May 24, 2022

Mr. Michael P. McCarn, Director

Research and Development Services Division

U.S. Department of the Navy

Naval Research Laboratory

4555 Overlook Avenue SW

Washington DC 20375

**RE: Permit No. 7323 to Construct and Operate a Cogeneration Facility at the Naval Research Laboratory, Building 149**

Dear Mr. McCarn:

Pursuant to sections 200.1 and 200.2 of Title 20 of the District of Columbia Municipal Regulations (20 DCMR), a permit from the Department of Energy and Environment (the Department) shall be obtained before any person can construct or operate a stationary source in the District of Columbia. The application of the U.S. Department of the Navy, Naval Research Laboratory (“Permittee”) to construct and operate a combustion gas turbine and heat recovery steam generator system, located adjacent to and south of Building 149, 4555 Overlook Avenue SW, Washington DC, has been reviewed.

Based on the submitted plans and specifications as detailed in the application electronically submitted via the Air Quality Division Permit System on February 4, 2022, your application to construct and operate the equipment is hereby approved, subject to the following conditions:

**I.** **General Requirements:**

a. The equipment shall be constructed and operated in accordance with the air pollution control requirements of 20 DCMR.

b. Except as specified in Condition I(c), this permit expires on May 23, 2027 [20 DCMR 200.4]. If continued operation after this date is desired, the Permittee shall submit an application for renewal by February 23, 2027.

c. This permit shall remain valid only if used within one year from the date of issuance in one of the following ways: [20 DCMR 202.6]

1. The Permittee has begun, or caused to begin, a continuous program of physical on-site construction of a source to be completed within a reasonable time; or

2. The Permittee has entered into binding agreements or contractual obligations that cannot be cancelled or modified without substantial loss to the owner or operator, to undertake a program of actual construction of the source to be completed within a reasonable time.

d. Construction or operation of equipment under the authority of this permit shall be considered acceptance of its terms and conditions.

e. The Permittee shall allow authorized officials of the District, upon presentation of identification, to:

1. Enter upon the Permittee’s premises where a source or emission unit is located, an emissions related activity is conducted, or where records required by this permit are kept;

2. Have access to and copy, at reasonable times, any records that must be kept under the terms and conditions of this permit;

3. Inspect, at reasonable times, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor, at reasonable times, any substance or parameter for the purpose of assuring compliance with this permit or any applicable requirement.

f. This permit shall be kept on the premises and produced upon request.

g. Failure to comply with the provisions of this permit may be grounds for suspension or revocation. [20 DCMR 202.2]

h. The Permittee shall, upon completion of the construction, notify the Department of the initiation of operation of the equipment. Such a notification shall be submitted to the Department within one week of initiation of operation. The date of initiation of operation shall be considered to be the date upon which the equipment becomes subject to the 20 DCMR, Chapter 3 Title V operating permit program.

i. The Permittee shall, within 12 months of the equipment covered by this permit becoming subject to the 20 DCMR, Chapter 3 Title V operating permit program, apply for an amendment to an existing Chapter 3 operating permit or shall amend any pending Chapter 3 operating permit application to include the requirements of this permit. [20 DCMR 301.1(a)(2)]

j. Within 15 days of receipt of a written request, the Permittee shall furnish to the District any information the District requests to determine whether cause exists for reopening or revoking the permit, or to determine compliance with the permit. Upon request, the Permittee shall also furnish the District with copies of records required to be kept by this permit. [20 DCMR 302.1(g)(5)]

**II**. **Emission Unit Description:**

The equipment to be constructed and operated pursuant to this permit consists of the following significant components:

* **Combined Heat and Power (CHP) Emission Unit[[1]](#footnote-2)**:
* One (1) Solar Mercury 50-6400R Combustion Gas Turbine (CT) rated at 40.06 MMBTU/hr heat input (LHV) or 43.1 MMBTU/hr heat input (HHV), firing natural gas (NG) only, ISO rate power output of 4,439 kWe; and
* **CHP Ancillary Equipment and Appurtenances:**
* One economizer;
* Stack; and
* One (1) 12,628 lbm/hr Rentech Heat Recovery Steam Generator (HRSG).

**III**. **Emission Unit Specific Requirements:**

a. The Permittee shall comply with the following emission unit specific requirements:

1. Emission Limitations:

A. The gas combustion turbine shall not emit pollutants in excess of those specified in the following Tables 1 and 2: [20 DCMR 201]

Table 1: Total 12-Month Rolling Emissions Limits from Permitted Equipment1

| **Pollutant** | **12-Month Rolling Emissions Limit** **(tons/12 mo. rolling period)** |
| --- | --- |
| Total Particulate Matter (PM Total)2,3 | 2.9 |
| Oxides of Nitrogen (NOx) | 3.6 |
| Volatile Organic Compounds (VOC) | 0.5 |
| Carbon Monoxide (CO) | 4.3 |

 1.The equipment covered consists of one Solar Mercury 50 gas turbine, and one HRSG.

2. PM (Total) is the sum of the filterable PM and condensable PM.

3. All PM is expected to be smaller than 2.5 microns, so PM (Total) equals PM2.5

Table 2: Maximum Hourly Emissions when Operating Between 50% and 100 % Load

| **Pollutants** | **Solar Mercury 50 Gas Turbine (CT) and HRSG (lb/hr)** |
| --- | --- |
| PM Total | 0.65 |
| NOx | 0.81 |
| VOC | 0.114 |
| CO | 0.99 |

B. Total suspended particulate emissions (TSP) (i.e. total filterable particulate matter) from the gas combustion turbine shall not exceed 0.07 pound per million BTU. [20 DCMR 600.1]

C. Sulfur dioxide (SO2) emissions from the gas turbine shall not exceed 0.060 lb SO2/MMBTU heat input. [40 CFR 60.4330]:

D. NOx emissions from the turbine shall not exceed 5 ppmvd at 15% O2. [40 CFR 60.4320 and 60.4325 and 20 DCMR 201, and 20 DCMR 805.4(a)(3)] *Note that this is a streamlined emission rate limit and is more stringent than the limits found in 40 CFR 60, Subpart KKKK and 20 DCMR 805.4(a)(3) for NOx emissions cited above. Compliance with this condition will ensure compliance with both requirements, including 20 DCMR 805.*

E. Visible emissions shall not be emitted into the outdoor atmosphere from the emission units and control equipment, except that discharges not exceeding forty percent (40%) opacity (unaveraged) shall be permitted for two (2) minutes in any sixty (60) minute period and for an aggregate of twelve (12) minutes in any twenty-four hour (24 hr.) period during start-up, cleaning, adjustment of combustion controls, if any, or malfunction of the equipment [20 DCMR 606.1].

*Note that 20 DCMR 606 is subject to an EPA-issued call for a State Implementation Plan (SIP) revision (known as a “SIP call”) requiring the District to revise 20 DCMR 606. See “State Implementation Plans: Response to Petition for Rulemaking; Restatement and Update of EPA’s SSM Policy Applicable to SIPs; Findings of Substantial Inadequacy; and SIP Calls To Amend Provisions Applying to Excess Emissions During Periods of Startup, Shutdown and Malfunction”, 80 Fed. Reg. 33840 (June 12, 2015). It is likely that this federal action will result in changes to the requirements of 20 DCMR 606. Any such changes, once finalized in the DCMR, will supersede the language of Condition III(a)(1)(E) as stated above.*

F. The Permittee shall ensure that any fugitive dust associated with the construction or installation of the equipment covered by this permit is minimized or controlled in accordance with applicable provisions of 20 DCMR 605.

G. An emission into the atmosphere of odorous or other air pollutants from any source in any quantity and of any characteristic, and duration which is, or is likely to be injurious to the public health or welfare, or which interferes with the reasonable enjoyment of life or property is prohibited. [20 DCMR 903.1] *Note: This condition is District enforceable only.*

2. Operational Limitations:

A. The sole allowable fuel for the combustion gas turbine shall be natural gas with a sulfur content low enough to ensure compliance with Condition III(a)(1)(C). [20 DCMR 201]

B. The Permittee shall install and maintain a totalizing natural gas fuel meter on the turbine to track natural gas usage.

C. The Permittee shall operate and maintain the combustion turbine in a manner consistent with good air pollution control practices for minimizing emissions at all times including startup, shutdown, and malfunction, and shall be maintained in accordance with one of the following: [20 DCMR 805.4(a)(8) and (40 CFR 60.4333]

i. The manufacturer’s emission-related written instructions; or

ii. An alternate written maintenance plan approved in writing by the Department.

D. All electricity produced by the covered equipment shall be used by the Permittee and shall not be sold. [20 DCMR 201]

E. At all times, including periods of start-up and malfunction, the Permittee shall, to the extent practicable, maintain and operate stationary sources and fuel-burning equipment, and associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions. Determination of whether acceptable operating procedures are being used will be based on information available to the Department which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. [20 DCMR 606.3 and 20 DCMR 201]

3. Monitoring and Testing:

A. To demonstrate continuous compliance with Condition III(a)(1)(D), the Permittee shall conduct Department-approved compliance source tests of NOx emissions from the combustion turbine in accordance with 40 CFR 60.8 and 40 CFR 60.4400 on the schedule described in Condition III(a)(3)(A)(i) through (iii) below. [20 DCMR 502, 20 DCMR 805.10(a)(2), 20 DCMR 805.4(b)(2), 40 CFR 60.8, 40 CFR 60.4340(a), and 40 CFR 60.4400]

i. The first of these tests shall be performed within 60 days after achieving the maximum production rate at which the gas turbine will be operated, but not later than 180 days after initial start-up.

ii. Except as specified in Condition III(a)(3)(A)(iii), subsequent tests shall be performed once each calendar year thereafter (no earlier than nine (9) months and more than fourteen (14) calendar months following the previous performance test).

iii. If the previous performance test results show emissions are less than or equal to seventy-five percent (75%) of the applicable emission limit, the subsequent test must be performed once during the next two calendar years and no more than twenty-six (26) calendar months following the previous performance test.

B. The sample port design and locations shall be approved by the Department prior to installation. [20 DCMR 502].

C. In order to determine compliance with the NOx and CO limits in Condition III(a)(1)(A), Table 2, in addition to determining compliance with Condition III(a)(1)(D) as required by 40 CFR 60.4400, the regular source tests required by Condition III(a)(3)(A) shall also be used to determine the following [20 DCMR 502]:

i. Natural gas flow rate to the turbine (dry basis);

ii. Exhaust gas flow rate from the gas turbine (dry basis); and

iii. Exhaust gas concentrations (dry basis) of CO in the stack gas.

D. The source test report shall provide the emissions results for NOx and CO in the following units: ppmv, dry (corrected to 15% oxygen), lb/hour, and lb/MMBTU heat input (HHV basis). [20 DCMR 502]

E. Within 60 days after achieving the maximum production rate at which the combustion turbine will be operated, but not later than 180 days after initial startup of the unit, and at least once every five years thereafter, the Permittee shall perform testing using methods approved in advance by the Department to determine compliance with the remaining emission limits contained in Condition III(a)(1)(A), Table 2 (PM Total and VOC) as well as Conditions III(a)(1)(B) and E). If the testing performed to meet the 180-day deadline is determined, by the Department, not to be representative of maximum operations due to delays in full startup, the Department may require additional testing at a time following completion of startup to ensure that representative testing is performed.

F. The Permittee shall submit and implement a monitoring plan to determine compliance with the sulfur content requirement of Condition III(a)(2)(A) that is consistent with the requirements of 40 CFR 60.4360. If the Department determines the plan is inadequate, the plan shall be revised to address the problems identified. In lieu of such a monitoring plan, the Permittee may demonstrate that the fuel will not exceed the applicable 0.060 lb SO2/MMBTU heat input standard pursuant to 40CFR 60.4365 using one of the following sources of information to make the required demonstration:

i. The fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the fuel, specifying that the maximum total sulfur content of the natural gas used is 20 grains of sulfur or less per 100 standard cubic feet; or

ii. Representative fuel sampling data which show that the sulfur content of the fuel does not exceed 0.060 lb SO2/MMBTU heat input. At a minimum, the amount of fuel sampling specified in Section 2.3.1.4 or 2.3.2.4 of Appendix D to 40 CFR 75 is required.

G. For all testing required pursuant to Conditions III(a)(3)(A), (C), (D), (E), and (K), the Permittee shall obtain approval for the testing and furnish the Department with a written report of the results of the performance tests and/or compliance tests in accordance with the following requirements [20 DCMR 502]:

i. A test protocol shall be submitted in electronic form to air.quality@dc.gov a minimum of thirty (30) days in advance of the proposed test date. The test shall be conducted in accordance with Federal and District requirements.

ii. The test protocol and test date(s) shall be approved by the Department prior to initiating any testing. The Department must have the opportunity to observe the test for the results to be considered for acceptance.

iii. The final results of the testing shall be submitted to the Department within sixty (60) days of the test completion. One (1) original copy and one electronic copy of the test report shall be submitted to the following addresses:

Chief, Compliance and Enforcement Branch

Department of Energy and Environment

Air Quality Division

1200 First Street NE, 5th Floor

Washington, DC 20002

and

air.quality@dc.gov

iv. The final report of the results shall include the emissions test report (including raw data from the test) as well as a summary of the test results and a statement of compliance or non-compliance with permit conditions to be considered valid. The summary of results and statement of compliance or non-compliance shall contain the following information:

1. A statement that the Permittee has reviewed the report from the emissions testing firm and agrees with the findings.

2. Permit number(s) and condition(s) which are the basis for the compliance evaluation.

3. Summary of results with respect to each permit condition.

4. Statement of compliance or non-compliance with each permit condition.

v. The results of the testing must demonstrate to the District’s satisfaction that the emission units are operating in compliance with the applicable regulations and conditions of this permit; if the final report of the test results shows non-compliance, the Permittee shall propose corrective action(s). Failure to demonstrate compliance through the testing may result in enforcement action.

H. In addition to the above reporting to the Department, the Permittee shall submit written reports to the U.S. Environmental Protection Agency (EPA) as follows [40 CFR 60.4375]:

i. For each test performed on the combustion turbine in accordance Condition III(a)(3)(A), the Permittee must submit a written report of the results of any such performance test to the U.S. EPA before the close of business on the 60th day following the completion of the performance test; and

ii. For any fuel sulfur content testing performed pursuant to Condition III(a)(3)(I) that indicates an exceedance of the requirements of Condition III(a)(1)(C), the Permittee must submit a report within 30 days of the end of each semi-annual period.

I. The total sulfur content of the fuel used in the combustion turbine shall be monitored in accordance with the requirements of 40 CFR 60.4360. Alternatively, if applicable, the Permittee may avoid monitoring the total sulfur content of the fuel if it can be demonstrated not to exceed concentration that would lead to potential SO2 emissions of 0.060 lbs SO2/MMBTU heat input in accordance with 40 CFR 60.4365. The Department must approve any such demonstration.

J. The Permittee shall monitor the facility to ensure that visible emissions, odor and other nuisance air pollutants are not emitted in such quantities as to create any violation of Condition III(a)(1)(E), (F), and (G) of this permit.

K. In addition to any specific testing requirements specified in this permit, the Department reserves the right to require that the Permittee perform additional emissions test using methods approved in advance by the Department. [20 DCMR 502.1]

4. Record Keeping Requirements: [20 DCMR 200.7, 20 DCMR 302.1(c)(2)(B), 20 DCMR 805.4(c), and 20 DCMR 805.11]

A. The Permittee shall maintain all records, including records of visual inspections, necessary for determining compliance with this permit in a readily accessible location for five (5) years from the date of the observation, monitoring sample, measurement, report, or application, and shall make these records available to the representatives of the Department and the EPA upon written or verbal request.

B. At a minimum, the following information shall be recorded and maintained in accordance with Condition III(a)(4)(A) of this permit. All such records must be either initialed or signed by the person recording the information or maintained in a verifiable electronic system whose information can be certified as to its accuracy.

i. Monthly records of the quantity of natural gas (thousand scf) burned in the turbine;

ii. Records of all test results and calculations performed pursuant to Conditions Conditions III(a)(3)(A), (C), (D), (E), and (K);

iii. Records of fuel sulfur information obtained pursuant to Condition III(a)(3)(I);

iv. Records of any deviations from permit requirements obtained performing monitoring pursuant to Condition III(a)(3)(J);

v. Records of reports submitted to EPA pursuant to Condition III(a)(3)(H);

vi. Records of all routine and non-routine maintenance performed on all equipment covered by this permit. These records shall include a description of the maintenance activity, any problem being corrected or other reason for the maintenance activity, and a statement indicating whether or not the problem was corrected;

vii. Records of calculated total emissions of each pollutant covered by Condition III(a)(1)(A), Table 1, as well as sulfur dioxide (SO2) from the turbine, kept in a 12-month rolling sum format. These calculated emissions estimates shall be performed using the most recent data obtained pursuant to testing and monitoring performed pursuant to Condition III(a)(3) in combination with collected fuel usage data.

5. Reporting Requirements: [20 DCMR 200.7]

A. The Permittee shall comply with all reporting requirements contained in Condition III(a)(3) of this permit;

B. The Permittee shall immediately report to the Department, by telephone, any permit deviation that poses an imminent and substantial danger to public health, safety, or the environment. [20 DCMR 302.1(c)(3)(C)(ii)] This shall be reported to the Department’s Emergency Operations number at (202) 281-0885.

C. In addition to complying with any other reporting requirements mandated by the 20 DCMR or this permit, the Permittee shall, within thirty (30) calendar days of becoming aware of any occurrence of excess emissions, supply the Department in writing with the following information:

i. The name and location of the facility;

ii. The subject source(s) that caused the excess emissions;

iii. The time and date of the first observation of the excess emissions;

iv. The cause and estimated/expected duration of excess emissions;

v. For sources subject to numerical emission limitations, the estimated rate of emissions (expressed in the units of the applicable emission limitation) and the operating data and calculations used in determining the magnitude of the excess emissions; and

vi. The proposed corrective actions and schedule to correct the conditions causing the excess emission.

D. The Permittee shall incorporate the requirements of this permit in all Title V semi-annual and annual compliance reports, certifications, and annual emission reports required pursuant to Title V permit No. 005.

E. Except as otherwise specified in this permit and Title V permit 005, all reports shall be submitted electronically to air.quality@dc.gov. Hard copies shall be submitted upon request of the Department.

If you have any questions, please call me at (202) 535-1747 or John Nwoke at (202) 724-7778.

Sincerely,

Stephen S. Ours, P.E.

Chief, Permitting Branch

SSO/JCN

1. This system does not include any duct burners or other supplemental firing. [↑](#footnote-ref-2)