground level concentrations from the proposed project equipment for the pollutants with "FER" would be "negligible" – i.e., below the evaluation criteria in the NJDEP's Risk Screening Policy for long-term cancer risk, long-term non-cancer health hazard, and short-term non-cancer health hazard.[1] A refined dispersion modeling for health risk assessment will be conducted for the two individual HAPs formaldehyde and acrolein, as these two were determined as FER in Level 1 risk analysis.

The NJDEP policy requires that the Facility must submit an atmospheric dispersion modeling protocol in accordance with procedures outlined in the Technical Manual 1002 "Guidance on Preparing an Air Quality Modeling Protocol.[2]" The protocol must be approved by the Department

[1] https://www.state.nj.us/dep/aqpp/downloads/techman/1003.pdf

[2] [2] https://www.state.nj.us/dep/aqpp/permitguide/ProceduresToConductRiskAssess.pdf

before the refined modeling study is performed. Based on an email guidance from NJDEP dated August 20, 2020, PVSC has opted to perform a preliminary refined risk assessment. Following sections presents the dispersion modeling approach and a draft modeling protocol for the refined modeling analysis for health risk assessment. This protocol follows the NJDEP Technical Manual TM1002 guidance on preparing an Air Quality modeling protocol and the second-level risk assessment analysis follows the NJDEP Technical Manual TM 1003 Guidance on preparing a risk assessment for air contaminant emissions.[3]

H.2 Air Quality Modeling Methodology

H.2.1 Model Selection

A refined dispersion modeling will be conducted using the most recent executable file available version of the U.S.EPA AERMOD version 19191. The graphical user interface, AERMOD View 9.9 created by Lakes Environmental Software, will be used to facilitate model setup and post-processing.

Following input parameters will be selected to conduct dispersion modeling.

H.2.1.1 Meteorology and Climate

The Newark area can be classified as having a humid subtropical and humid continental climate with cold winters and hot humid summers. Annual average daily temperatures range from about 46.5°F (min) to 63.1°F (max) and the area receives an average of about 46.2 inches per year of rainfall and average of about 29.5 inches per year of snowfall. Winds are predominantly blowing from the southwest to northeast.

The most recent five years of pre-processed meteorological data (surface and upper air from 2013 through 2017) were obtained from NJDEP for the Newark Liberty International Airport - EWR (Station No. 14734) meteorological stations

H.2.1.2 Terrain Description

The terrain near the Facility is generally flat, with elevations ranging from 0 feet above mean sea level to 60 feet above sea level within one kilometer of the Facility. To the north, west and south, the terrain remains generally flat, with little to no variation in elevation. To the east is the Newark Bay where the elevations approach sea level.

AERMAP Version 18081 will be used to process the terrain data for the air quality modeling analysis. National Elevation Dataset (NED) terrain data files from the United States Geological Survey will be obtained and processed. A USGS DEM file 7.5 min US ~ 30 m will be obtained from USGS National Map Seamless Server.

H.2.1.3 Selection of Dispersion Coefficients

Section 8.2.3 of Appendix W to 40 CFR Part 51 ("Guideline on Air Quality Models") describes the acceptable procedures to determine whether rural or urban dispersion coefficients should be used in the model. These include a land use classification procedure or a population-based

[3] https://www.state.nj.us/dep/aqpp/permitguide/ProceduresToConductRiskAssess.pdf

procedure to determine whether the character of an area is primarily urban or rural. The two procedures are outlined below:

- Land Use Procedure: Classify the land use within a three-kilometer (3-km) radius of the source based on the categories shown. If Land Use Types I1, I2, C1, R2, and R3 account for 50 percent or more of the area, use urban dispersion coefficients; otherwise, use rural dispersion coefficients.

- Population Density Procedure: Calculate the average population density within a 3-km radius of the source. If the population density is greater than 750 people/km^2, use urban dispersion coefficients; otherwise use rural dispersion coefficients.

For this project, a population density procedure has been used to determine the dispersion coefficients. The facility is in Newark city located in Essex County. The population for Newark City is 282,011[4] based on population estimates provided in U.S. Census Bureau. The land area for Newark City is 62.6 km^2, based on Wikipedia[5]. The population density is calculated as 4,501 people/km^2 which is greater than 750 people/km^2, therefore urban dispersion coefficients will be used in the model with the population of 282,011.

H.3 Model Set up

H.3.1 Model Layout

Figure 1 shows a U.S. Geological Survey topographic map of the area and the vicinity of the Facility. **Figure 2** presents a detailed layout of the Facility with the location of the Ironbound District. The property boundary line is also shown in this figure. **Figure 3** presents a layout of the buildings at the PVSC site (including the proposed SPGF building), as inputted into the model. A list of these buildings and their dimensions is presented below in **Table H-1.** The Building Profile Input Program (BPIP-PRIME) will be implemented to account for each building's potential zone of influence and building downwash effects on each stack. Three of the buildings noted below were chosen as inactive as no building downwash effects were observed on the proposed stacks.

Table H-1 Building Base Elevations and Heights

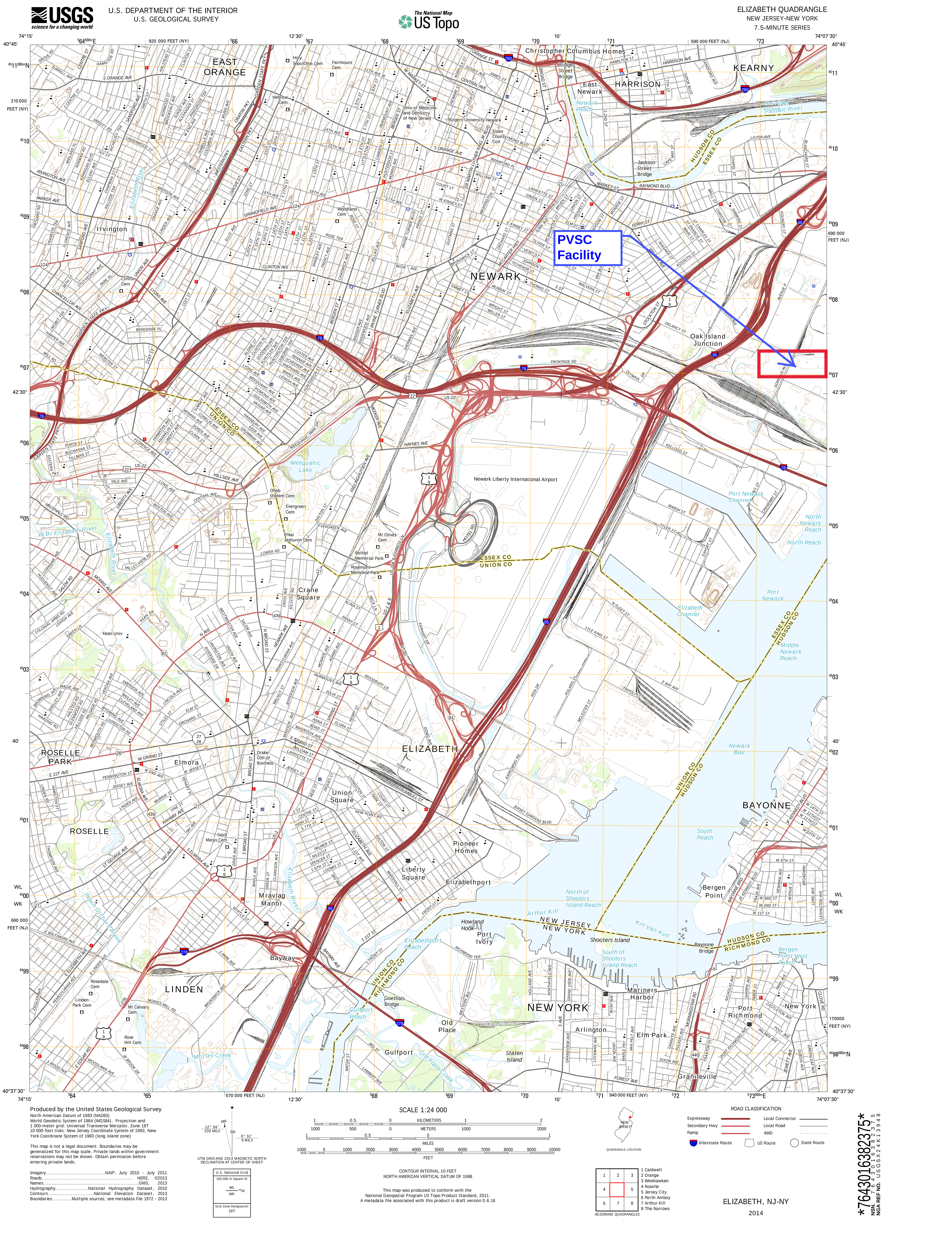
Building ID	Building Name	Tier No.	Base Elevation (meters)	Building Tier Height (meters)	Active/Inactive
MAINT SHED	Maint Shed 1	1	1.72	3.35	Inactive
MAINT SHED2	Maint Shed 2	1	2.78	4.57	Inactive
EXISTING BLDG	Existing bldg	1	2.57	11.28	Inactive
NJ TRANSIT BLDG ALL	Full warehouse	1	3.83	9.75	Active
BLD_7	Proposed SPGF Building Tier 1	1	2.81	20.12	Active

[4] U.S. Census Bureau Quick Facts for Newark City, New Jersey, Essex County, NJ, Population estimates, July 1, 2019: https://www.census.gov/quickfacts/fact/table/newarkcitynewjersey,essexcountynewjersey,NJ/PST045219 (Accessed on October 22, 2020)

[5] Land Area obtained from https://en.wikipedia.org/wiki/Newark,_New_Jersey (Accessed October 22, 2020)

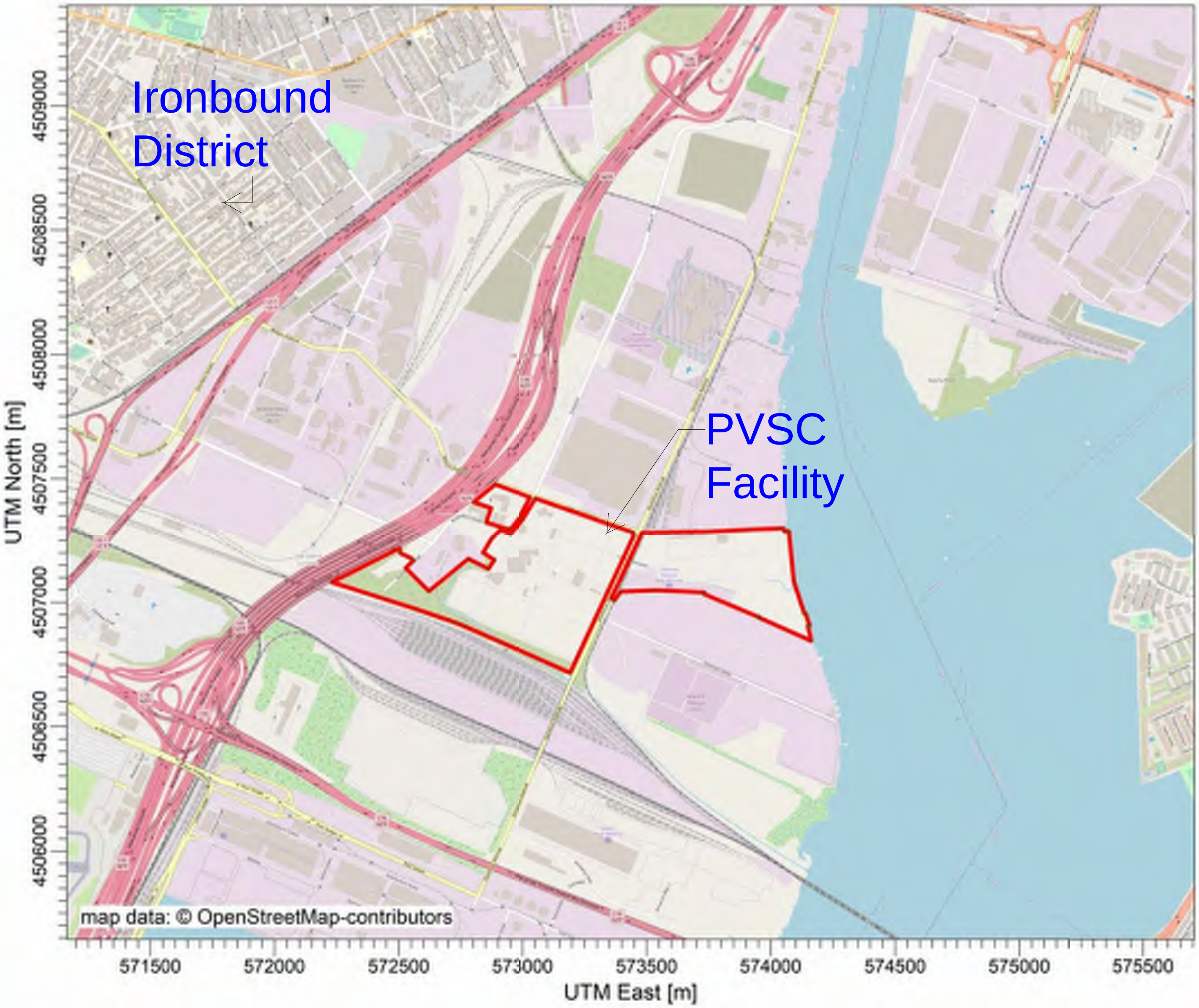
Building ID	Building Name	Tier No.	Base Elevation (meters)	Building Tier Height (meters)	Active/Inactive
BLD_7	Proposed SPGF Building Tier 2	2	2.81	23.26	Active

Figure 1 USGS Topographic Map



PROJECT TITLE:

PVSC SPGF Dispersion Modeling Protocol
Figure 2 Facility Layout



COMMENTS:

SOURCES:

5

RECEPTORS:

2110

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

11/5/2020

SCALE: 1:25,606

0 — 0.5 km

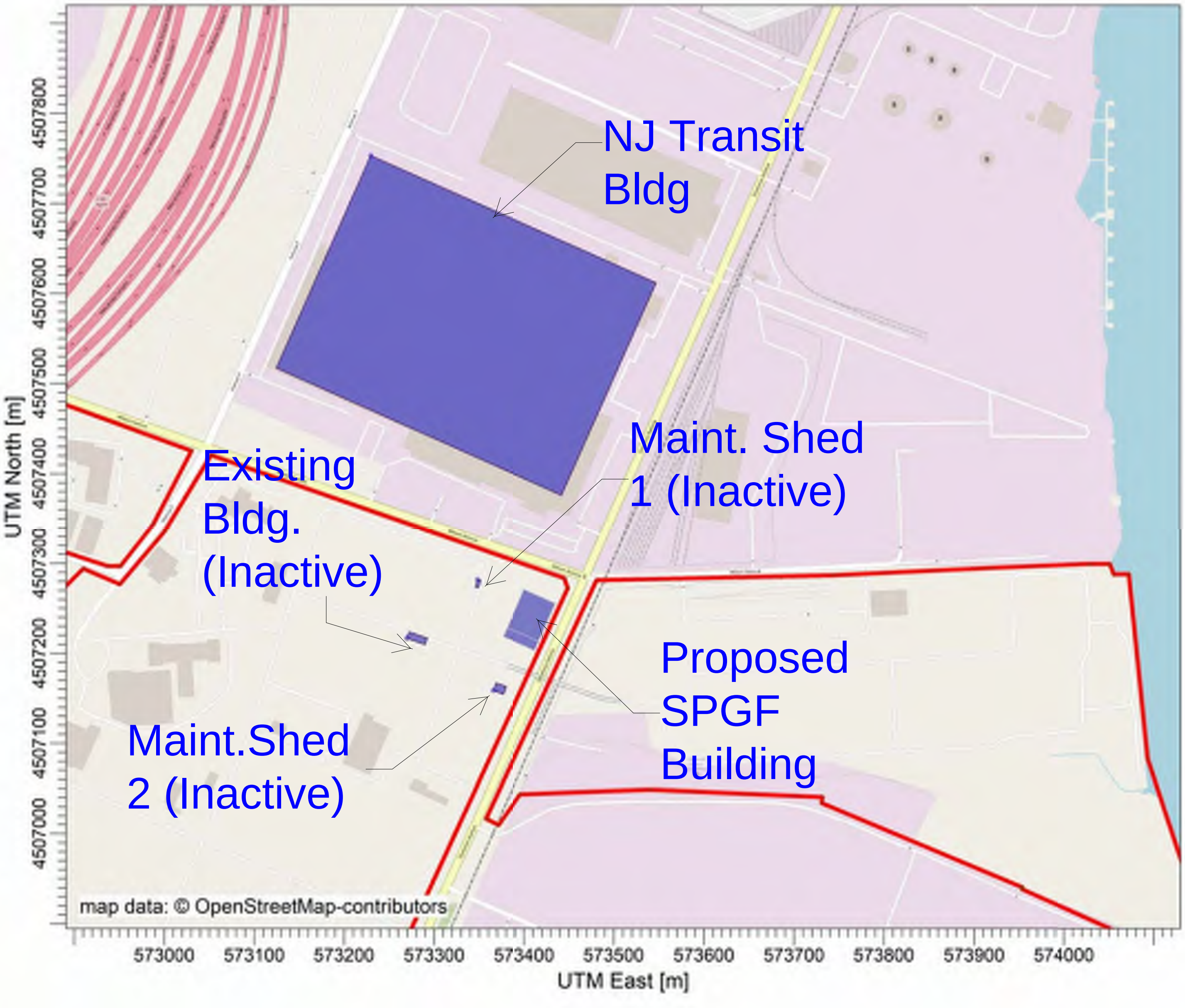
CDM Smith

PROJECT NO.:

215015

PROJECT TITLE:

PVSC SPGF Dispersion Modeling Protocol
Figure 3 Building Layout



COMMENTS:

5

2110

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

11/5/2020

SCALE: 1:6,981

0 — 0.2 km

PROJECT NO.:

215015

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_BasicPlots\PVSC_BasicPlots.isc

H.3.2. Emission Source Data

The proposed Project emission sources, as shown in **Table H-2**, are:

- Three Combustion Turbine Generators
- Two Black Start Generators

Detailed Maximum potential to emit (PTE) calculations for the proposed equipment and operating scenarios are presented in **Appendix B** of the application package**.** The location of CTGs and BSGs is depicted in **Figure 4**. All proposed stacks will be modeled as point sources in AERMOD.

Table H-2 Proposed Emission Sources

Model Stack ID	Emission Unit and Emission Point NJID (per RADIUS forms)	Model Source Description	Emission Unit Description in RADIUS forms
CTG-1	E3001/PT301	Combustion Turbine Generator # 1	NG Turbine 1 – 28 MWe Natural Gas Turbine 1
CTG-2	E3002 /PT302	Combustion Turbine Generator # 2	NG Turbine 2 – 28 MWe Natural Gas Turbine 2
CTG-3	E3003/PT303	Combustion Turbine Generator # 3	NG Turbine 3 – 28 MWe Natural Gas Turbine 3
BSG-1	E3004/PT304	Black Start Generator # 1	NG Engine 1 – 2000 kW Natural Gas Black Start Engine 1
BSG-2	E3005/PT302	Black Start Generator # 2	NG Engine 2 – 2000 kW Natural Gas Black Start Engine 2

H.3.2.1 Emission Source Operating Structure

The non-emergency operation of the SPGF would not exceed 592 hours/year (facility operating hours). In addition, all three combustion gas turbines together will be limited to 1,284 hours/year (machine operating hours) for all proposed non-emergency operating scenarios combined. PVSC is proposing to limit the operating hours for all three turbines together to 1,284 hours/year to restrict the facility's annual maximum potential emission rates. In this operating structure, any one of the three turbines could operate up to 592 hours/year; however, the combined operating hours for all three turbines would not exceed 1,284 hours/year.

Black-start generators allow the CTGs to be started up when the grid is down which is an emergency operation. The non-emergency operation of the black-start generators will be limited to 100 hours per year per generator for readiness testing and maintenance. Therefore, the maximum potential non-emergency operation per BSG would not exceed 100 hours per year. PVSC is proposing to request a permit condition in which both BSGs would not be exercised (in non-emergency operation) at the same time when the two CTGs are operating at 592 hours each, and the third turbine could be operating at 100 hours.

PROJECT TITLE:

PVSC SPGF Dispersion Modeling Protocol
Figure 3 Proposed Stack Layout

COMMENTS:

5

2110

COMPANY NAME:

CDM Smith

MODELER:

Disha Shah

DATE:

11/5/2020

SCALE: 1:1,617

0 0.04 km

CDM Smith

PROJECT NO.:

215015

H.3.3 Combustion Turbine Generators

H.3.3.1 Steady-state Load Screening Analysis

The stack parameters for three CTGs at steady-state are provided in **Table H-3**. The stack parameters were obtained from the vendor for steady-state operation. A load screening analysis with unit emission rates and stack parameters in Table H-3 was conducted to determine which exhaust parameters will result in maximum ground level concentration predictions.

Table H-3 CTG Stack Parameters

Parameter	Unit	CTG Stacks 1, 2, 3		
		100%	75%	50%
Stack Base Elevation	feet (above mean sea level)	AERMAP calculated	AERMAP calculated	AERMAP calculated
Stack Flow Rate	actual cubic feet/minute	189,214	144,724	122,125
Stack Gas Temperature	degrees Fahrenheit	840	830	825
Stack Gas Velocity	feet per second	100.30	76.13	63.99
Stack Inside Diameter	meters	3.048	3.048	3.048
Stack Height	feet	106	106	106
Load Screening Analysis Emission Rate	g/s	1	0.75	0.5

As shown in **Table H-4**, the maximum predicted concentration results of load screening analysis indicated that 100% load scenario is worst case for the short-term averaging period for each CTG, whereas, 75% load scenario is worst case for the annual averaging period for each CTG.

Table H-4 CTG Steady-state Load Screening Model Results

Source Group	Load%	Equipment ID	Max. Predicted Conc. (µg/m^3)	Max. Predicted Conc. (µg/m^3)
			1-hour Averaging Period	Annual Averaging Period
CT1SS100	CTG1	100	**16.4029**	0.5327
CT2SS100	CTG2	100	**13.5543**	0.7334
CT3SS100	CTG3	100	**16.4694**	0.6503
CT1SS75	CTG1	75	15.1193	**0.8036**
CT2SS75	CTG2	75	12.6281	**0.9669**
CT3SS75	CTG3	75	14.8571	**0.9602**
CT1SS50	CTG1	50	11.4458	0.7293
CT2SS50	CTG2	50	9.4676	0.8685
CT3SS50	CTG3	50	11.0141	0.8923

H.3.3.2 Startup and Shutdown Analysis

For startup and shutdown analysis, a load screening will not be conducted. Instead, all possible operating scenario combinations will be modeled. The stack parameters were obtained from the vendor for startup and shutdown operation. It is assumed that the 50% load condition represents the transient conditions occurring during startup and shutdown. The stack parameters and emission rates for startup and shutdown events are provided in **Table H-5**.

Table H-5 CTG Stack Parameters for Startup and Shutdown

Parameter	Unit	CTG Stacks 1, 2, 3 Startup and Shutdown
		50% Load (No Emission Control)
Stack Base Elevation	feet (above mean sea level)	AERMAP calculated
Stack Flow Rate	actual cubic feet/minute	257,579
Stack Gas Temperature	degrees Fahrenheit	900
Stack Gas Velocity	feet per second	54.66
Stack Inside Diameter	meters	3.048
Stack Height	feet	106
Formaldehyde Emission Rate (Startup)	lb/event	0.88
Formaldehyde Emission Rate (Shutdown)	lb/event	0.805

Each CTG startup event is assumed to take up to 25 minutes from a cold condition to achieve steady-state operation, with no controls operating. During the remainder of 35 minutes in a startup hour, the turbine will be operating at steady-state with emission controls. Each CTG shutdown event is assumed to take up to 10 minutes from steady-state operation, with full emission controls operating, to shutdown with no controls. The smallest averaging period option available in AERMOD is one hour, therefore the following sections describe an approach that will be used to develop a health risk model for a full hour or 60 minutes averaging period that includes a startup or a shutdown event. These are defined as "Startup hour" and "Shutdown hour", as shown below in **Table H-6**.

Table H-6 Startup and Shutdown Hour Conditions

Parameter	Event Time
Startup Hour	25 minutes for startup with no control and remainder 35 minutes in steady-state with emission control
Shutdown Hour	10 minutes for shutdown with no control and remainder 50 minutes in steady-state with emission control

A startup hour and shutdown hour are assumed to occur during the 50% transient load condition, but the remainder of hour which operates under steady-state could occur at various partial loads such as 100%, 75% and 50%. A weighted average method was used to obtain stack parameters for the startup hour and shutdown hour, as shown in **Table H-7 and Table H-8** respectively. **Table H-9** presents the weighted average formaldehyde emission rates for startup hour and shutdown hour. These stack parameters and emission rates will be used in the health risk model to obtain maximum 1-hour predicted ground level concentrations for the startup hour and shutdown hour.

Table H-7 CTG Stack Parameters During Startup Hour Condition

Parameter	Unit	CTG Stacks 1, 2, 3 @ 50% Load start up event for 25 minutes with no control		
		Remainder 35 mins at 100% load steady-state with control	Remainder 35 mins at 75% load steady - state with control	Remainder 35 mins at 50% load steady-state with control
Stack Base Elevation	feet (above mean sea level)	AERMAP calculated	AERMAP calculated	AERMAP calculated
Stack Flow Rate	actual cubic feet/minute	383,048	316,595	283,233
Stack Gas Temperature	degrees Fahrenheit	866	860.17	857.25
Stack Gas Velocity	feet per second	81.29	67.18	60.10
Stack Inside Diameter	meters	3.048	3.048	3.048
Stack Height	feet	106	106	106

Table H-8 CTG Stack Parameters During Shutdown Hour Condition

Parameter	Unit	CTG Stacks 1, 2, 3 @ 50% Load shutdown event for 10 minutes with no control		
		Remainder 50 mins at 100% load steady-state with control	Remainder 50 mins at 75% load steady-state with control	Remainder 50 mins at 50% load steady-state with control
Stack Base Elevation	feet (above mean sea level)	AERMAP calculated	AERMAP calculated	AERMAP calculated
Stack Flow Rate	actual cubic feet/minute	436,821	341,888	294,227
Stack Gas Temperature	degrees Fahrenheit	851	842.67	838.50
Stack Gas Velocity	feet per second	92.70	72.55	62.44
Stack Inside Diameter	meters	3.048	3.048	3.048
Stack Height	feet	106	106	106

Table H-9 Proposed CTG Formaldehyde Short-term Emission Rates for Health Risk Model

Operating Scenario	Emission Units	CTG Stacks 1, 2, 3		
		100% load	75% load	50% load
Steady-state	lb/hr	0.15	0.12	0.09
	g/s	0.0189	0.0151	0.0113
Startup Hour	lb/hr	0.9675	0.95	0.9325
	g/s	0.1219	0.1197	0.1175
Shutdown Hour	lb/hr	0.93	0.905	0.88
	g/s	0.1172	0.1140	0.1109

H.3.4 Black Start Generators

H.3.4.1 Load Screening Analysis

The stack parameters for two emergency BSGs are provided in **Table H-10**. The stack parameters were obtained from the vendor. A load screening analysis with unit emission rates and stack parameters in Table H-10 was conducted to determine which exhaust parameters will result in maximum ground level concentration predictions.

Table H-10 BSG Stack Parameters

Parameter	Unit	BSG Stacks 1 and 2		
		100%	75%	50%
Stack Base Elevation	feet (above mean sea level)	AERMAP calculated	AERMAP calculated	AERMAP calculated
Stack Flow Rate	actual cubic feet/minute	16,371	12,837	9,468
Stack Gas Temperature	degrees Fahrenheit	881	889	920
Stack Gas Velocity	feet per second	124.57	97.68	72.04
Stack Inside Diameter	meters	0.509	0.509	0.509
Stack Height	feet	78.07	78.07	78.07
Load Screening Analysis Emission Rate	g/s	1	0.75	0.5

As shown in **Table H-11**, the maximum predicted concentration results of load screening analysis indicated that 100% load scenario is worst case for both, the short-term averaging period and annual averaging period for each BSG.

Table H-11 BSG Load Screening Model Short-term Averaging Period Results

Source Group	Load%	Equipment ID	Max. Predicted Conc. (µg/m^3)	Max. Predicted Conc. (µg/m^3)
			1-hour Averaging Period	Annual Averaging Period
BSG1_100	BSG1	100	**93.1654**	**18.8973**
BSG2_100	BSG2	100	**88.3156**	**21.2858**
BSG1_75	BSG1	75	75.8831	16.4147
BSG2_75	BSG2	75	75.3925	18.3504
BSG1_50	BSG1	50	55.4709	12.6778
BSG2_50	BSG2	50	59.5070	14.1293

H.3.4 Averaging Periods

The averaging periods and modeled value outputs that will be used in the model are described in **Table H-12**.

Table H-12 Modeled Value Selection

Pollutant	Risk Assessment Category	Averaging Period	Modeled Value Selection
Formaldehyde	Carcinogenic Incremental Cancer Risk (IR)	Annual	5-yr annual average concentration (from 5-year met dataset)
Formaldehyde	Hazard Quotient (HQ) (Long-term) Non-cancer risk	Annual	Maximum Annual concentration (from 5- year met dataset)
Formaldehyde	HQ (Short-term) Non-cancer risk	1-hour	Maximum 1-hour concentration
Acrolein	HQ (Short-term) Non-cancer risk	1-hour	Maximum 1-hour concentration

H.3.5 Health Risk Assessment

H.3.5.1 Cancer Risk

Based on TM1002, Section 10.1, for a refined risk assessment, chronic health risks should be calculated based on a five-year average (43,800 hours) concentration. Therefore, incremental cancer risk (IR) for formaldehyde is determined by multiplying the five-year average modeled air concentration (averaged over five years of met data) predicted by AERMOD with the air toxic-specific inhalation Unit Risk Factor (URF) value.

$$\textbf{Cancer Risk} = C \times URF$$

where:

C = 5-year average air concentration from AERMOD (µg/m^3), of the unique air toxic

URF = Inhalation unit risk factor (µg/m^3)$^{-1}$, of the unique air toxic

H.3.5.2 Short-term and Long-term Non-cancer Risk (Hazard Quotient)

The hazard quotient for long-term non-cancer risk for formaldehyde will be calculated by dividing the maximum annual average modeled air concentration (from five years of met data) predicted by AERMOD by the long-term air toxic-specific reference concentration (RfC).

Hazard Quotient = C/RfC

where:

C = Maximum annual average ambient air concentration from AERMOD (μg/m^3), of formaldehyde

RfC = Reference concentration (μg/m^3), of the Formaldehyde.

Based on TM1002, Section 10.1, for calculating acute health risks, the maximum air toxic specific short-term concentration modeled should be used. Therefore, the following equation is used to assess short-term non-cancer risk.

$$\textbf{Hazard Quotient}_{\textbf{short-term}} = C_{st}/RfC_{st}$$

where:

C_{st} = Short-term average ambient air concentration from AERMOD (μg/m^3), of the unique air toxic

RfC_{st} = Short-term reference concentration (μg/m^3), of the unique air toxic

The averaging periods, URF, RfC and risk thresholds for each air toxic is summarized in **Table H-13**. If all evaluated health risks fall into the “negligible” category, no further risk assessment is needed.

Table H-13 NJDEP Toxicity Values for Inhalation Exposure

Pollutant	Averaging Period	URF	RfC	Significant Risk Level
Formaldehyde	Long-term (5-yr or Annual)	1.3×10^{-5}	9	IR > 1E-6 and HQ_{lt} > 1
Formaldehyde	Short-term (1-hour)	-	55	HQ_{st} > 1
Acrolein	Short-ter (1-hour)	-	2.5	HQ_{st} > 1
IR = ? RfC = Reference Concentration URF = Unit Risk Factor				

IR=Incremental Cancer Risk; HQ_{lt}=Hazard Quotient Long-term; HQ_{st} = Hazard Quotient Short-term

Note: 1) Reference concentrations and Unit Risk Factor obtained from NJDEP's toxicity values for inhalation exposure, updated June 2020[6].

[6] Accessed here: https://www.state.nj.us/dep/aqpp/downloads/risk/ToxAll2020.pdf , on October 30. 2020

H.3.5 Receptor Network

The receptor network includes the property boundary (fence line) receptors and a multi-tier cartesian grid, based on NJDEP Technical Manual TM1002. The network was comprised of a total of 2,110 receptors, and included the following:

- Cartesian multi-tier receptor grid with a total of 1,830 ground-level receptors
    - Tier 1 – Every 50 m from center of the grid to 500 m
    - Tier 2 – Every 100 m up to 1,500 m
    - Tier 3 – Every 250 m up to 3,000 m
    - Tier 4 – Every 500 m up to 5,000 m
- Cartesian plant boundary with receptors along the PVSC fence line every 25 meters for a total of 280 ground-level receptors.

A visual representation of much of the receptor network can be seen in **Figure 5**. **Figure 6** shows general location of the Ironbound District and shows the location of the sensitive receptors. **Table H-14** provides a summary of location and description of the sensitive receptors that were selected.

Table H-14 Sensitive Receptor Locations

Receptor	Location		Type of Location
	Easting X (m)	Northing Y (m)	
Sensitive Receptor 1	572069.7	4508360.8	Ironbound District (Apartment Complex Building) 63 Rome St.
Sensitive Receptor 2	575421.1	4507060.7	Droyer's Point (Apartment Complex Building)
Sensitive Receptor 3	573414.0	4507360.7	N.J. Transit Bldg
Sensitive Receptor 4	573594.5	4507837.1	Delaney Hall Juvenile Detention Facility
Sensitive Receptor 5	573696.0	4508135.8	Essex County Correctional Facility
Sensitive Receptor 6	569890.6	4507237.1	North State Prison

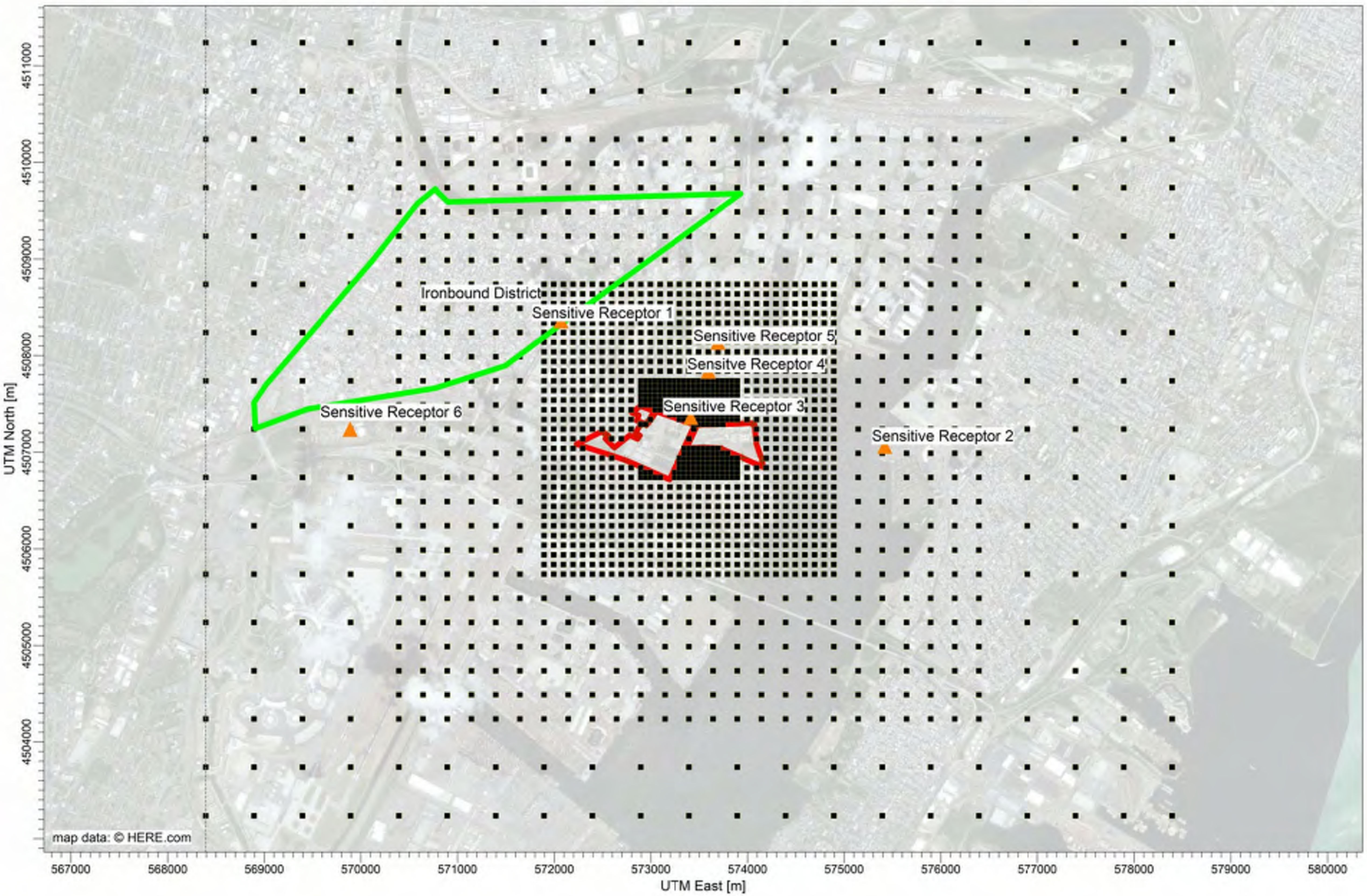
H.3.6 Health Risk Model Setup

Two separate CTG runs will be prepared to understand the maximum concentration impacts from a single turbine operating individually.

1) Formaldehyde (long-term or annual averaging period) for CTGs.
2) Formaldehyde (short-term or 1-hour averaging period) for CTGs for steady-state, startup and shutdown

PROJECT TITLE:

PVSC SPGF Dispersion Modeling Protocol
Figure 5 Receptor Layout



COMMENTS:

SOURCES:
5

RECEPTORS:
2110

COMPANY NAME:
CDM Smith

MODELER:
Disha Shah

DATE:
11/9/2020

SCALE: 1:42,132
0 — 1 km

CDM Smith

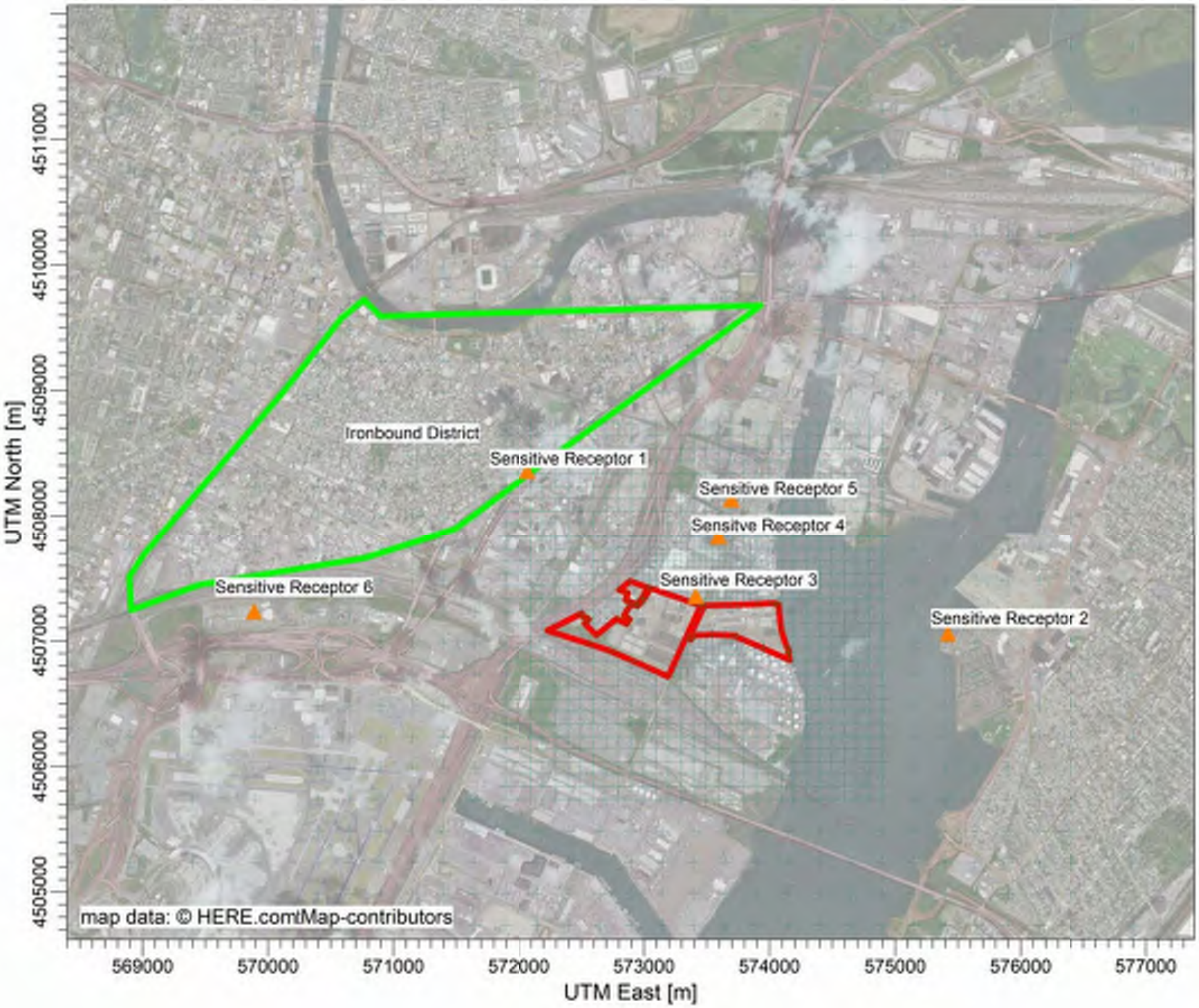
PROJECT NO.:
215015

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_BasicPlots\PVSC_BasicPlots.isc

PROJECT TITLE:

PVSC SPGF Dispersion Modeling Protocol
Figure 6 Sensitive Receptor Locations



COMMENTS:	
	5
	2110
COMPANY NAME:	**CDM Smith**
MODELER:	**Disha Shah**
DATE:	**11/5/2020**
SCALE:	1:50,680 (0 — 1 km)
PROJECT NO.:	**215015**

AERMOD View - Lakes Environmental Software

C:\Work\PVSC\AERMOD\PVSC_BasicPlots\PVSC_BasicPlots.isc

The refined health risk model for short-term averaging period for formaldehyde will be conducted with the 100% load scenario stack parameters and emission rates indicated in **Table H-15**.

Table H-15 Proposed CTG Formaldehyde Short-term Emission Rates (Steady State) for Health Risk Model

Operating Scenario	Emission Units	CTG Stack 1	CTG Stack 2	CTG Stack 3
		100% load	100% load	100% load
Steady-state	lb/hr	0.15	0.15	0.15
	g/s	0.0189	0.0189	0.0189

Further, the maximum predicted concentration results of load screening analysis indicated that 75% load scenario is worst case for the long-term (annual) averaging period for each CTG. Therefore, the refined health risk model for CTGs steady-state operating scenario will use long-term (annual and five-year) averaging period for formaldehyde and will be conducted with the 75% load scenario stack parameters and emission rates indicated in **Table H-16**.

Note, that the formaldehyde emission rates shown in Table H-16 in tons per year (tpy) represent annual combined CTG emissions that includes emissions from steady state, startup and shutdown operation, as shown in Appendix B Maximum PTE calculations. The tpy emissions have been converted to lb/hr using 8760 hours to determine an annualized lb/hr value.

Table H-16 Proposed CTG Formaldehyde Long-term (Annual and Five-Year) Emission Rates for Health Risk Model

Pollutant	Emission Units	CTG Stack 1	CTG Stack 2	CTG Stack 3
		75% load	75% load	75% load
Formaldehyde	tpy	0.0644	0.0644	0.0644
	lb/hr	0.0147	0.0147	0.0147
	g/s	0.0019	0.0019	0.0019

Two separate BSG model runs will be prepared for risk analysis.

1) Formaldehyde (long-term or annual averaging period) for BSGs

2) Formaldehyde and acrolein (short-term or 1-hour averaging period) for BSGs

The refined health risk model for BSGs that will be prepared for short-term (1-hour) averaging period for formaldehyde will use 100% load scenario stack parameters and emission rates indicated in **Table H-17**.

Table H-17 Proposed BSG Short-term Emission Rates for Health Risk Model

Pollutant	Emission Units	BSG Stack 1	BSG Stack 2
		100% load	100% load
Formaldehyde	lb/hr	1.1719	1.1719
	g/s	0.1477	0.1477
Acrolein	lb/hr	0.0961	0.0961
	g/s	0.0121	0.0121

The refined health risk model for BSGs that will be prepared for long-term (annual and five-year) averaging period for formaldehyde will use 100% load scenario stack parameters and emission rates indicated in **Table H-18**. Note, that the formaldehyde emission rates shown in Table H-18 in tons per year (tpy) represent annual emissions from BSG, as shown in Appendix B Maximum PTE calculations. The tpy emissions have been converted to lb/hr using 8760 hours to determine an annualized lb/hr value.

Table H-18 Proposed BSG Formaldehyde Long-term (Annual and Five-Year) Emission Rates for Health Risk Model

Pollutant	Emission Units	BSG Stack 1	BSG Stack 2
		100% load	100% load
Formaldehyde	tpy	0.0586	0.0586
	lb/hr	0.0134	0.0134
	g/s	0.0017	0.0017

In addition, a combined overall risk impact will be evaluated to understand the impacts of simultaneous operation of CTGs and BSGs from each air toxic.

Appendix I

Ironbound Community Corporation Public Information Session Meeting Summary

Appendix I

Ironbound Community Corporation Public Information Session Meeting Summary

Date: January 7, 2021, 11:00 A.M.
Location/Call in Details: WebEx On-Line Meeting
Project Name: Passaic Valley Sewerage Commission Standby Power Generation Facility – Title V Air Operating Permit Modification Application – Pre-Permit Public Information Session

Meeting Attendees:

Ironbound Community Corporation (ICC)
PVSC
AECOM/HDR JV: PVSC FEMA Resiliency Program Managers
Black & Veatch/CDM Smith: Engineer of Record

Meeting Objectives: To provide information to the ICC about the proposed Standby Power Generation Facility Project, and to seek ICC's input on the content of the permit application. The draft permit application had been provided to ICC for their review on December 14, 2020.

Items:

1. An overview of the Project background, purpose, and design of the Title V Permit Modification Application contents was presented. A copy of the presentation slides is attached. This information session was an early-stage opportunity for ICC to provide input in addition to the public comment period that would happen later in the process.

2. Following the presentation, ICC representatives provided verbal comments, summarized in the table below.

Comment No.	Comment	Response
1	Did the analysis investigate the potential for solar and battery storage combined, including an expanded footprint or using existing structures, as opposed to analyzing only storage or only solar?	Yes. With wind or solar, a 100% battery backup is required so that emergency power can always be provided, even if wind speed is low or storm clouds affect solar. The site constraint for any combination is primarily the quantity of batteries required to produce the maximum power requirements. An expanded footprint was considered as described in Section 3.2.1 of the Application.
2	Why was solar analysis done for entire year, rather than for the 2 weeks needed for a Superstorm Sandy event?	Section 3.2.2 of the Application has been revised. It shows that the total gross power output available from a solar PV system would meet at most 31% of the 34-MW demand during a Superstorm Sandy event. The system would also need full battery back-up.
3	Has there been consideration to install solar panel covers on the	Comment acknowledged. The Project itself would not contribute to odor emissions. In response to this

Comment No.	Comment	Response
	open sewage pits [primary and final settling tanks] to address odor? Would covering the pits help with reducing odors in the neighborhood?	comment, information has been added to the Application to note that PVSC has previously studied installing solar panel covers on the tanks and determined it would not be practical due to the need to access the tanks for maintenance.
4	ICC expressed concern about cumulative impacts in their community for odor and air quality. This project may be fine, but there will still be an impact.	Comment acknowledged. The analysis in the draft application is just for the Project. The analysis shows incremental air quality impact, not cumulative.
5	Would like additional information about formaldehyde impacts.	Additional information about the health endpoints for inhalation of formaldehyde and acrolein have been added in Section 6 of the Application.
6	What is PVSC's schedule to obtain site plan approval?	PVSC is exempt from obtaining site plan approval from the City of Newark.
7	ICC expressed concern about combined sewer overflows during storm events, and asked that PVSC consider green infrastructure for stormwater capture.	Comment acknowledged.
8	How much aqueous ammonia will be stored on-site? Asked about risk management plan. Will PVSC be creating a new type of hazard?	Aqueous ammonia would be at 19% dilution in a 10,000-gallon storage tank; typical delivery truck is approximately 6,700 gallons. PVSC has an Emergency Response Plan and a Discharge Prevention Containment and Countermeasure Plan (DPCC) for reporting and monitoring of all chemicals onsite. This tank would be included. Ammonia dilution is below the regulatory threshold for required risk management plan. However, PVSC would have monitoring, leak detection and risk mitigation.
9	Will the 2015 FEMA NEPA Environmental Assessment for this project be updated?	No.
10	Was the greenhouse gas analysis compared to entire grid and average emission rates from the whole grid?	The Project's greenhouse gas emissions were compared only with those for peak power production on the grid, because those are the times the Project would displace power from the grid.
11	Did the analysis take into account the goals of the NJ Energy Master Plan? NJ PACT?	The greenhouse gas analysis found that the Project would be consistent with the goals of the NJ Energy Master Plan by reducing emissions from peak power production. In response to this comment, consideration of Project consistency with NJDEP's Protecting Against Climate Threats (PACT) policy has been added to Section 3.4 of the Application.

Protecting Public Health and the Environment

Passaic Valley Sewerage Commission (PVSC) Resiliency Program

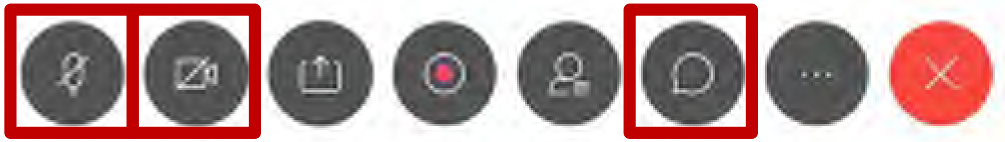
Standby Power Generation Facility Project

January 7, 2021

Presented to: Ironbound Community

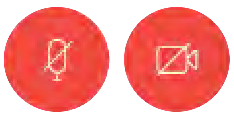
Meeting Logistics

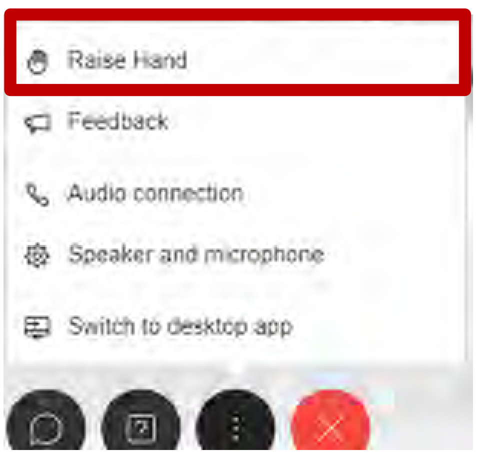
WEBEX CONTROL BAR



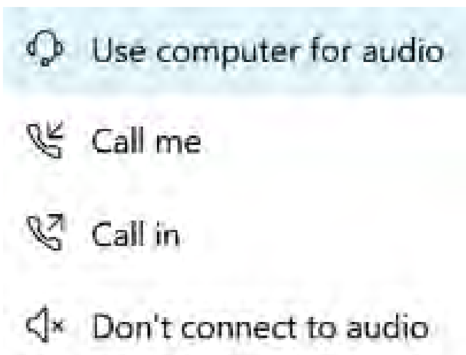
AUDIO VIDEO CHAT

MUTED / OFF





MEETING PREVIEW AUDIO SELECTION



TO BE UNMUTED

Click the "Raise Hand" button or ask to be unmuted in the "Chat" box

ISSUES HEARING AUDIO?

Re-join using "Call me" Audio Selection

Purpose of Today's Meeting

- ❖Early-stage **information session** to share details of Standby Power Generation Facility Project
- ❖**Opportunity for input** to the permit application prior to wider public comment period on draft permit
- ❖All feedback shared during this session will be documented for NJDEP
- ❖A PDF of the PowerPoint presentation can be provided following the session

Presentation Outline

❖Introductions

❖PVSC Resiliency Program

❖Standby Power Generation Facility (SPGF) Project Background

❖SPGF Facility

❖Title V Air Permit Modification Application

Introductions

Joe Frissora
HDR

Cynthia Hibbard
CDM Smith

PVSC Resiliency Program

❖ PVSC Newark Bay Wastewater Treatment Plant (WWTP)

- ➢ Serves approximately 155 square miles and includes 48 municipalities in parts of Bergen, Essex, Hudson, Passaic and Union Counties.
- ➢ Receives liquid waste from customers all along the East Coast.
- ➢ Serves over 4 million residents, 5,000 commercial users, and 200 significant industrial users.
- ➢ 5th Largest WWTP in the US
- ➢ Single largest power user in the State of NJ

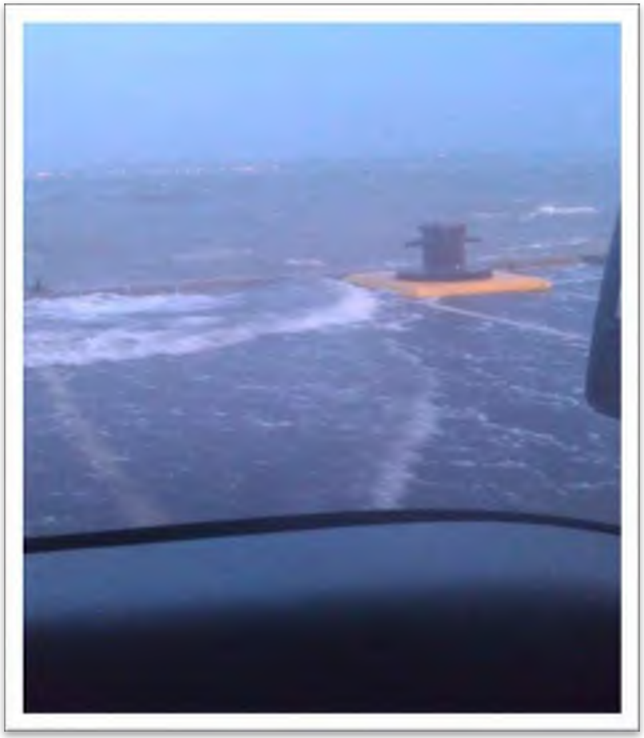
AECOM+HDR A JOINT VENTURE

BLACK & VEATCH Building a world of difference.

CDM Smith

PVSC Resiliency Program

- ❖ NJDEP identified PVSC WWTP as critical component of New Jersey's infrastructure after Superstorm Sandy. The Superstorm impacts included:
  - ➢ A 12-foot storm surge from adjacent Newark Bay that inundated the treatment plant; flooding buildings, tunnels and process areas.
  - ➢ Failure of the direct PSE&G power supply to the treatment plant.
  - ➢ Without power, approximately 840 million gallons of raw sewage was discharged directly to the Passaic River and Newark Bay.
- ❖ NJDEP and Federal agencies required PVSC to protect the facility from future storm events in order to maintain operations that would prevent environmental damage

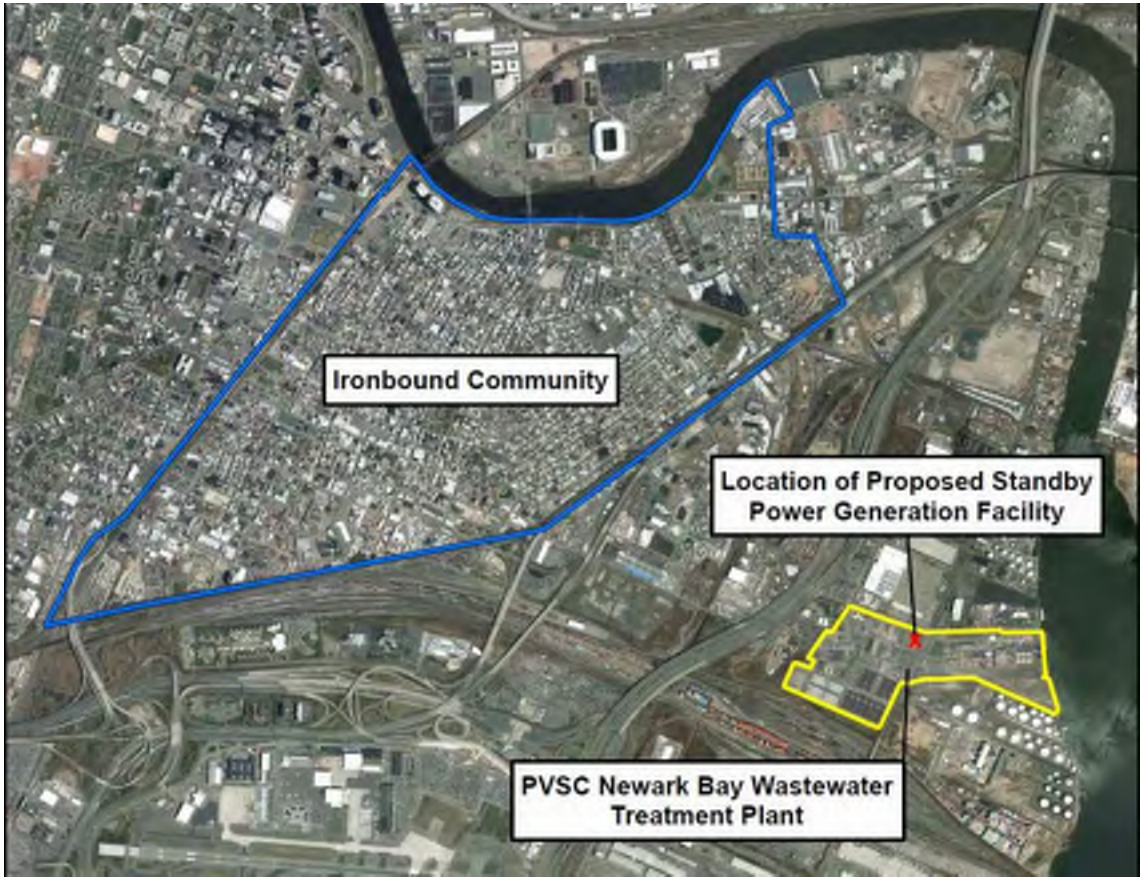


State of New Jersey
Passaic Valley Sewerage Commission
Protecting Public Health and the Environment

AECOM+HDR A JOINT VENTURE · BLACK & VEATCH Building a world of difference. · CDM Smith

Standby Power Generation Facility Project Background

- Designed to support the entire WWTP electric load, allowing the plant to function upon loss of the utility electrical supply.
- Proposed to provide on-site emergency and peak load management power to PVSC's wastewater treatment processes.



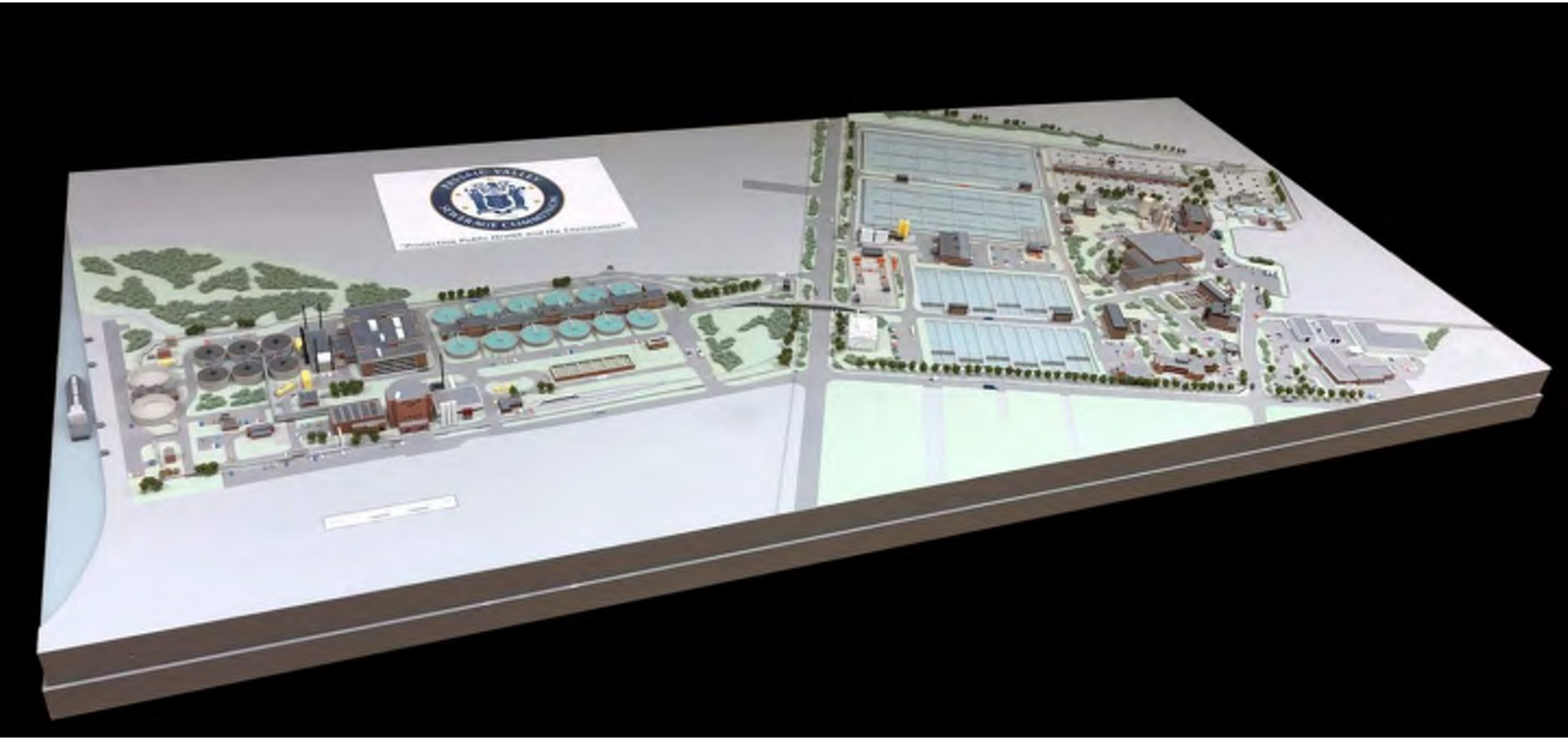
Standby Power Generation Facility Project Background

- Emergency Operation:
  - When there is a power outage or the facility's primary source of mechanical or thermal energy fails because of an emergency;
  - When facility power is disrupted due to construction, repair, or maintenance activity at the facility - limited to 30 days in any calendar year; or
  - When there is a voltage reduction issued by the Pennsylvania Jersey Maryland (PJM) Interconnection and posted on the PJM internet website (www.pjm.com) under the "Emergency Procedures" menu.
- Non-Emergency Operation:
  - Normal readiness testing and maintenance
  - PJM Demand Response and Peak Load Management Program
    - PVSC would disconnect itself from the grid during periods of peak demand and peak pricing.
    - PVSC would produce only enough power to support its own operations. No power to be exported or sold to the grid.
  - Non-emergency startups and shutdowns
  - Preparation for potential emergency operation

SPGF Proposed Equipment and Control Technologies

- Standby Power Generation Facility (SPGF) Proposed Combustion Equipment
  - Three 28-MW combustion turbine generators (CTGs) using natural gas.
    - Two would operate at 17 MW each, for a total of 34 MW needed to run the plant.
  - Two 2-MW black start engine generators (BSGs) using natural gas.
    - Only one would operate at a time to start the CTGs without utility electricity supply.
  - Two 164-kW fire pump engines (FPE) using diesel fuel.
    - One would operate at a time to pump water for fire suppression if hydrant pressure is not available.
- Air Pollution Control Technologies
  - All engines have low emissions below the applicability thresholds for state-of-the-art (SOTA) air pollution control equipment. However, PVSC is voluntarily applying SOTA for the CTGs beyond what would be required.
  - The exhaust of each CTG would be treated with a SOTA air pollution equipment train consisting of an oxidation catalyst and selective catalytic reduction (SCR).

Standby Power Generation Facility



AECOM+HDR A JOINT VENTURE

BLACK & VEATCH Building a world of difference.

CDM Smith

Standby Power Generation Facility

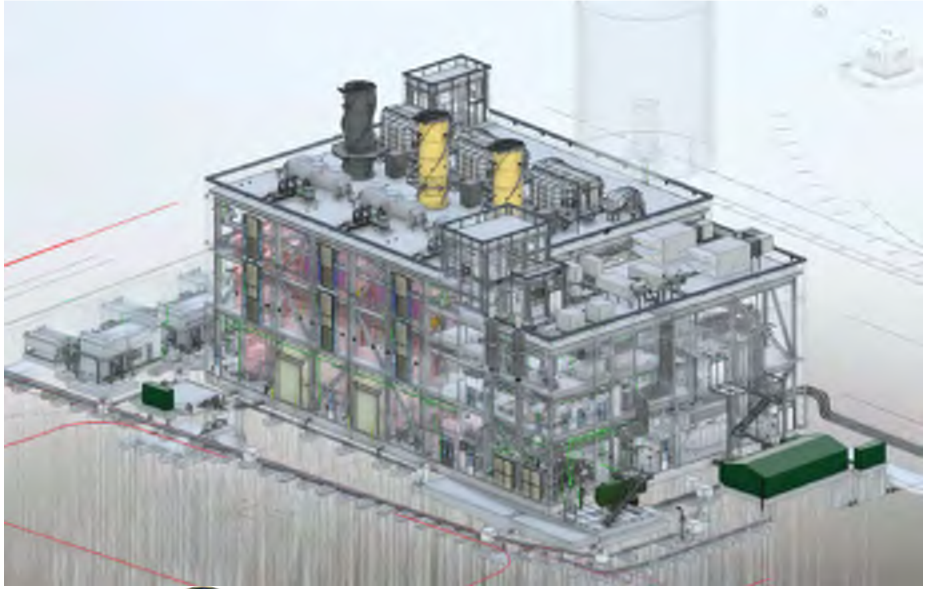
AECOM+HDR A JOINT VENTURE

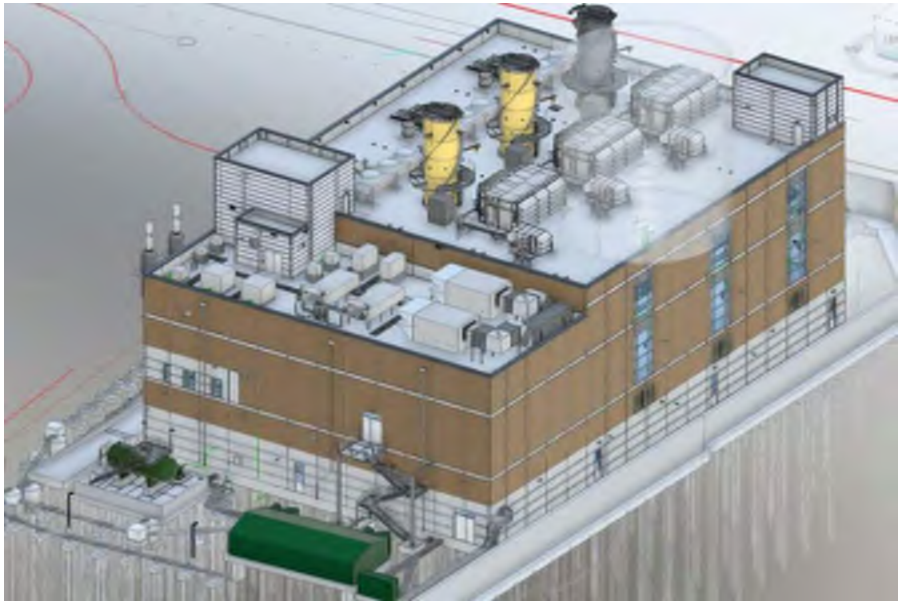
BLACK & VEATCH Building a world of difference.

CDM Smith

Standby Power Generation Facility

Standby Power Generation Facility





AECOM+HDR A JOINT VENTURE

BLACK & VEATCH Building a world of difference.

CDM Smith

Operating Scenarios

Equipment	Operating Scenario	Operating Hours/year	Operating Restrictions
CTGs	Emergency	Unrestricted	-
	Normal readiness testing and maintenance	100 hours each	All three CTGs together would be limited to 2,100 hours/year for all non-emergency operating scenarios combined.
	Demand Response and Peak Load Management	1,000 hours each	
	Preparation for Potential Emergency Operation		
	Non-emergency startups and shutdowns		
BSGs	Emergency	Unrestricted	-
	Normal readiness testing and maintenance	100 hours each	Only one BSG will be tested at one time.
FPEs	Emergency	Unrestricted	-
	Normal readiness testing and maintenance	100 hours each	-

Note: The projected actual hours of operation from all three CTGs demand response and peak load management are 240 machine hours per year and 864 machine hours per year respectively.

Title V Air Permit Modification Application

- Draft Air Permit Application Review
  - Regulatory Applicability
    - All proposed combustion equipment would have emissions that would meet or be lower than state and federal applicable air regulatory requirements.
  - Criteria Air Pollutant Emissions
    - SPGF Project would not change Title V designations for any air pollutant at PVSC's Newark Bay Treatment Plant.
    - The criteria pollutant emissions from the Project would **not** exceed any Significant Net Emission Increase Thresholds.
  - Greenhouse Gas Emissions
  - Health Risk Analysis

Title V Air Permit Modification Application

❖ Comparison with Significant Net Emission Increase Thresholds

CTG + BSG + FPE = Project Total Emissions

Pollutant	Three 28-MW Combustion Turbine Generators (tons/year)	Two 2-MW Black Start Engines (tons/year)	Two 164-kW Fire Pump Engines (tons/year)	Project Total Emission Increase at the PVSC Facility (tons/year)	Significant Net Emission Increase Threshold (tons/year)
Carbon Monoxide (CO)	7.41	0.33	0.13	**7.87**	**100**
Nitrogen Oxides (NOx)	3.24	0.16	0.13	**3.53**	**25**
Particulate Matter (PM10)	4.63	0.02	0.01	**4.65**	**100**
Sulfur Dioxide (SO2)	1.12	0	0	**1.13**	**100**
Total Suspended Particulate Matter (TSP)	4.63	0.03	0.01	**4.67**	**100**
Volatile Organic Compounds (VOC)	2.16	0.11	0.01	**2.28**	**25**

Project Emissions < Increase Threshold

- The criteria pollutant emissions from the Project are **substantially lower** than the Significant Net Emission Increase Thresholds.

AECOM+HDR A JOINT VENTURE   BLACK & VEATCH Building a world of difference.   CDM Smith

Greenhouse Gas Emissions

- Although a new source of GHG emissions, SPGF would provide a net benefit in displacing PJM Grid emissions.
  - Reduced regional GHG emissions by net 300 lbCO_2e/MWh

Case	Emission Factor (lb CO2e/MWh)	GHG Emission Rate[1] (tons CO2e/year)
Standby Power Generation Facility (SPGF)	1,317	39,000
Pennsylvania Jersey Maryland (PJM) Interconnection Power Pool - Peak Units	1,618	48,000

[1] Maximum potential non-emergency operation: 2,100 hours/year x 28 MW/CTG = 58,800 MWh/year

AECOM+HDR A JOINT VENTURE

BLACK & VEATCH Building a world of difference.

CDM Smith

Greenhouse Gas Emissions *(Cont.)*

Design Objective: SPGF must produce 34 MW for 14 continuous days.

- Battery storage would require 1,900 units (14 acres stacked 200 ft. tall)

- Alternative Technologies Evaluated
  - Solar Power
  - Wind Power

- Alternative technologies are not feasible at SPGF site

Health Risk Analysis

- NJDEP guidance (Technical Manual 1003) requires risk screening.
- Level 1 Risk Screening identified formaldehyde and acrolein emissions for further evaluation.
  - All other toxic air pollutants were considered negligible.
- Level 2 risk analysis conducted using USEPA AERMOD refined dispersion modeling.
  - Five years of actual hourly meteorological data
  - Local terrain and buildings

Refined Air Dispersion Modeling Domain

- The highest concentration in the Ironbound District is **<u>1/60th or less</u>** of any applicable NJDEP Incremental Health Risk Threshold

Health Risk Analysis Summary

- Formaldehyde and acrolein concentrations from the proposed SPGF project decrease significantly as one moves further from the project location.
- Modeled worst-case concentrations would be below inhalation incremental health risk criteria near the project and at all sensitive receptor locations. At the Ironbound Community:
  - Peak short-term acute concentrations would be less than 1/62nd of the health-based criteria;
  - Long-term (highest annual average) concentrations would be less than 1/200th of the health-based criteria.

Title V Permit Conditions

- The Title V application must demonstrate that the proposed SPGF would meet the following requirements:
  - ✓ Cannot cause or contribute to an exceedance of a state or federal ambient air quality standard.
  - ✓ Must comply with all applicable air regulatory requirements and emissions limits.
  - ✓ Must comply with control technology standards.
  - ✓ Must have negligible incremental inhalation health risk or include measures to mitigate the risk.
- **The SPGF would meet all NJDEP Title V Permit criteria.**

Conclusion

- ❖ Benefits of SPGF Project
  - ➢ Public health protection for Superstorm Sandy event
  - ➢ Climate resiliency
- ❖ PVSC is a member of the community
  - ➢ Low-emitting combustion turbine generators
  - ➢ Use of State-of-the-Art air pollution control equipment beyond what is required

Next Steps

Pre-Application Information Session (**Today**) → Application Submittal (Q1 2021) → Public Comment Period on Draft Permit (Q2 2021)

CDM Smith

PASSAIC VALLEY SEWERAGE COMMISSION