

**GOVERNMENT OF THE DISTRICT OF COLUMBIA**  
Department of Energy and Environment

**TECHNICAL SUPPORT MEMORANDUM  
FOR PROPOSED SYNTHETIC MINOR PERMITTING ACTION**

**Permit No. 7289-SM**

**TO:** File

**FROM:** Stephen S. Ours, P.E.  
Chief, Permitting Branch

Abraham T. Hagos  
Environmental Engineer For ATH

**SUBJECT:** **Smithsonian Institution, National Museum of the American Indian  
Synthetic Minor Permit No. 7289-SM for Operations 4<sup>th</sup> & Independence  
Avenue SW, Washington DC**

**DATE:** September 7, 2022

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This Technical Support Memorandum has been prepared to document the basis for a facility-wide synthetic minor operating permit for the following:

**Applicant and Permittee:**

Smithsonian Institution  
1000 Jefferson Drive SW  
Washington DC 20560-0009

**Facility Location:**

National Museum of the American Indian  
4<sup>th</sup> Street & Independence Avenue SW  
Washington DC 20560

**Application Signatory per 20 DCMR 200.13:**

John Michael Bixler  
Deputy Director of Facilities Management

**TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian**

**Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 2

**FACILITY DESCRIPTION AND BACKGROUND INFORMATION:**

The Smithsonian Institution operates the National Museum of the American Indian (NMAI), which is located at 4<sup>th</sup> Street and Independence Avenue SW, Washington DC 20560. The facility's primary emission units are listed in the following table:

<b>Emission Units<sup>1</sup></b>			
<b>Emission Unit ID</b>	<b>Stack ID</b>	<b>Emission Unit Name</b>	<b>Description</b>
G-1	Stack S2	Emergency Generator	1,250 kWe Cummins, Model No. DFCL-5564915, Serial No. H020403284 emergency generator set powered by a 1,863 hp Cummins Model KTA-50-G3 diesel-fired engine, installed in 2004 (not subject to NSPS Subpart III)
B-1	Stack S1	Boiler-1	8.165 MMBTU/hr dual fuel fired Cleaver-Brooks, model No. CBI-200-200-125, serial No. OL 101887 boiler.
B-2	Stack S1	Boiler-2	8.165 MMBTU/hr dual fuel oil fired Cleaver-Brooks, model No. CBI-200-200-125, serial No. OL 101888 boiler.
B-3	Stack S1	Boiler-3	8.165 MMBTU/hr dual fuel oil fired Cleaver-Brooks, model No. CBI-200-200-125, serial No. OL 101889 boiler.
SPB-1	Stack SPB1	Spray Paint Booth	HVLP Spray Gun, Cross-draft, Model IESDDRF 141020PSB, 98% dry filter eff.

The facility also has several pieces of equipment and operations determined to be insignificant activities. These are:

1. Three (3) fuel storage tanks as follows:
  - a. One 20,000 gallon underground storage tank (T1) for boiler and emergency generator fuel;
  - b. One 275 gallon boiler day tank (T2); and
  - c. One 60 gallon emergency generator day tank (T3);
2. Three 2.52 MMBTU/hr Fulton boilers (dual fuel);
3. Facility-wide pesticide applications;
4. Metal inert gas (MIG) welding operations; and
5. Woodworking operations (vented indoors).

These units were all previously permitted under Title V Permit No. 040, issued September 30, 2014. Of these, only the 2.52 MMBTU/hr Fulton boilers have the potential to emit oxides of nitrogen (NOx).

## **TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian**

**Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 3

On September 18, 2020, the Air Quality Division (AQD) of the Department of Energy and Environment (the Department) received an application, for a synthetic minor permit to replace existing Title V operating Permit No. 040, and on August 8, 2022, AQD received revised facility-wide potential to emit (PTE) calculations, both with and without proposed synthetic minor limitations. The draft permitting action accompanying this Technical Support Memorandum addresses this application.

### **DISCUSSION OF PROPOSED SYNTHETIC MINOR LIMITATIONS**

In the initial synthetic minor permit application, dated September 4, 2020, the permit applicant requested relaxation of previously existing boiler operating limits found in the currently effective Title V permit. These limits were taken at the time of initial Chapter 2 and subsequent Title V permit issuance to avoid (after-the-fact: the units had initially been constructed without permits) non-attainment new source review (NNSR) requirements that would have been applicable to the facility had they requested unrestricted operation of their units. At the time, these limits kept the facility's PTE below the major source threshold for NO<sub>x</sub>, but the District did not, at that time, have a synthetic minor permitting program, so the limits were established in a Title V permit.

Upon subsequent discussions of the emission limit relaxation request, the applicant confirmed (via an email from their consultant, Wes Baggett, of AECOM, dated May 20, 2022) that the previously existing limits should remain in place. These limits are found in the currently active Title V permit (Condition III.b.2.C.), which limits fuel oil usage for each of the three Cleaver Brooks boilers to 144 hours and 8,398 gallons per 12-month rolling period. With these limits in place the facility-wide potential NO<sub>x</sub> emissions are limited to 22.30 tons per year (TPY), which is less than the 25 TPY threshold to be considered a major source in the District of Columbia.

Based on the existing emission limits retained in Condition III(b)(2)(A) and the retention of these operational limits in Condition III(b)(2)(D) of the permit, along with associated monitoring and record keeping requirements and a requirement to report exceedances of the operational limits found in Condition I(c)(3)(B), the synthetic minor limitations are enforceable as a practical matter, and pursuant to 20 DCMR 200.6 and 200.7, this facility qualifies for synthetic minor status.

The emergency generator set does not require a synthetic minor limitation as it is limited to the standard 500 hours per year of operations for emergency generator sets and the associated NO<sub>x</sub> emissions are incorporated into the 22.30 TPY facility-wide potential to emit (PTE) discussed above.

Also, in addition to the small Fulton boilers (which are permitted to operate without any synthetic minor limitation in Condition IV of the draft permit), the facility has identified several "insignificant" activities related to the facility, including woodworking operations (vented indoors), metal inert gas (MIG) welding operations, pesticide application, and small diesel storage tanks which have the potential to emit some small emissions, but do not emit NO<sub>x</sub> emissions. These are not included in the permit as the Department does not require permits

**TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian**

**Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 4

pursuant to Chapter 2 for these units and they do not contribute to NOx emissions and therefore have no potential to affect the synthetic minor status of the facility.

**EMISSIONS SUMMARY:**

The following is an estimate of overall potential emissions from the facility:

<b>FACILITY-WIDE EMISSIONS SUMMARY [TONS PER YEAR]</b>		
<b>Pollutants</b>	<b>Potential Emissions <u>without</u> 20 DCMR 200.6/200.7 Limits</b>	<b>Potential Emissions <u>with</u> 20 DCMR 200.6/200.7 Limits</b>
Sulfur Dioxide (SO <sub>2</sub> )	0.22	0.13
Oxides of Nitrogen (NO <sub>x</sub> )	32.12	22.30
Coarse Particulate Matter (PM10)	5.16	2.33
Volatile Organic Compounds (VOCs)	3.89	3.78
Carbon Monoxide (CO)	15.06	13.43

**REGULATORY REVIEW:**

This facility has been found to be subject to the requirements of the following regulations:

Federal and District Enforceable:

20 DCMR Chapter 1 - General Rules

20 DCMR Chapter 2 - General and Non-Attainment Area Permits

20 DCMR 500 - Records and Reports

20 DCMR 502 - Sampling, Tests, and Measurements

20 DCMR 600 - Fuel-Burning Particulate Emission

20 DCMR 604 - Open Burning

20 DCMR 605 - Control of Fugitive Dust

20 DCMR 606 - Visible Emissions

20 DCMR 774 - Architectural and Industrial Maintenance Coatings

20 DCMR 800 - Control of Asbestos

20 DCMR 801 - Sulfur Contents of Fuel Oils

20 DCMR 805 - Reasonably Available Control Technology for Major Stationary Sources of the Oxides of Nitrogen

40 CFR 51.212, 52.12, 52.30, 60.11, and 61.12 - Credible Evidence

40 CFR 63, Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (NESHAP for RICE)

## **TECHNICAL SUPPORT MEMORANDUM**

### **Smithsonian Institution, National Museum of the American Indian Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 5

#### District Enforceable Only:

20 DCMR 402 - Chemical Accident Prevention (*Note: AQD did not make a positive determination that this regulation was applicable to the facility, but included it as a standard requirement in the permit.*)

20 DCMR 900 - Engine idling

20 DCMR 901 - Vehicular exhaust emissions

20 DCMR 902 - Lead Content of Gasoline

20 DCMR 903 - Odorous or other nuisance air pollutants

20 DCMR 1406 - Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

#### 20 DCMR Chapter 2 – General and Non-Attainment Area Permits:

The stationary engine, the three 8.165 MMBTU/hr boilers, and the paint booth at the facility are stationary sources that have the potential to emit air pollutants, and are therefore subject to 20 DCMR Chapter 2 permitting requirements. There are three units of fuel burning equipment at the facility with heat input ratings below 5 MMBTU/hr. These units are included in the permit as insignificant activities, as they have the potential to contribute NO<sub>x</sub> emissions toward facility-wide emissions limited pursuant to 20 DCMR 200.6 and 200.7 (discussed above), but they are not subject to 20 DCMR Chapter 2 because the heat input rating make them exempt pursuant to 20 DCMR 200.14. As such, all of the significant units at the facility are subject to Chapter 2 permitting requirements.

#### 20 DCMR Chapter 3 – Operating Permits and Acid Rain Programs:

As discussed above in the “Discussion of Proposed Synthetic Minor Limitations”, 20 DCMR Chapter 3 will no longer be applicable upon the issuance of this permit with its limits established pursuant to 20 DCMR 200.6 and 200.7. Existing Title V permit 045-R1 will be superseded and replaced by this permit. The acid rain portions of 20 DCMR Chapter 3 are not, and have never been, applicable to the facility.

#### 20 DCMR Chapter 5 – Source Monitoring and Testing:

Throughout the permit, appropriate monitoring, testing, and record keeping requirements have been established to ensure that all emission and operational limits in the permit are enforceable as a practical matter. These requirements are established under the authority of Chapter 5.

#### 20 DCMR 600 – Fuel-Burning Particulate Emission:

The requirements of this section apply to the 8.3165 MMBTU/hr boilers at the site. The emission limit should be 0.11 lb/MMBTU based on the equipment heat input and the equation contained in 20 DCMR 600.1. Note that, during the review of the application, it was noted that the previous permit contained an incorrect standard pursuant to this condition. This error has been corrected with this version of the permit.

Additionally, this section applies to the 2.52 MMBTU/hr Fulton boilers listed as miscellaneous/insignificant activities in Condition IV of the permit. The limit for these units is 0.13 lb/MMBTU and is reflected in Condition IV(c)(1) of the permit.

**TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian**

**Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 6

20 DCMR 801: Sulfur Content of Fuel Oils:

This regulation limits fuel oil sulfur content to 1% by weight in all circumstances (20 DCMR 801.1). The boiler fuel is subject to the more stringent 0.0015% sulfur by weight (15 ppm) standard in 20 DCMR 801.3.

The only portion of 20 DCMR 801 applicable to the emergency engines is the 1% sulfur content limit. However, because the emergency engine and the boilers share a common fuel source tank, the 0.0015% sulfur standard has been applied to that unit in the permit as well.

20 DCMR 805 - Reasonably Available Control Technology for Major Stationary Sources of the Oxides of Nitrogen

Although the facility is obtaining a synthetic minor limitation, the facility, at one time (prior to initial permitting), had the potential to emit greater than 25 tons per year of NO<sub>x</sub> and has not demonstrated that they never exceeded that level. As such, this regulation is applicable pursuant to 20 DCMR 805.1(a) through (c).

This regulation is applicable to the three 8.165 MMBTU/hr boilers at the site (see 20 DCMR 805.1(a)), and requires biennial combustion process tune-ups pursuant to 20 DCMR 805.5(b) and 805.9. These requirements have been incorporated into Conditions III(b)(1)(D) and III(b)(2)(E) and (F) of the permit. Record keeping is required pursuant to Condition III(b)(4)(H)

This regulation is not applicable to the emergency engines as they are not permitted to operate 500 hours or more per 12 month rolling period. See the regulatory exemption at 20 DCMR 805.1(c)(5) and permit Condition III(a)(2)(A).

This regulation is also not applicable to the small boilers covered by Condition IV of the permit as their heat input ratings are below 5 MMBTU/hr. See 20 DCMR 805.1(c)(2).

40 CFR 60, Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

This NSPS is not applicable to the units at this facility because all boilers are smaller than 10 MMBTU/hr on a heat input basis.

40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines:

The engine of the emergency generator set is not subject to 40 CFR 60, Subpart IIII. 40 CFR 60, Subpart IIII applies to stationary compression ignition internal combustion engines (CI-ICE) that: 1) are model year of 2007 or later, 2) commenced construction after July 11, 2005 and were manufactured after April 1, 2006, or 3) were modified or reconstructed after July 11, 2005.

The diesel-fired emergency generator set present at the site is described in the following table:

**TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian**

**Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 7

<b>Emission Units</b>			
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G-1	Stack S2	Emergency Generator	1,250 kWe Cummins, Model No. DFLC-5564915, Serial No. H020403284 emergency generator set powered by a 1,863 hp Cummins Model KTA-50-G3 diesel-fired engine, installed in 2004

The unit was installed prior to the applicability date of this regulation, thus the requirements are not included in the permit.

40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines (NESHAP for RICE):

Subpart ZZZZ of 40 CFR 63 regulates/monitors HAPs such as acetaldehyde, acrolein, benzene, toluene, xylene, cadmium, chromium, lead, etc., through surrogate compounds such as formaldehyde, CO and/or VOC. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

A facility that emits or has the PTE 10 tons/year of any single HAP or 25 tons/year of any combination of HAPs is considered a major source of HAPs. Any source that is not a major source is an area source of HAPs. Because this facility does not have the PTE more than 10 tons/year of a single HAP or an aggregate of more than 25 tons of total HAPs, it is not a major source; it is an area source.

Subpart ZZZZ is applicable to new or reconstructed compression ignition (CI) engines, where “new” (at an area source of HAP emissions) is defined as those engines that are manufactured or reconstructed on or after June 12, 2006. The 1,250 kWe emergency generator set was installed in 2004 and is therefore considered “existing” rather than “new” with respect to this regulation.

Subpart ZZZZ is applicable to “existing” CI engines at area sources of HAP emissions if construction (or reconstruction) of the unit was commenced before June 12, 2016. This unit is considered an existing CI engine under this regulation.

It should be noted that, pursuant to 40 CFR 63.6585(f)(3) this unit could potentially be exempt from applicability of this subpart as an existing institutional emergency stationary RICE located at an area source of HAP emissions. However, because the units are intended for use, not just during full loss of power, but also during situations of low voltage or frequency (considered non-emergency operation per Delaware v. EPA), and the Permittee wishes to be authorized to operate for up to fifty (50) hours per calendar year in non-emergency situations, they are not eligible for exemption from the requirements of this regulation found in 40 CFR 63.6585(f)(3). For more information on the implications of the partial RICE vacatur established in Delaware v. EPA, see <https://www.epa.gov/stationary-engines/technical-documents-neshap-reciprocating-internal->

**TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian**

**Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 8

combustion-engines-0. Due to this case's outcome, operation of the emergency generator set to address low voltage or frequency situations would now be considered non-emergency operation, which the Department does not allow unless the unit is complying with either an NSPS (Subpart IIII or JJJJ) or NESHAP Subpart ZZZZ. As such, in order to be granted the non-emergency operation allowances in Subpart ZZZZ, this regulation was applied to the equipment.

**40 CFR 63, Subpart JJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources:**

The three boilers greater than 5 MMBTU/hr rated heat input and the three boilers less than 5 MMBTU/hr rated heat input at this facility are existing boilers and are permitted to burn natural gas and No. 2 fuel oil. The applicant did not indicate that fuel oil is used only during gas interruptions in the 2011 Title V application. However, in a revised 2012 Title V application and subsequent comments during development of the resulting permit, the applicant did so indicate. Nothing in the synthetic minor permit application currently being processed has revised this request. Therefore, the requirements of this NESHAP have not been included in the permit. Instead, Condition III(b)(2)(C) establishes limits to ensure that the NESHAP is not triggered for the larger boilers and Condition IV(d)(3) establishes similar limits for the smaller boilers.

**PROCEDURE FOR SUBMITTING COMMENTS OR REQUESTING PUBLIC HEARING:**

During the public comment period, any interested person may submit written comments on the draft permit and may request a public hearing, if no public hearing has already been scheduled. A request for a public hearing shall be in writing and shall state the nature of the issues proposed to be raised in the hearing. The District shall grant such a request if it is deemed appropriate. The venue, date, and time for any public hearing will be announced in the D.C. Register and on the Department's website.

**COMMENT PERIOD:**

Beginning Date: September 16, 2022

Ending Date: October 17, 2022

All written comments should be addressed to the following individual and office:

Stephen S. Ours, P.E.  
Chief, Permitting Branch  
Department of Energy and Environment  
Air Quality Division  
1200 First Street, NE, 5<sup>th</sup> Floor  
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[stephen.ours@dc.gov](mailto:stephen.ours@dc.gov)



**TECHNICAL SUPPORT MEMORANDUM**

**Smithsonian Institution, National Museum of the American Indian  
Synthetic Minor Permit No. 7289-SM**

September 7, 2022

Page 9

**POINT OF CONTACT FOR INQUIRIES:**

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