

# STATEMENT OF BASIS for NEWARK ENERGY CENTER

## TITLE V OPERATING PERMIT RENEWAL AND PERMIT MODIFICATION

Program Interest (PI): 08857 / Permit Activity Number: BOP160004

### I. FACILITY INFORMATION

Newark Energy Center is located at 955 Delancy Street, Newark, NJ 07105, Essex County and consists of a plant that generates electricity using two combined cycle gas turbines and two supplementary fired heat recovery steam generators. The facility is owned by Newark Energy Center, LLC and is operated by Newark Energy Center, LLC.

The facility is classified as a major facility based on its potential to emit 34.8 tons/year (tpy) of volatile organic compounds, 138 tpy of nitrogen oxides, 482 tpy of carbon monoxide, 101 tpy of particulate matter with an aerodynamic diameter less than 10 microns (PM-10), 119 tpy of ammonia, 153 tpy of methane, and 2,157,259 tpy of carbon dioxide equivalent (CO<sub>2</sub>e).

This permit allows individual hazardous air pollutant (HAPs) to be emitted at a rate to not exceed: 117 lbs/year of acrolein, 466 lbs/year of benzene, 4,300 lbs/year of formaldehyde, 85 lb/year of polycyclic organic matter and 5,020 lbs/year of toluene.

### II. AREA ATTAINMENT CLASSIFICATION

The Federal Clean Air Act (CAA) sets National Ambient Air Quality Standards (NAAQS) for six common air pollutants. These commonly found air pollutants (also known as "criteria pollutants") are particulate matter, ground-level ozone, carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), and lead. The US Environmental Protection Agency (USEPA) also classifies areas as "attainment" or "nonattainment" for each criteria pollutant, based on the magnitude of an area's problem. Nonattainment classifications are used to specify what air pollution reduction measures an area must adopt, and when the area must reach attainment. Currently, the entire State of New Jersey is designated as nonattainment for the 8-hour ozone NAAQS. New Jersey is designated attainment for all other pollutants. For nonattainment classification refer to <https://www.epa.gov/green-book/green-book-national-area-and-county-level-multi-pollutant-information>.

### III. BACKGROUND AND HISTORY

The equipment that emits air contaminants from this facility includes:

- Two GE 7FA combined cycle combustion turbines, each with dry low NO<sub>x</sub> burners, Selective Catalytic Reduction system (SCR) with a 90% NO<sub>x</sub> control efficiency and Catalytic Oxidizers with a 90% CO control efficiency;
- Two Heat recovery steam generators, each with a duct burner (DB);
- One 12-cell cooling tower with high efficiency drift eliminators (drift:0.0005% of circulating water flow)
- One diesel fired 1.5 MW emergency generator; and
- One diesel fired emergency fire pump.

Table 1 - Operating Permit Revision History (located at the end of this document) provides a summary of all the changes that have been incorporated into the operating permit through seven-day notice changes, administrative amendments, minor modifications, or significant modifications since the approval of the initial operating permit or the most recent renewal thereof. Please refer to the attached explanation sheet for the structure and configuration of conditions of approval, included in the Facility Specific Requirements section of this permit.

A Facility-Wide Risk Assessment was previously conducted on June 25, 2012 and health risk was determined to be negligible consistent with NJDEP Technical Manual 1003. A Facility-Wide Risk Assessment was conducted, with this permit application, for polycyclic organic compound emissions, which are being added to the permit and health risk was determined to be negligible consistent with NJDEP Technical Manual 1003. No further revised Facility-Wide Risk Assessment was conducted, with this permit application, since no other changes were made to Air Toxics (including HAPs) emissions and no changes were made to the risk parameters since the last risk assessment.

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This is a Permit Modification with Renewal and includes the following changes:

1. Remove auxiliary boiler (U1, OS13); Reduce natural gas limit (U1, OS Summary (OSS)) and annual emission limits (U1, OSS; GR1 and GR2) accordingly
2. Change emission unit U1 facility designation from "Cogen Plant" to "2 Turbine/DB"; This designation better defines U1.
3. Reduce PM-10 and PM-2.5 stack test frequency for turbines/DBs (U1), from quarterly to permit term. The current permit allows the permittee to request reduced test frequency once 8 consecutive quarterly stack tests demonstrate emissions less than 80% of the permit limit; This requirement has been met
4. Add Polycyclic Organic Matter limits for U1, as potential emissions exceed the reporting threshold; Reduce acrolein limit for U1, OS3/OS4 which was previously miscalculated
5. Reduce total HAPs limit for U1 from 8.22 tpy to 4.99 tpy to account for only the HAPs that are emitted above the Department's pre-2018 reporting threshold pursuant to current DEP policy. Pursuant to N.J.A.C. 7:27-22.30(l), the HAP emissions in the operating permit must be updated, based on N.J.A.C. 7:27-17.9(a) reporting thresholds at the next permit renewal
6. Add hourly heat input, SO<sub>2</sub>, TSP, PM-10, PM<sub>2.5</sub> and Ammonia emission limits to U1 start-up and shut down operating scenarios; All limits equal to steady state limits except ammonia which is 10 ppm<sub>dv</sub> @ 15% O<sub>2</sub>
7. Remove initial stack test requirement for U1; Testing was performed and compliance was demonstrated
8. Update monitoring requirement citation for U1 N.J.A.C 7:27-16.9(b) CO limits from "N.J.A.C. 7:27-22.16(o)" to "N.J.A.C 7:27-16.23(a)1"
9. Remove NSPS conditions with initial only compliance requirements (notification of initial startup, notification of achieving maximum production rate, initial performance testing, and initial opacity monitoring) from U1 because these requirements have been fulfilled
10. Change the compliance period for U1 N.J.A.C 7:27-22.16(a) based SO<sub>2</sub> and TSP emission limits from "each of 3 Department validated stack test runs" to "the average of three Department validated stack test runs" pursuant to current DEP policy
11. Combine (3) permit conditions, which regulate the type and amount of chemical additives that can be used to treat the cooling tower water, into a single permit condition, in U2, OSS
12. Update list of allowable cooling tower water treatment chemicals in U2, OSS; None of these chemicals are HAPs
13. Correct the N.J.A.C. 7:27-6.2(a) limit in U2, OSS, which was previously miscalculated; The more stringent N.J.A.C.7:27-22.16(a) particulate limits (U2, OS1) are unchanged
14. Add a compliance period of "based on 1 hour block average" to the U2, OS1 requirement to continuously monitor the cooling tower water with an oxidation / reduction potential meter; This is consistent with other NJ permits
15. Reduce limit for testing and maintenance operation of the emergency generator (U3) and emergency fire pump (U4) from 200 hr/yr to 100 hr/yr, each; Reduce annual emission limits (OSS; GR1 and GR2) accordingly
16. Remove NSPS Kb requirement from IS1 as this regulation doesn't apply to these tanks
17. Remove GR1 permit requirement to obtain emission offsets for NO<sub>x</sub> and VOC, in accordance with N.J.A.C 7:27-18; These offsets have been obtained
18. Change record keeping requirement for the turbine net heat rate (GR2), in order to require the facility to maintain the calculation that demonstrates compliance with the heat rate limit rather than just demonstrate compliance initially
19. Create Group 10 with RGGI requirements for the turbines
20. Delete all 0.05% sulfur content in fuel oil limits (N.J.A.C 7:27-9.2) which expired on June 30, 2016 and have since been replaced by a 0.0015% limit that is already included in the permit
21. Round permit limits to 3 significant digits, pursuant to current DEP policy
22. Add summary of all applicable Federal regulations to OSS for each emission unit
23. Clarify that all VOC permit limits include formaldehyde emissions

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This renewal will also change the allowable emission limits as listed in the following table:

Allowable Emission Limits	Facility's Potential Emissions (tons per year)*									
	VOC (total)	NO <sub>x</sub>	CO	SO <sub>2</sub>	TSP (total)	PM <sub>10</sub> (total)	PM <sub>2.5</sub> (total)	Pb	HAPs (total)	CO <sub>2</sub> e (total)
Current Permit	35.0	139	484	19.7	67.1	101	97.6	N/A	8.22	2,160,278
Proposed Permit	34.8	138	482	19.7	67.0	101	97.5	N/A	4.99	2,157,259
Change (+ / -)	-0.2	-1.0	-2.0	0	-0.1	0	-0.1	N/A	-3.23	-3,019

VOC Volatile Organic Compounds

NO<sub>x</sub> Nitrogen Oxides

CO Carbon Monoxide

SO<sub>2</sub> Sulfur Dioxide

TSP Total Suspended Particulates

\* Other Any other air contaminant regulated under the Federal Clean Air Act. There is no change to the sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), ammonia (NH<sub>3</sub>) or Methane emissions.

PM<sub>10</sub>

PM<sub>2.5</sub>

Pb

HAPs

CO<sub>2</sub>e

Particulates under 10 microns

Particulates under 2.5 microns

Lead

Hazardous Air Pollutants

Carbon Dioxide equivalent

**IV. CASE-BY-CASE DETERMINATIONS**

No case-by-case determinations were required for this permit action.

**V. EMISSION OFFSET REQUIREMENTS**

This permit action is not subject to Emission Offset requirements.

**VI. BASIS FOR MONITORING AND RECORDKEEPING REQUIREMENTS**

The facility's operating permit includes monitoring, recordkeeping and reporting requirements that are sufficient to demonstrate the facility's continued compliance with the applicable requirements consistent with the following:

- Provisions to implement the testing and monitoring requirements of N.J.A.C. 7:27-22.18, the recordkeeping and reporting requirements of N.J.A.C. 7:27-22.19, and all emissions monitoring and analysis procedures or compliance assurance methods required under the applicable requirements, including any procedures and methods promulgated pursuant to 40 CFR 64; and
- Where the applicable requirement does not require direct periodic monitoring of emissions, the Department requires periodic monitoring of surrogate parameters sufficient to yield reliable data from the relevant time period that are representative of the facility's compliance with the permit.

For combustion turbines and duct burners (U1):

- The facility monitors the fuel consumed by the turbines, with and without the duct burner operating, the fuel consumed by the duct burners, and total hours of turbine operation. This information is used to calculate the long-term (tons/year) emissions limits for VOC, SO<sub>2</sub>, TSP, PM-10, PM-2.5, H<sub>2</sub>SO<sub>4</sub>, CO<sub>2</sub>, CH<sub>4</sub>, CO<sub>2</sub>e and individual HAPs.
- Surrogate monitoring for the short-term (lb/hr) emission limits includes natural gas sulfur content for SO<sub>2</sub> emissions and hourly heat input for all hourly emissions, including HAPs.
- The temperature at the exit from the Catalytic Oxidizer catalyst is a surrogate for VOC emissions from the turbine and duct burner.

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For cooling tower (U2):

- The facility monitors the total hours of operation as a surrogate for the long term (tons/year) emissions limits for TSP, PM-10 and PM-2.5.
- The facility monitors the total dissolved solids concentration in the cooling tower water as a surrogate for short term particulate emissions (TSP, PM-10 and PM-2.5).
- The facility monitors the pH and the oxidation reduction potential of the cooling tower water as a surrogate to show that there is no H<sub>2</sub>SO<sub>4</sub> in the water which could be released to the atmosphere.

For emergency generator (U3):

- The facility monitors the total hours of operation as a surrogate for the long term (tons/year) emissions limits for NO<sub>x</sub>, CO, VOC, TSP, PM-10, PM-2.5 and CO<sub>2</sub>.
- Fuel oil sulfur content is monitored as a surrogate for SO<sub>2</sub> emissions.

For emergency fire pump (U4):

- The facility monitors the total hours of operation as a surrogate for the long term (tons/year) emissions limits for NO<sub>x</sub>, CO, VOC, TSP, PM-10, PM-2.5 and CO<sub>2</sub>.
- Fuel oil sulfur content is monitored as a surrogate for SO<sub>2</sub> emissions.

3. In some cases, direct periodic monitoring of emissions and/or surrogate parameters is not required due to one or more of the following:

- Equipment size and capacity limitations,
- Subject equipment being permitted at the maximum rated capacity,
- There is no specific state or Federal standard that applies to this piece of equipment,
- Not a pollutant of concern for this piece of equipment,
- Agreements with EPA on the frequency of testing and monitoring for combustion sources.

Based on the above criteria, there is no direct or surrogate monitoring for the following pieces of equipment:

- For the combustion turbine (U1), the opacity limitations in the permit are not monitored because the turbine combusts only natural gas.
- For emergency generator (U3), the opacity limitations in the permit are not monitored because the source is only allowed to operate for a maximum of 100 hour per year for testing and maintenance and during emergencies which require it to operate.
- For emergency fire pump (U4), the opacity limitations in the permit are not monitored because the source is only allowed to operate for a maximum of 100 hour per year for testing and maintenance and during emergencies which require it to operate.

### VII. APPLICABLE STATE AND FEDERAL RULES

The facility is subject to New Jersey Air Pollution Control Regulations, codified in N.J.A.C. 7:27-1 through 34, as applicable. A complete text of these regulations is available at:

<http://www.nj.gov/dep/aqm/rules27.html>

The facility is subject to Federal regulations listed below.

Cross-State Air Pollution Rule (CSAPR): Cross-State Air Pollution Rule

NSPS Subpart A: General Provisions

NSPS Subpart KKKK: Standards of Performance for Stationary Combustion Turbines

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NSPS Subpart IIII:	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
Phase II Acid Rain:	Acid Rain Program
PSD:	Prevention of Significant Deterioration of Air Quality

The Greenhouse Gas (GHG) emissions from this facility are 2,157,258 (tons/year) CO<sub>2</sub>e and there is no GHG emissions increase.

#### **VIII. FACILITY'S COMPLIANCE STATUS**

The Responsible Official at the facility has certified that the facility currently meets all applicable requirements of the Federal Clean Air Act and the New Jersey Air Pollution Control Act. Based on this certification, the Department's evaluation of the information included in the facility's application, and a review of the facility's compliance status, the Department has concluded that this air pollution control operating permit should be approved.

The facility has submitted a timely and complete application to renew their operating permit and an application shield is in effect.

This operating permit includes a permit shield, pursuant to the provisions of N.J.A.C. 7:27-22.17. A permit shield provides that compliance with the relevant conditions of the operating permit shall be deemed compliance with the specific applicable requirements that are in effect on the date of issuance of the draft operating permit, and which form the basis for the conditions in the operating permit.

Also, prior to the expiration of the five-year period, the facility will be required to apply for a renewal of this operating permit, at which time the Department will evaluate the facility and issue a public notice with its findings.

#### **IX. EXEMPT ACTIVITIES**

The facility's operating permit does not include exempt activities such as office and interior maintenance activities, maintenance shop activities, food preparation facilities, cafeterias and dining rooms, etc. A complete list of exempt activities, as allowed by the Operating Permit rule, can be found at N.J.A.C. 7:27-22.1.

Table 1 - Operating Permit Revision History

Permit Activity Number	Type of Revision	Description of Revision	Final Action Date
BOP180001	Administrative Amendment	<p><b>Specific Changes made by BOP180001:</b></p> <ul style="list-style-type: none"> <li>• Change the Responsible Official and the Operator listed in the Facility Profile.</li> </ul>	6/14/2018
BOP160001	Significant Modification	<p><b>Specific Changes made by BOP160001:</b></p> <ol style="list-style-type: none"> <li>1. Remove FC REF#16 as NEC has provided all funds to the city of Newark and no longer has any control over or knowledge of those funds.</li> <li>2. Remove (2) Ammonia Storage Tanks (IS2) from permit as they are exempt from permitting as per the definition of “exempt activity” at N.J.A.C. 7:27-22.1.</li> <li>3. Change the compliance monitoring calculation for annual VOC, TSP, PM-10 and PM2.5 emission limits to be based on actual emission rates from the latest stack test performed, rather than on the maximum emission rate permitted.</li> <li>4. Change the compliance monitoring calculation for annual SO2 emission limits to be based on emission rates calculated from the latest monthly natural gas sulfur test, rather than on the maximum emission rate permitted.</li> <li>5. Replace continuous monitoring of CO2 emissions with continuous monitoring using certified fuel flow meters and calculations based on Equation G-4 of 40 CFR Part 75.</li> <li>6. Recalculate CO2 and greenhouse gas emission (GHG) limitations in the permit using the following: <ul style="list-style-type: none"> <li>• Use 40 CFR 75, equation G-4 to calculate CO2 and GHG emissions. This will make the permit limits consistent with the new CO2 monitoring method.</li> <li>• Updated Global Warming Potentials for methane and nitrous oxide (from 40 CFR 98, table A-1)</li> </ul> </li> <li>7. Remove CO2 lb/hr emission limits from the permit as there is no reporting threshold for CO2 lb/hr emissions. CO2 ton per year emission limit remain in the permit.</li> <li>8. Remove the restriction on firing the duct burners at temperatures below 59 degrees Fahrenheit.</li> <li>9. Change the lower limit of the selective catalytic reduction (SCR) operating temperature range from 550 degrees F to 400 degrees F, consistent with the operation and maintenance manual for the SCR system.</li> <li>10. Clarify that the control efficiency of the SCR system should have a design value of 90% or greater. Delete exemption during start-up and shut down as design value does not change.</li> <li>11. Change the lower limit of the catalytic oxidizer (CO) catalyst operating temperature range from 550 degrees F to 350 degrees F, consistent with the manufacturer’s guidelines for the catalyst used.</li> <li>12. Replace continuous monitoring requirement for heat input to emergency engines with manufacturer's design specification.</li> <li>13. Change the definition of “Hot Start-up” to include a start-up that occurs after the turbine has been shut down for less than 8 hours. The current permit defines a hot start-up as a start-up that occurs after the turbine has been shut down for more than 4 hours but less than 8 hours.</li> <li>14. Add a limit on the number of cold start-ups, warm/hot start-ups and shutdowns that the turbine can make during any 365 day period. This limit is consistent with the number of start-ups and shutdowns assumed for permitted emission limit calculations and for modelling.</li> </ol>	5/16/2017

		<p>15. Require CEMs monitoring of the NOx and CO emissions during start-up and shut down in order to demonstrate compliance with the applicable emission limits.</p> <p>16. Add a requirement to continuously monitor the Oxidation Reduction Potential of the cooling tower water.</p> <p>17. Include a compliance schedule that requires operation of the auxiliary boiler to cease permanently by December 31, 2017 and the boiler be decommissioned, in accordance with modified NEA-150003-08857. The compliance schedule also requires that, when operated, the heat input to the auxiliary boiler be restricted to 40 MMBtu/hr and total operation of the boiler during calendar year 2017 be restricted to a maximum of 500 hours.</p>	
BOP140005	Significant Modification	<p><b>Specific Changes made by BOP140005:</b></p> <ul style="list-style-type: none"> <li>•Include H2SO4 storage tank in the facility wide H2SO4 limit (GR1, REF #5) and include storage tank emissions in the calculation to demonstrate compliance with this limit.</li> <li>•Change permitted water tower chemical use limit (U2, OS Summary, REF #8) from 470 tpy to 2267 tpy.</li> <li>•Add monitoring and recordkeeping requirements to the cooling tower flow rate limitation (U2, OS1, REF #1).</li> <li>•Add new permit condition (U2, OS1, REF #6) to regulate the pH of cooling tower water.</li> <li>•Revision of stack parameters for the combustion turbines (PT1 and PT2), Emergency Generator (PT6), Fire Pump (PT7) and Cooling Tower (PT8) to reflect as built parameters. The air quality impact of the turbine operation was originally assessed at the design stack diameter of 264 inches and was found to comply with all air quality standards. That stack was built at the diameter of 222 inches, and it again demonstrated compliance with all air quality standards through computer modeling. The as built conditions of the cooling tower, the emergency generator and the fire water pump all vary somewhat from what were designed and modeled, and therefore were remodeled. Results show no violations of any air quality standards are expected.</li> <li>•Separation of Auxiliary boiler from emission point PT1 and creation of a separate stack (PT3) for the auxiliary boiler with appropriate parameters. Modeling has been performed with separate stacks.</li> </ul>	8/24/2015
BOP140006	Administrative Amendment	<p><b>Specific Changes made by BOP140006:</b></p> <ul style="list-style-type: none"> <li>• Change the Responsible Official from Mr. Dan Walsh to Mr. Robert Haley.</li> </ul>	12/10/2014
BOP140003	Administrative Amendment	<p><b>Specific Changes made by BOP140003:</b></p> <ul style="list-style-type: none"> <li>• Change the company name and plant name of the facility (Not a transfer of ownership or operational control).</li> </ul>	7/29/2014
BOP130001	Administrative Amendment	<p><b>Specific Changes made by BOP130001:</b></p> <ul style="list-style-type: none"> <li>• Update the site address, mailing address, Fees/Billing Contact, General Contact, and the Responsible Official listed in the Facility Profile.</li> <li>• Add REF #16, regarding the submittal of an annual report on the status of the environmental projects that Hess is funding in the city of Newark, pursuant to resolution 7R3D(AS), back into the FC section of the compliance plan. This requirement was included in the proposed Operating Permit (BOP110001) but was inadvertently omitted from the approved Operating Permit (BOP110001);</li> </ul>	1/7/2013

FACILITY NAME (FACILITY ID NUMBER)  
BOP050001

Activity Number assigned by the Department

**New Jersey Department of Environmental Protection  
Facility Specific Requirements**

Emission Unit Number assigned by the Facility

Brief description of emission unit

**Emission Unit:** U40 Sewage Sludge Incinerators  
**Operating Scenario:** OS Summary

OR

**OS2 Fluidized Bed Incinerator**

OS Summary lists all rules and requirements that apply to an emission unit. An emission unit may contain one or more pieces of equipment and corresponding operating scenarios.

OSX denotes the operating scenario number and lists the rules and requirements that apply to a scenario. An operating scenario represents various ways (or scenarios) a piece of equipment is permitted to operate.

Item Number

Description of applicable requirement

Monitoring method to ensure compliance

Recordkeeping to show facility's compliance

Actions and submittals required for the facility

Ref.#	Applicable Requirement	Monitoring Requirement	Recordkeeping Requirement	Submittal/Action Requirement
3	The permittee shall conduct an annual performance test for each pollutant in Table 2 of 40CFR62 Subpart LLL between 11 and 13 calendar months after the previous performance test or within 60 days of a process change. [40 CFR 62.16000(a)]	Other: Conduct the performance test using the test methods, averaging methods and minimum sampling volumes or durations as specified in 40CFR62 Subpart LLL and according to the testing, monitoring and calibration requirements specified in 40 CFR 62.16015(a). [40 CFR 62.16000(a)].	Other: (1) Maintain records of the results of initial, annual and any subsequent performance tests conducted to determine compliance with the emission limits and standards and/or to establish operating limits, as applicable. [40 CFR 62.16025(e)].	Submit a report: Annually to the Administrator and to the Department. The permittee shall submit an annual compliance report as specified in 40 CFR 62. [40 CFR 62.16000(d)]

Rule citation for applicable requirement

Rule citation for monitoring requirement

Rule citation for recordkeeping requirement

Rule citation for submittal/ action requirement

**Explanation Sheet for Facility Specific Requirements**