REGION 1
BOSTON, MA 02109

December 19, 2023

FACT SHEET

Outer Continental Shelf Preconstruction Air Permit
New England Wind 1 Project
Park City Wind, LLC

Offshore Renewable Wind Energy Development
EPA Draft Permit Number: OCS-R1-07

Acronyms and Abbreviation List

APPS	Air to Prevent Pollution from Ships
AQRV	Air Quality Related Values
BACT	Best Available Control Technology
BOEM	Bureau of Ocean Energy Management
CAA	Clean Air Act
CA SIP	California State Implementation Plan
CERC	Continuous Emission Reduction Credit
C.F.R.	Code of Federal Regulations
CH_4	Methane
CO	Carbon Monoxide
COA	Corresponding Onshore Area
CO_2	Carbon Dioxide
CO_2e	Carbon dioxide equivalent
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
DERC	Discrete Emission Reduction Credit
EAB	Environmental Appeals Board
ECA	Emission Control Area
EGRID	Environmental Protection Agency's Emissions and Generation Resource Integrated Database
EIAPP	Engine International Air Pollution Prevention
EPA	United States Environmental Protection Agency
EJ	Environmental Justice
ERC	Emission Reduction Credit
ESA	Endangered Species Act
ESP	Electrical Service Platform
EUG	Emission Unit Group
FWS	U.S. Fish and Wildlife Service
GCOP	Good Combustion and Operation Practices
GHG	Greenhouse Gas
g/kW-hr	Grams per kilowatt-hour
H_2SO_4	Sulfuric acid
HAP	Hazardous Air Pollutant
HC	Hydrocarbon
HV GIS	High Voltage Gas Insulated Switchgear
IAPP	International Air Pollution Prevention
ISO NE	ISO New England
KV	Kilovolt
KW	Kilowatt
LAER	Lowest Achievable Emission Rate
LV GIS	Low Voltage Gas Insulated Switchgear
MassDEP	Massachusetts Department of Environmental Protection
MV GIS	Medium Voltage Gas Insulated Switchgear
MW	Megawatt
NEW1	New England Wind 1
NEW2	New England Wind 2
NHPA	National Historical Preservation Act
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NMHC	Non-methane hydrocarbons
NNSR	Nonattainment New Source Review
NSR	New Source Review
N_2O	Nitrous oxide
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
OCS	Outer Continental Shelf
OCS-DC	Offshore Converter Station
OnCS-DC	Onshore Converter Station
OECLA	Offshore Export Cable Laying Activities
OSCLA	Outer Continental Shelf Lands Act
Pb	Lead
PCW	Park City Wind, LLC
PM	Particulate Matter
PM_{10}	Particulate Matter with an Aerodynamic Diameter <= 10 Microns
$PM_{2.5}$	Particulate Matter with an Aerodynamic Diameter <= 2.5 Microns
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
RPM	Revolutions Per Minute
SER	Significant Emission Rate
SIL	Significant Impact Levels
SO_2	Sulfur Dioxide
TPY	Tons Per Year
U.S.C.	United States Code
VW1	Vineyard Wind 1, LLC
VOC	Volatile Organic Compound
WDA	Wind Development Area
WTG	Wind Turbine Generator

Table of Contents

I. General Information

Company Name and Address:	Park City Wind, LLC 125 High Street, 6th Floor Boston, MA 02110
Facility Name:	New England Wind 1 (NEW1)
Location of Regulated Activities:	Outer Continental Shelf (OCS) Lease Area OCS-A 0534 and potentially a portion of the currently identified Lease Area OCS-A 0501. See Section II.A for more information.
Draft OCS Permit Number:	OCS-R1-07
EPA Contact:	Morgan M. McGrath, P.E.

On October 7, 2022, Park City Wind, LLC ("PCW" or the "applicant") submitted to EPA Region 1 (EPA) an initial application requesting a Clean Air Act ("CAA" or "the Act") preconstruction permit under Section 328 of the CAA for the construction and operation of their New England Wind 1 Offshore Windfarm ("NEW1" or "the Project"). After review of this initial air permit application, EPA requested supplemental information for NEW1 on November 4, 2022, and December 16. On January 13, 2023, EPA received a revised OCS air permit application, which replaced the initial application. EPA determined the application to be administratively complete on February 13, 2023.

After reviewing the application and additional information, the EPA prepared this Fact Sheet and a draft OCS preconstruction air permit as required by 40 C.F.R. parts 55 and 124. All CAA permitting requirements applicable to the windfarm are contained within EPA Permit No. OCS-R1-07. Since the decommissioning phase of the wind farm will occur well into the future, the EPA is currently unable to determine the specific permitting requirements for the decommissioning phase. Therefore, EPA is not permitting that phase at this time.

The EPA's draft permit is based on the information and analysis provided by the applicant and the EPA's own technical expertise. This Fact Sheet documents the information and analysis the EPA used to support the OCS draft permit decisions. It includes a description of the proposed wind farm, the applicable regulations, and an analysis demonstrating how the applicant will comply with the requirements contained in the permit.

The EPA has made the permit application materials and any supplemental information provided by the applicant available to the public as part of the administrative record for this Fact Sheet and the draft CAA permit. The permit application and supplemental information for the draft permit is available on EPA Region 1's web site: https://www.epa.gov/caa-permitting/caa-permitting-epas-new-england-region.

II. Project Description

The application proposes to construct up to sixty-two (62) wind turbine generators (WTGs), up to two (2) electrical service platforms (ESPs), associated offshore cables, and an onshore transmission system. Once operational, the project will have an anticipated nameplate capacity of 804 megawatts (MW) of renewable energy.

A. Project Location

The Project will be located within federal waters on the Outer Continental Shelf (OCS) located within the Bureau of Ocean Energy Management (BOEM) Renewable Energy Lease Area OCS-A 0534 and potentially occupying a portion of BOEM Lease Area OCS-A 0501. The wind development area (WDA) for NEW1 is approximately 57,081 acres[1]. At its closest point, the NEW1 WDA is approximately 28 km (15 nautical miles (NM[2])) from the nearest Massachusetts shoreline.[3] See Figure 1.

The Project will include up to 62 WTGs that will generate electricity from offshore wind. The Project will also include one or two ESPs that serve as common interconnection points for the WTGs[4]. The ESP(s) will include step-up transformers and other electrical gear to increase the voltage of power generated by the WTGs. The WTGs and ESP(s) will be oriented in an east-west, north-south grid pattern with one (1) NM spacing between positions and will be supported by monopile or piled jacket foundations. Strings of WTGs will connect to each ESP via a submarine inter-array cable transmission system. If two ESPs are used, they may be connected withto an inter-link cable. Two offshore export cables will transmit electricity from the ESP(s) to a landfall site in the Town of Barnstable, Massachusetts. All offshore cables will be buried beneath the seafloor. Grid interconnection cables will then connect the Project's onshore substation to the ISO New England electric grid at Eversource's existing 345 kilovolt (kV) substation in West Barnstable, Massachusetts.

[1] The NEW1 WDA is comprised of the northeast portion of the BOEM Lease Area OCS-A 0534. The entire lease area itself is approximately 101,590 acres and the wind development area (WDA) for NEW1 is approximately 57,081 acres. It is possible the NEW1 WDA could extend to the southwestern portion of BOEM Lease Area OCS-A-0501, which is dependent on the final physical footprint occupied by the Vineyard Wind 1 project. *See* Figure 1.

[2] All miles referenced in this Fact Sheet are nautical miles (NM). One NM is equal to 1.15077 statute miles. EPA performs jurisdictional and OCS air emissions determinations based on NM.

[3] Note that the closest point in Massachusetts to the NEW1 WDA is on Nomans Land, which is an uninhabited island that is closed to the public. The distance is measured from the boundary of the NEW1 WDA (not the nearest WTG position).

[4] If two ESPs are used, they may be located at two separate positions or co-located at one of the potential ESP positions (co-located ESPs would be smaller structures installed on monopile foundations).

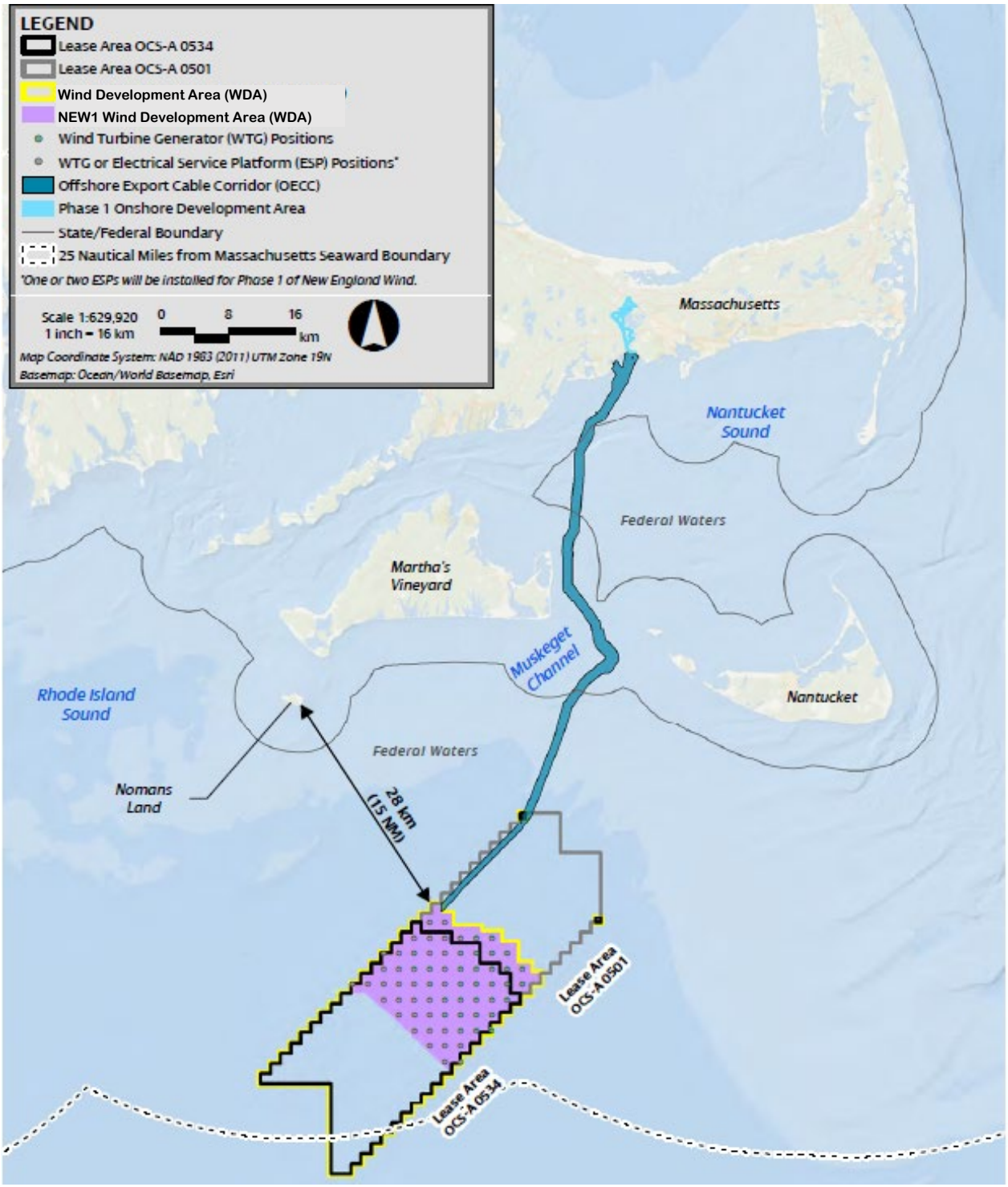

Figure 1 Location of New England 1 ("NEW1") Offshore Windfarm Project

B. Construction Emissions from New England Wind 1 Project

Offshore construction will include activities involving scour protection, foundation, and offshore cable installation, followed by ESP and WTG installation and commissioning. Table 1 contains the Project's potential emissions during the construction phase (annualized), as contained in NEW1's revised emission estimates provided to the EPA on January 13, 2023. Note that the estimates during the construction period represent the annualized worst-case potential to emit (PTE).

Table 1 Estimated Construction OCS Emissions (tons per year (tpy)) for the NEW1 Project

CO_2e	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	Lead	VOC
169,631	640	2,771	87	84	26	0.01	61

For purposes of EPA's CAA OCS permit, construction emissions from the windfarm are estimated to begin once any equipment or any activity that by itself meets the definition of an OCS source is located within the WDA. At that point, the EPA considers the NEW1 WDA to be an OCS Facility and to meet the definition of an OCS source, as defined in CAA section 328 and 40 C.F.R. part 55, for the purposes of calculating potential emissions. Emissions from vessels servicing or associated with any part of the OCS Facility are included in the potential emissions while at the OCS Facility or traveling to and from any part of the OCS Facility when within 25 NM of the source's centroid[5].

C. Operation and Maintenance Emissions from New England Wind 1 Project

The operation and maintenance (O&M) phase of the windfarm will begin when the first WTG is completed and begins to produce commercial power. Note that individual WTGs could be producing commercial power before the construction of the entire OCS Facility is completed. Table 2 contains the NEW1 project's maximum potential emissions during the O&M phase (post-operational phase start date), as contained in NEW1's revised emission estimates provided to the EPA on January 13, 2023. Note that the estimates during the O&M phase represent the annualized worst-case potential to emit and assumes the facility is operating at the maximum production capacity.

Table 2 Estimated Operations and Maintenance Emissions (TPY) for the NEW1 Project

CO_2e	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	Lead	VOC
19,965	71	283	9	9	1.0	<0.01	5

Once operational, electricity produced by the WTGs will displace electricity generated by fossil fuel power plants and therefore, significantly reduce emissions associated with the existing ISO NE electric grid. Once operational, emissions from vessels, equipment, and generators are estimated from routine inspections and preventive maintenance. Corrective maintenance may occur periodically, and more significant repairs are expected to be rare.

[5] EPA utilizes the centroid of the Wind Development Area to estimate PTE within 25 nautical miles of the source's centroid. See Vineyard Wind 1 Fact Sheet: pg 11-14 (2019-06-28) located at https://www.epa.gov/caa-permitting/outer-continental-shelf-wind-energy-database for more information on this concept.

D. Total Source Emissions

Vineyard Wind 1, LLC (owner of the Vineyard Wind 1 (VW1) project) and Park City Wind, LLC (owner of the NEW1 project and the New England Wind 2 (NEW2) project) qualify as one (1) stationary source for Clean Air Act permitting purposes under applicable regulations. More information on the reasons why these projects qualify as one stationary source for CAA permitting purposes can be found in Section III.D of this Fact Sheet. The following table summarizes the combined O&M potential to emit emissions for all three project(s) projects that comprise this source. Note that the construction timeline indicated for VW1 is anticipated to be completed prior to when NEW1 and NEW2 commence construction.

Table 3 Combined O&M Emissions for VW1 LLC[6] and Park City Wind, LLC (TPY)[7]

CO_2e	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	Lead	VOC
45,864	164	646	22	21	2	<0.01	12

III. Applicability of 40 C.F.R. Part 55 – OCS Air Regulations

A. OCS Statutory and Regulatory Authority

Section 328(a) of the CAA requires that the EPA establish air pollution control requirements for equipment, activities, or facilities located on the OCS that meet the definition of an OCS source. Sources located within 25 NM of a state's[8] seaward boundary also need to comply with several onshore requirements. To comply with this statutory mandate, on September 4, 1992, the EPA promulgated 40 C.F.R. part 55, which established the requirements to control air pollution from OCS sources to attain and maintain federal and state ambient air quality standards.[9]

The Energy Policy Act of 2005 (*See* Title III (Oil and Gas), Subtitle G – Miscellaneous, Section 388) amended section 8 of the Outer Continental Shelf Lands Act (OCSLA) to allow the EPA and the Department of the Interior to authorize activities on the OCS that "produce or support production, transportation, or transmission of energy from sources other than oil and gas." Section 4(a)(1) of OCSLA was recently amended to expand the scope of "exploring, developing or producing resources" in the OCS to include "non-mineral energy resources" such as offshore wind. *See* William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021, H.R. 6395, 116th Cong. § 9503 (2021). BOEM reviews construction and operation plans from offshore wind energy developers and approves, approves with modifications, or disapproves those plans. EPA issues a CAA OCS permit to

[6] As contained in the Fact Sheet for Vineyard Wind 1, LLC dated June 28, 2019.
[7] EPA views VW1, NEW1, and NEW2 as separate projects for Clean Air Act preconstruction permitting. A detailed discussion of our analysis related to these projects is in included at section V.A of this Fact Sheet.
[8] The term "state," when used to reference one of the 50 states within the United States, includes states that are officially named commonwealths, e.g., the Commonwealth of Massachusetts.
[9] Refer to the Notice of Proposed Rulemaking, December 5, 1991 (56 Fed. Reg. 63,774), and the preamble to the final rule promulgated September 4, 1992 (57 Fed. Reg. 40,792) for further background and information on the OCS regulations.

establish air pollution control requirements for such sources when the definition of "OCS source" is met, as defined in CAA § 328 and 40 C.F.R. part 55.[10]

Under CAA § 328(a)(4)(C) and 40 C.F.R. § 55.2, an OCS source includes any equipment, activity, or facility which:

(1) Emits or has the potential to emit any air pollutant,

(2) Is regulated or authorized under the OCSLA (43 U.S.C. § 1331 *et seq.*); and

(3) Is located on the OCS or in or on waters above the OCS.

Furthermore, 40 C.F.R. § 55.2 establishes that for a vessel to be considered an OCS source, the vessel must also be:

(1) Permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing, or producing resources therefrom, within the meaning of section 4(a)(1) of OCSLA (43 U.S.C. §1331 *et seq.*); or

(2) Physically attached to an OCS facility, in which case only the stationary sources [sic] aspects of the vessels will be regulated.

Finally, under 40 C.F.R. § 55.2, the term "Outer Continental Shelf" has the meaning provided by section 2 of the OCSLA (43 U.S.C. § 1331 *et seq.*), which defines the "Outer Continental Shelf" as "all submerged lands lying seaward and outside of the area of lands beneath navigable waters as defined in section 1301 of this title, and of which the subsoil and seabed appertain to the United States and are subject to its jurisdiction and control."

Once an activity, facility, or equipment (which may include a vessel) is considered an OCS source, then the emission sources of that OCS source become subject to the requirements of 40 C.F.R. part 55, which include, but are not limited to: (1) obtaining an OCS air permit, as required by 40 C.F.R. § 55.6; (2) complying with the applicable federal regulations and requirements specified at 40 C.F.R. § 55.13; (3) for an OCS source within 25 NM of a state's seaward boundary, complying with the state or local air emissions requirements of the corresponding onshore area (COA) specified at 40 C.F.R. § 55.14; (4) monitoring, reporting, inspection, and enforcement requirements specified at 40 C.F.R. §§ 55.8 and 55.9; and (5) permit fees as specified under 40 C.F.R. § 55.10.

B. Procedural Requirements for OCS Permitting

Regulations developed pursuant to OCS statutory requirements under section 328 of the CAA are codified at 40 C.F.R. part 55. The OCS regulations create procedures that require an applicant seeking to construct and operate an OCS source to identify the federal regulations and the state and local regulations from the COA that may apply to the source, and to seek to have those regulations apply, as a matter of federal law, to the OCS source. Once the EPA has received a complete permit application,

[10] A copy of the Construction and Operation Plan may be found at https://www.boem.gov/renewable-energy/state-activities/new-england-wind-formerly-vineyard-wind-south

the EPA[11] then follows the applicable procedural requirements for federal permitting in those regulations which follow the requirements in 40 C.F.R. part 124 or 40 C.F.R. part 71, and then finalizes the OCS permit in accordance with those federal requirements.[12]

The OCS regulations first require the applicant to submit a Notice of Intent (NOI) to the nearest EPA regional office. *See* 40 C.F.R. § 55.4. The NOI provides emissions information regarding the OCS source, including information necessary to determine the applicability of onshore requirements and the source's impact in onshore areas. *See* 40 C.F.R. § 55.5. NEW1 submitted to the EPA an NOI for the windfarm on January 28, 2022. Information provided in the NOI for this windfarm indicated that Massachusetts is the nearest onshore area ("NOA"). The EPA did not receive a request from another state to be designated the COA for this project, thus Massachusetts is designated as the COA for this project. *See* 40 C.F.R. § 55.5(b)(1).

The federal requirements that apply to an OCS source are provided in 40 C.F.R. § 55.13. The EPA also reviews the state and local air requirements of the COA to determine which requirements should be applicable on the OCS and revises 40 C.F.R. part 55 to incorporate by reference those state and local air control requirements that are applicable to an OCS source. *See id.* § 55.12. Once the EPA completes its rulemaking to revise 40 C.F.R. part 55, the state and local air regulations incorporated into 40 C.F.R. part 55 become federal law and apply to any OCS source associated with that COA.

Under this "consistency update" process, the EPA must incorporate applicable state and local rules into 40 C.F.R. part 55 as they exist onshore. This limits the EPA's flexibility in deciding which requirements will be incorporated into 40 C.F.R. part 55 and prevents the EPA from making substantive changes to the requirements it incorporates. As a result, the EPA may be incorporating rules into part 55 that do not conform to certain requirements of the CAA or are not consistent with the EPA's state implementation plan (SIP) guidance[13]. The EPA includes all state or local air requirements of the COA except any that are not rationally related to the attainment or maintenance of federal or state ambient air quality standards or part C of Title I of the Act, that are designed expressly to prevent exploration and development of the OCS, that are not applicable to an OCS source, that are arbitrary or capricious, that are administrative or procedural rules, or that regulate toxics which are not rationally related to the attainment and maintenance of federal and state ambient air quality standards.[14]

On November 23, 2021, the EPA published a Notice of Proposed Rulemaking (NPRM) proposing to incorporate various Massachusetts air pollution control requirements into 40 C.F.R. part 55[15] in response to a NOI submittal for another wind energy project Sunrise Wind, LLC. (NOI submitted on September 9, 2021).

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[11] The authority to "take all actions required to implement the Outer Continental Shelf (OCS) rules promulgated at 40 CFR Part 55" has been delegated to the Regional Administrator in EPA Region 1. See Docket for Delegation of Authority.
[11] *See* 40 C.F.R. § 55.6(a)(3).
[12] *See* 40 C.F.R. § 55.6(a)(3).
[13] Inclusion of a state rule in 40 C.F.R. part 55 does not imply that a state rule meets the requirements of the CAA for SIP approval, nor does it imply that the rule will be approved by the EPA for inclusion in the SIP.
[14] *See* 40 C.F.R. §§ 55.12(d), 55.14(c).
[15] 86 Fed. Reg. 66,509–66,512.

EPA also received an NOI on November 5, 2021, from Revolution Wind, LLC, an NOI on January 28, 2022, from Park City Wind, LLC (for the NEW 1 and NEW 2 projects) and an NOI on May 31, 2022, from Mayflower Wind Energy, LLC.[16] Massachusetts was also designated as the COA for all three projects. Upon the designations, EPA conducted a consistency review in accordance with regulations at 40 C.F.R. § 55.12 and determined any recent changes to the Massachusetts regulations since the NPRM were non-substantive as they relate to OCS sources, and that it was not necessary to propose an additional consistency update at that time.[17]

EPA published a final rulemaking notice for the consistency update to part 55 on November 15, 2022. *See* 87 Fed. Reg. 68,364 (Nov. 15, 2022). EPA's November 15, 2022, Federal Register notice satisfies EPA's obligation under § 55.12 to conduct a consistency review for the subsequent NOIs received from Sunrise Wind, LLC, Revolution Wind, LLC, Park City Wind, LLC ((for the NEW 1 and NEW 2 projects)), and Southcoast Wind, LLC (formerly Mayflower Wind Energy).

The Massachusetts regulations that the EPA incorporated into part 55 in this action are the applicable provisions of (1) 310 CMR 4.00: Timely Action Schedule and Fee Provisions; (2) 310 CMR 6.00: Ambient Air Quality Standards for the Commonwealth of Massachusetts; and (3) 310 CMR 7.00: Air Pollution Control, as amended through March 5, 2021. EPA's final rule did not affect the provisions of 310 CMR 8.00 that were previously incorporated by reference into part 55 through EPA's prior consistency update on November 13, 2018. *See* 83 Fed. Reg. 56,259 (Nov. 13, 2018).

The applicant's next step is to submit an air permit application that provides the information to show that it will comply with all applicable federal requirements in 40 C.F.R. part 55, including those state and local requirements incorporated by reference into 40 C.F.R. part 55 as explained previously), and any other federal requirements that may apply to the source. The EPA reviews the application and proposes either to approve or deny the application. If the EPA decides to propose approval of the application, the EPA drafts a draft air permit and a fact sheet that documents its proposed permit decision. The EPA then provides a notice and comment period of at least 30 days on the draft permit and may also hold a public hearing if there is a significant degree of public interest and/or if a hearing might clarify issues involved in the permit decision. Following the comment period, the EPA responds to all significant comments raised during the public comment period, or during any hearing, and issues the final air permit decision.

C. Scope of the "OCS Source" Under 40 C.F.R. part 55

[16] On February 1, 2023, Mayflower Wind Energy LLC notified EPA of a name change to South Coast Wind Energy, LLC.

[17] Since EPA's November 23, 2021, NPRM, Massachusetts revised the regulations at 310 CMR 7.00 (Statutory Authority; Legend; Preamble; Definitions) and 310 CMR 7.40 (Low Emission Vehicle Program), effective December 30, 2021. EPA previously determined that the regulations at 310 CMR 7.40 (Low Emission Vehicle Program) were not applicable to OCS sources and did not propose to incorporate this section of 310 CMR 7.00 into part 55 as part of the November 23, 2021, NPRM. Although EPA's NPRM proposed to incorporate by reference the definitions located at 310 CMR 7.00 (Statutory Authority; Legend; Preamble; Definitions), MassDEP's most recent revisions to 310 CMR 7.00 (Statutory Authority; Legend; Preamble; Definitions) were related to the amendments to the regulations at 310 CMR 7.40 (Low Emission Vehicle Program). EPA has reviewed the recent amendments to the Massachusetts regulations at 310 CMR 7.00 (Statutory Authority; Legend; Preamble; Definitions) and determined that these changes are non-substantive as they relate to OCS sources.

The CAA permitting analysis for an offshore windfarm located in federal waters must begin with a determination of the scope of the "OCS source" because the boundaries of the source determine what activities are attributed to the source for purposes of quantifying its "potential emissions" and determining what CAA programs apply.[18] These "potential emissions" must also include the emissions from vessels "servicing or associated with an OCS source" as that is required under CAA section 328 and EPA's implementing regulations at 40 C.F.R. part 55. Once the scope of the OCS source is identified, EPA must then determine if and how CAA programs such as the New Source Review (NSR) preconstruction permitting and Title V operating permit programs[19] may apply to the source. NSR and title V permitting will generally apply and may cause the OCS source's emissions to exceed the applicability thresholds included in those programs.

For purposes of CAA permitting, EPA is treating all stationary equipment and activities within the proposed windfarm, including all wind turbines, as part of a single "OCS source" because all such equipment and activities are integral components of a single industrial operation that emits or has the potential to emit any air pollutant, is regulated or authorized under the OCSLA, and is located on the OCS or in or on waters above the OCS. The OCS source comprises all offshore WTGs and their foundations, each ESP and its foundation, the inter-array cables, and vessels when they meet the definition of an OCS source in 40 C.F.R. § 55.2. Thus, emissions from any vessel "servicing or associated with" any component of the OCS source (including any WTG or ESP) while at the source and while en route to or from the source within 25 NM of the source's centroid must be included in the OCS source's potential to emit, consistent with the definition of "potential emissions" in 40 C.F.R. § 55.2.

EPA uses the term "OCS Facility," which means the entire wind development area[20] once the first OCS source is established in the wind development area. The first OCS source is established once any equipment or activity that meets the definition of an OCS source is located within the wind development area. The term "OCS Facility" is used to differentiate from the term "OCS source" when that term is used in the permit to refer to individual pieces of equipment or vessels that meet the definition of "OCS source" which are subject to control technology requirements.[21]

D. Scope of the Stationary Source Under New Source Review Regulations

The EPA must apply the New Source Review program regulations to determine the emission units that are considered part of the major stationary source for purposes of applying these requirements. This approach of using the definition within the specific CAA program is articulated well in an EAB Decision

[18] The OCS regulations themselves do not constitute a permitting program but, instead, make existing federal and state air pollution control requirements applicable to OCS sources. 40 C.F.R. § 55.1.

[19] Applicability of Prevention of Significant Deterioration (PSD) and Nonattainment NSR (NNSR) permit programs is discussed in Section V and VI of this Fact Sheet.

[20] The NEW1 WDA is comprised of the northeast portion of the BOEM Lease Area OCS-A 0534. The entire lease area itself is approximately 101,590 acres and the wind development area (WDA) for NEW1 is approximately 57,081 acres. It is possible the NEW1 WDA could extend to the southwestern portion of the currently identified BOEM Lease Area OCS-A-0501, which is dependent on the final physical footprint occupied by the Vineyard Wind 1 project. *See* Figure 1.

[21] Note that the CAA defines the term "OCS source" to include "any equipment, activity, or facility" that (1) emits or has the potential to emit any air pollutant, (2) is regulated or authorized under the Outer Continental Shelf Lands Act (OCSLA), and (3) is located on the OCS or in or on waters above the OCS. CAA § 328(a)(4)(C).

In re Shell Offshore, Inc., Kulluk Drilling Unit and Frontier Discoverer Drilling Unit, 13 E.A.D. 357, 380 (EAB 2007). The EAB stated in that decision:

> We find that the Region correctly concluded that, once it determines an emissions source located on the OCS is properly classified as an "OCS source," then that emissions source becomes subject to the requirements of 40 C.F.R. part 55. Further, the permitting programs and other requirements to which the OCS source is subject through part 55, including the PSD permitting program, then apply to the OCS source based on the regulations that define the scope of those programs. Specifically, simply because EPA has identified an OCS source as regulated under the CAA, and subject to the requirements of part 55, does not mean it can avoid the next necessary step of determining the scope of the "stationary source" for PSD purposes.

In accordance with these requirements of the applicable regulations, the EPA must determine whether NSR regulations apply to the windfarm based on the regulations that define the scope of the source under this CAA permitting program.

For the NSR preconstruction permitting programs, which include Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR), the EPA regulations define "stationary source" as "any building, structure, facility, or installation which emits or may emit a regulated NSR pollutant."[22] Those regulations, in turn, define the term "building, structure, facility, or installation" to mean "all of the pollutant-emitting activities which [1] belong to the same industrial grouping, [2] are located on one or more contiguous or adjacent properties, and [3] are under the control of the same person (or persons under common control)," with "same industrial grouping" referring to the same Major Group, two-digit SIC code. For the Title V permit operating program, "major source" is similarly defined in relevant part as a stationary source or group of stationary sources that meet these same three criteria.[23, 24]

State and local permitting authorities have EPA-approved NSR permitting regulations that contain identical or similar definitions for the terms "stationary source" and "major source." Under the EPA-approved Massachusetts nonattainment new source review (NNSR) regulations at 310 CMR 7.00, Appendix A (incorporated by reference into the federal rules at 40 C.F.R. § 55.14), "stationary source" is defined as follows:

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[22] 40 C.F.R. §§ 52.21(b)(5), 51.165(a)(1)(i), 51.166(b)(5); *see* 42 U.S.C. § 7602(z) (defining "stationary source" as "any source of an air pollutant" except those emissions resulting directly from certain mobile sources or engines).

[23] 40 C.F.R. §§ 70.2, 71.2; *see* 42 U.S.C. § 7661(2) (defining major source for Title V permitting as "any stationary source (or any group of stationary sources located within a contiguous area and under common control)" that is either a major source as defined in CAA section 112 or a major stationary source as defined in CAA section 302 or part D of subchapter I (NNSR)). The EPA was also clear in promulgating its regulatory definitions of "major source" that the language and application of the Title V definitions were intended to be consistent with the language and application of the PSD definitions contained in 40 C.F.R. § 52.21. 61 Fed. Reg. 34,210 (July 1, 1996).

[24] NEW1 did apply for a Title V operating permit as part of its OCS air permit application. However, EPA will not be issuing the T5 Permit at this time. In accordance with the COA Per 310 CMR 7.00 Appendix C (4)(a) (5.), "For new construction subject to the requirements of 310 CMR 7.00: Appendix C, an application for an operating permit shall be submitted no later than one year after commencement of operation."

Stationary source means any building, structure, facility, or installation which emits, or which may emit any air pollutant subject to regulation under the Act.

(a) A stationary source may consist of one or more emissions units and:

1. may be a land-based point or area source; or
2. may be in, or on, the OCS or other submerged lands beneath navigable waters (lakes, rivers, and coastal waters adjacent to Outer Continental Shelf lands); or
3. may be any internal combustion engine, or engine combination, greater than 175 horsepower (hp) used for any stationary application; or
4. may be any internal combustion engine regulated under Sec. 111 (New Source Performance Standards (NSPS)) of the Act, regardless of size; or
5. may be any internal combustion engine of less than 175 horsepower (hp) not actually controlled to meet a regulation under Sec. 213 (Nonroad Engines and Vehicles) of the Act.

(b) A stationary source does not include:

1. emissions resulting directly from an internal combustion engine for transportation purposes; or
2. tailpipe emissions from any source regulated under title II of the Act or any emissions from in-transit, non-OCS marine vessels.

The Massachusetts NNSR regulations at 310 CMR 7.00, Appendix A define "building, structure, facility, or installation" as follows:

> [A]ll of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Any marine vessel is a part of a facility while docked at the facility. Any marine vessel is a part of an Outer Continental Shelf (OCS) source while docked at and within 25 nautical miles en route to and from the OCS source. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same Major Group (*i.e.*, which have the same two-digit code) as described in the *Standard Industrial Classification Manual*, 1987.

The Massachusetts Title V operating permit program regulations at 310 CMR 7.00, Appendix C define a "major source" as follows:

> For the purpose of defining "major source," a stationary source or group of stationary sources shall be considered part of a single industrial grouping if all the pollutant emitting activities at such source or group of sources on contiguous or adjacent properties belong to the same Major Group (*i.e.*, all have the same two-digit code) as described in the Standard Industrial Classification Manual, 1987.

Additionally, in 2019, EPA issued guidance[25] to provide its interpretation of the term "adjacent" as that term is used in NSR and Title V source determinations. In that guidance, EPA provided an interpretation of "adjacent" based solely on physical proximity for the purpose of determining whether separate activities are located on adjacent properties. The guidance indicated that EPA would no longer consider "functional interrelatedness" in determining whether activities are located on adjacent properties. EPA has applied the regulatory definitions and interpretive statements to determine the scope of the stationary source for the windfarms under the applicable NSR and Title V regulations – i.e., for purposes of determining whether the pollutant-emitting activities, equipment, or facilities for these projects: [1] belong to the same industrial grouping, [2] are located on one or more contiguous or adjacent properties, and [3] are under common control.[26] The same reasoning applies to the New England Wind project. As explained in more detail in those prior actions[27], the EPA considers a WDA to fit within the concept of a "property" meaning "a place or location." EPA has made this determination for two reasons. First, the WDA is a discrete and clearly identifiable area set apart from the surrounding open ocean by its man-made features. One could not approach or pass through the WDA and its towering grid of wind turbines without recognizing that it was a fundamentally different "place" than the open ocean. Second, although the WDA occupies a relatively large area, its size is necessarily unique to the expansive spatial scales associated with OCS windfarm development projects.[28] Viewed in context, the WDA is a relatively small property when compared to the area set aside for future development by the offshore wind industry off the coast of Massachusetts and is an even smaller property when compared to the OCS and surrounding open ocean more broadly.

In addition, the New England Wind 1, and 2projects and the previously permitted Vineyard Wind 1 project qualify as a single stationary source under the criteria in the EPA's NSR and Title V regulations described above.

Regarding the first criterion, the activities of Vineyard Wind 1, LLC (owner of the VW1 project) and Park City Wind, LLC (owner of the NEW1 and NEW2 projects) are classified under Standard Industrial Code (SIC) 4911, Electric Services. Accordingly, all pollutant-emitting activities for both the Vineyard Wind 1, LLC and Park City Wind, LLC projects, e.g., VW1, NEW1 and NEW2, belong to the same industrial grouping, and thus satisfy the first criterion for treatment as a single stationary source.

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[25] *See* the memo "Interpreting 'Adjacent' for New Source Review and Title V Source Determinations in All Industries Other Than Oil and Gas" at https://www.epa.gov/sites/production/files/2019-12/documents/adjacent_guidance.pdf

[26] *See* Fact Sheets for Vineyard Wind 1, LCC, South Fork Wind, LLC, and Revolution Wind, LLC, which are available online at https://www.epa.gov/caa-permitting/epa-issued-caa-permits-region-1.

[27] On September 28, 2023, EPA issued Permit No. OCS-R1-05 for Revolution Wind, LLC. In this permit action, EPA concluded that Revolution Wind, LLC and South Fork Wind, LLC constitute a single stationary source because all the pollutant-emitting activities, equipment, or facilities for these projects: [1] belong to the same industrial grouping, [2] are located on one or more contiguous or adjacent properties, and [3] are under common control. In the public comment period for Revolution Wind, LLC, a commenter suggested that Revolution Wind and South Fork Wind do not meet the second of these criteria—i.e., that these projects are not located on contiguous or adjacent properties. As explained in EPA's fact sheet and response to comment for Revolution Wind, LLC, EPA looks exclusively to physical proximity in determining whether this criterion is satisfied.

[28] Offshore windfarms require some degree of spacing between turbines, resulting in a single facility or installation covering a relatively large property. This spacing is necessary to balance navigational concerns, wind energy generation, and impacts to other resources such as marine mammals, recreational fishing and boating, and commercial marine fisheries.

Regarding the second criterion, the pollutant-emitting activities of these projects are located on contiguous properties. As discussed above, the WDA for a wind farm project qualifies as a single property. The pollutant-emitting activities for the Vineyard Wind 1 and Park City Wind, LLC projects will be located on adjoining lease areas, with the former located on OCS lease area OCS-A 0501 and the latter on lease area OCS-A 0534. As can be seen in Figure 1 (*Location of New England 1 (NEW1) Offshore Windfarm Project*) in Section II.A of this Fact Sheet, lease area OCS-A 0501 shares a common boundary with Lease area OCS-A 0534. In addition to being on contiguous lease areas, the NEW1 WDA has the potential to overlap with the currently identified lease area OCS-A 0501. *See* Figure 1. The portion of the NEW1 WDA that will be developed for NEW1 will depend on: (1) whether the Applicant acquires a small portion of lease area OCS-A 0501 from Vineyard Wind 1 LLC; (2) the generating capacity of the WTGs, which will determine the number of WTGs installed; and (3) engineering and environmental constraints, which could eliminate positions and extend the footprint of the VW1 project farther southwest. *See* Figure 1 Location of New England 1 ("NEW1") Offshore Windfarm Project. NEW1 and NEW2 share a similar overlapping boundary of their respective WDAs, which will be refined based on similar criteria as found above as the projects move forward, however the potential overlap occurs solely within the BOEM Lease Area OCS-A 0534. Regardless of where this dividing line between properties is ultimately drawn, properties with a common boundary line of this nature qualify as contiguous.

Therefore, the Park City Wind, LLC and Vineyard Wind 1, LLC projects are located on contiguous properties and satisfy the second criterion for treatment as a single stationary source.

Regarding the third and final criterion [3], common control, EPA evaluated the relationship between Park City Wind, LLC and Vineyard Wind 1, LLC. EPA considers common ownership sufficient to establish common control for corporate entities under the same corporate umbrella.[29] Park City Wind, LLC is a wholly owned subsidiary of Avangrid Renewables, LLC. Vineyard Wind 1, LLC, is currently a 50/50 joint venture of Avangrid Renewables, LLC, and Copenhagen Infrastructure Partners (CIP). Furthermore, EPA also considers one entity's power or authority over the other to dictate decisions that could affect the applicability of, or compliance with, relevant air pollution regulatory requirements.[30] As a result of EPA's assessment, the EPA has determined that Park City Wind, LLC and Vineyard Wind 1, LLC are under common control and meet the third and final criterion for treatment as a single stationary source.

For the reasons discussed above, the Park City Wind, LLC and Vineyard Wind 1, LLC projects belong to the same industrial grouping, are located on contiguous properties, and are under common control. Therefore, the EPA has determined that the Park City Wind, LLC and Vineyard Wind 1, LLC projects constitute a single stationary source under the NSR and Title V permit programs and the potential

[29] *See* Letter from Carl Daly, Acting Director, EPA Region 8 Air & Radiation Div., to Danny Powers, Air Quality Program Mgr., Southern Ute Indian Tribe (July 23, 2019), *available at* https://www.epa.gov/sites/default/files/2019-10/documents/jaques2019.pdf.

[30] *See* Letter from William L. Wehrum, Assistant Adm'r, EPA Office of Air and Radiation, to the Hon. Patrick McDonnell, Sec'y, Pa. Dept. of Envtl. Prot. (April 30, 2018), *available at* https://www.epa.gov/sites/production/files/2018-05/documents/meadowbrook_2018.pdf.

emissions of this single stationary source is used to determine applicability of the relevant permit program requirements under 40 C.F.R. Part 55. Part 55.2 defines potential emissions as follows:

> *Potential emissions* means the maximum emissions of a pollutant from an OCS source operating at its design capacity. Any physical or operational limitation on the capacity of a source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as a limit on the design capacity of the source if the limitation is federally enforceable. Pursuant to section 328 of the Act, emissions from vessels servicing or associated with an OCS source shall be considered direct emissions from such a source while at the source, and while enroute to or from the source when within 25 miles of the source and shall be included in the "potential to emit" for an OCS source. This definition does not alter or affect the use of this term for any other purposes under § 55.13 or § 55.14 of this part, except that vessel emissions must be included in the "potential to emit" as used in §§ 55.13 and 55.14 of this part.

Once the facility meets the definition of an OCS source, emissions from vessels servicing or associated with any part of the facility are included in the OCS source's potential emissions while at the source and when traveling to and from any part of the OCS source when within 25 NM of the source's centroid. Although emissions from vessels servicing or associated with the OCS source contribute to the total potential emissions within 25 NM of the source's centroid, they are not regulated as part of the OCS source in the draft permit unless that vessel is meeting the criteria of the definition of an OCS source and the propulsion engine would be used to supply power for purposes of performing a given stationary source function (e.g., to lift, support, and orient the components of each WTG during installation). However, these emissions from vessels within 25 NM of the source's centroid are included when making the following determinations regarding the equipment and activities that are OCS sources:

1. Applicability of CAA programs and COA requirements, including NNSR and PSD Permitting;
2. When calculating the number of NO_X and VOC offsets required due to emissions during operation; and
3. When determining the impact of emissions on ambient air and Class I and Class II areas.

Jack-up vessels, support vessels, or other vessels may contain emission equipment that would otherwise meet the definition of "nonroad engine," as defined in section 216(10) of the CAA. However, based on the specific requirements of CAA section 328, emissions from these otherwise nonroad engines on subject vessels are considered direct emissions from the OCS source they are associated with for the purposes of calculating potential emissions of that OCS source. Similarly, all engines on vessels that meet the definition of an OCS source and are "operating as OCS sources," are regulated as stationary sources and are subject to the applicable requirements of 40 C.F.R. part 55, including control technology requirements.

E. Wind Turbine Generators (WTGs) and Electrical Service Platforms (ESPs)

As described below, WTGs and ESP(s) will be installed on the seabed within the wind development area.[31]

The OCS Facility is made up of many WTGs spread out over a wide area of the ocean. Each WTG is firmly fixed to a foundation piece on the seafloor, with a tower that extends up into the air where the blades can make use of higher wind speeds. Each WTG has blades that rotate due to the movement of air. Within the non-rotating part on top of the turbine known as the nacelle, the blades' rotation is passed through a drive shaft, often via gear box, to turn magnets inside a coil of wire which generates an alternating current of electricity. Each WTG sends its power through cables down the tower and under the seabed to an offshore substation, or electrical service platform (ESP).[32] An ESP is an offshore platform containing the electrical components necessary to collect the power generated by the WTGs (via the inter-array cable), transform it to a higher voltage and transmit this power to onshore electricity infrastructure (via the export cables). The purpose of the ESP is to reduce the potential electrical losses and maximize the transmission of electricity onshore.

As mentioned earlier, the NEW1 project will consist of up to 62 WTGs and up to 2 ESPs. The WTGs and ESP(s) will be oriented in an east-west, north-south grid pattern with one NM spacing between positions and will be supported by monopile or piled jacket foundations. The general process for installation of the windfarm involves the installation of the foundations to the sea floor and preparation of the structures for the WTGs and the ESPs. Vessels supply all the WTG components and install them on the foundations.

1. Generator Engines

During operations, electricity needed to power auxiliary systems on the WTGs is produced by the WTGs themselves or is supplied from the onshore electric grid through the Project's offshore cables (during low wind conditions or if the WTGs are not operating for other reasons, such as maintenance). If a WTG is temporarily disconnected from the electric grid and winds are insufficient for the WTG to power its auxiliary systems, the WTG's integrated battery system will provide backup power during O&M. The WTG can recharge its battery system when sufficient winds are available.

In the unlikely event that a WTG is disconnected from the electrical grid, winds are too low for the WTG to power its auxiliary systems, and the backup battery power system fails or cannot provide sufficient power, portable diesel generators may be temporarily placed on a WTG (or alternatively on a

[31] For NEW1, the *Wind Development Area* ("WDA") is represented by the purple shaded area in Figure 1. The NEW1 WDA is up to 231 square kilometers (km^2) in size. The portion of the NEW1 WDA that is ultimately developed for the Project will depend on: (1) whether the Applicant acquires a small portion of the currently identified Lease Area OCS-A 0501 from Vineyard Wind 1 LLC; (2) the generating capacity of the WTGs, which will determine the number of WTGs installed; and (3) engineering and environmental constraints, which could eliminate positions and extend the footprint of the VW1 Project farther southwest. At its closest point, the NEW1 WDA is approximately 28 km (15 NM) from the nearest Massachusetts shoreline. See Figure 1.

[32] More information on the operational nature of an offshore windfarm is available at the Orsted-hosted webpage titled, "How do offshore wind turbines work?" https://us.orsted.com/renewable-energy-solutions/offshore-wind/what-is-offshore-wind-power/how-do-offshore-wind-turbines-work. Last visited, February 23, 2023.

support vessel) during O&M to supply backup power. These emergency generators would be necessary to maintain safety systems, such as aviation obstruction lights, marine navigation lights, electrical cooling, and dehumidification systems, and the WTG's rotor assembly during adverse weather. If an entire inter-array cable string consisting of up to six WTGs is disconnected from the grid, the Permittee conservatively estimates that as many as six (6) portable emergency generators could be required. The generators would operate in accordance with the requirements for an "emergency stationary internal combustion engine" at 40 C.F.R. §§ 60.4211(f) and 60.4219, which limit the use of emergency engines to 100 hours per year for maintenance checks, readiness testing, and non-emergency situations (limited to 50 hours per year). In this unique circumstance, the maintenance checks and readiness testing are not expected to be conducted while the generator is situated on a WTG or while the generator is being transported to the NEW1 WDA (such activities would occur onshore beforehand); the generators would only operate during emergencies when meeting the definition of an OCS source.

For permitting purposes it is assumed that the ESP(s) will have two (2) permanent generators installed to provide backup power to critical systems. During O&M, these backup generators would operate for emergencies, reliability testing, and potentially limited ESP maintenance (if grid power is unavailable or the maintenance activity requires disconnection from the grid). Because the back-up generators on the ESP(s) may be used for installation and commissioning activities, they are considered non-emergency engines.

2. Gas-Insulated Switchgear (GIS)

Sulfur hexafluoride (SF_6) is used as an electrical and thermal insulating gas in electrical equipment, specifically used in the switchgears located in the base of the WTGs, and ESPs. SF_6 is a greenhouse gas (GHG), having a global warming potential (GWP) of 23,500 times that of carbon dioxide (CO_2). SF_6 has the highest GWP of all GHGs addressed by the Intergovernmental Panel on Climate Change (IPCC) inventory protocols.

F. Vessels

According to the Permittee's application, offshore construction for the windfarm is anticipated to be completed in the following general sequence:[33]

1. Foundation and Scour Protection Installation
2. Offshore Cable Installation
3. WTG Installation and Commissioning
4. ESP Installation and Commissioning

Offshore construction of the Project will require an array of vessels, many of which are specifically designed for offshore renewable wind energy facility construction and cable installation. Vessels such as HLVs, HTVs, tugboats, barges, supply vessels, and/or jack-up vessels will be used to transport the

[33] More detailed information on the construction process can be found in permit application, which is accessible in the permit docket for this action.

WTG, ESP(s), and their foundations to the NEW1 WDA. As described further in the preceding sections, installation of the WTGs, ESP(s), and foundation components is expected to be performed using a combination of jack-up vessels, anchored vessels, and DP vessels. Scour protection and cable protection may be installed using specialized rock-dumping or other vessels. Cable-laying is expected to be performed by specialized cable-laying vessels. Prior to cable-laying, a pre-lay grapnel run and pre lay survey would be made by the cable laying vessel, a support vessel, and/or a survey vessel along the planned offshore cable alignments. Additional vessels might also be used for boulder clearance prior to cable installation.

CTVs are expected to be used to transport personnel to and from shore and may be used for environmental monitoring. SOVs or other large support vessels (e.g., jack-up vessels) may provide offshore living accommodations for workers in the NEW1 WDA. Surveys during construction may require the use of survey vessels. There may be emissions from other construction equipment used aboard vessels such as pile driving hammer engines and noise mitigation devices (e.g., air compressors used to supply air to bubble curtains) should they be required during pile driving. There may also be fugitive emissions from solvents, paints, fuel storage and transfer operations, and other chemicals. Other trivial sources of emissions may result from as needed supporting activities such as welding, grinding, and sanding.

WTG installation will be followed by the commissioning period where the WTGs will be prepared for operation and energized. The WTG commissioning and testing phase will be conducted in parallel with the WTG installation phase.[34] SOVs or CTVs may be used to transport crew to and from the WTGs during commissioning activities.

Once operational, the applicant expects to use SOVs to execute daily O&M activities. Typically, an SOV is equipped with DPS, a large open deck, appropriate lifting and winch capacity and workspace for O&M workers. The SOV would remain offshore for several days/weeks at a time. Workers would then access the WTGs and ESP(s) to perform routine O&M activities via a gangway directly from the SOV, a CTV, and/or a smaller daughter craft that resides on the SOV. Daughter craft and/or CTVs would be used to transfer crew to and from shore.

Although less likely, if an SOV or similar accommodation vessel is not used, several CTVs and helicopters would be used to frequently transport crew to and from the NEW1 WDA for inspections, routine maintenance, and minor repairs. CTVs are purpose-built to support offshore wind energy projects and are designed to transport personnel, parts, and equipment safely and quickly.

In addition, other larger support vessels (e.g., jack-up vessels) may be used infrequently during O&M to perform some routine maintenance activities, periodic corrective maintenance, and significant repairs.

NEW1 described the following vessels with air pollutant emitting equipment in the permit application.

[34] The definition of 'commissioning' is not standardized but covers the activities after a given wind turbine has been constructed but before it begins to produce commercial power. Commissioning tests will usually involve standard electrical tests for the electrical infrastructure as well as the turbine, and inspection of routine civil engineering quality records. *See* https://www.wind-energy-the-facts.org/commissioning-operation-and-maintenance.html

Table 4 Description of Vessels

Vessel Type	Description of Vessel Type
Anchor handling tug supply (AHTS) vessels	Vessels that primarily handle and reposition the anchors of other vessels. AHTS vessels may also be used to transport equipment or for other services.
Barges	Vessels with or without propulsion that may be used for transporting Project components (e.g., monopiles, WTGs, etc.) or installation activities.
Bunkering vessels	Vessels used to supply fuel and other provisions to other vessels offshore.
Cable laying vessels	Specialized vessels/barges that lay and bury offshore cables into the seafloor.
Crew transfer vessels (CTVs)	Smaller vessels that transport crew, parts, and equipment to and from the NEW1 during both construction and operations and maintenance (O&M). These vessels may also transport marine mammal observers.
Heavy lift vessels (HLVs)	Vessels that may be used to lift, support, and orient the WTGs, ESP(s), and foundations during installation.
Heavy transport vessels (HTVs)	Ocean-going vessels that may transport Project components to port facilities or directly to the NEW1 WDA.
Jack-up vessels	Self-propelled or non-self-propelled vessels that extend legs to the ocean floor to provide a safe, stable working platform. Jack-up vessels may be used to install foundations and/or WTGs, to transport WTG components to the NEW1 WDA, for offshore accommodations, and/or for cable splicing activities.
Scour/cable protection installation vessels (e.g., fallpipe vessels)	DP vessels that may be used to deposit a layer of rock around the WTG and ESP foundations or over limited sections of the offshore cable system.
Service operation vessels (SOVs)	Larger vessels that provide offshore living accommodations and workspace as well as transport crew to and from the NEW1 WDA
Support vessels (e.g., work boats, supply boats, accommodation vessels)	Multipurpose vessels that may be used for a variety of activities, such as clearing the seabed floor of debris prior to laying offshore cables (i.e., a pre-lay grapnel run), supporting cable installation, commissioning WTGs, or transporting equipment.
Survey vessels	Specialized vessels used to perform geophysical and geotechnical surveys.
Tugboats/towboats/push boats	Ocean-going vessels or smaller harbor craft used to transport equipment and barges to the NEW1 WDA

Some of the vessels used as part of the construction and O&M activities listed above may not meet the definition of an OCS source. CAA Section 328 defines an OCS source as "any equipment, activity, or facility which: (1) emits or has the potential to emit any air pollutant; (2) is regulated or authorized under the Outer Continental Shelf Lands Act (OCSLA) (43 U.S.C. § 1331 et seq.); and (3) is located on the OCS or in or on waters above the OCS." 42 U.S.C. § 7627(a)(4)(C). Such activities "include, but are not limited to, platform and drill ship exploration, construction, development, production, processing, and transportation." *Id.* The OCS regulations, at 40 C.F.R. § 55.2, define an OCS source by first incorporating the statutory language referenced previously and then adding that vessels are considered OCS sources only when they meet either of the following criteria: (1) the vessel is "[p]ermanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources therefrom, within the meaning of section 4(a)(1) of OCSLA (43 U.S.C. § 1331 et seq.);"[35] or (2) the vessel is "[p]hysically attached to an OCS source, in which case only the stationary source aspects of the vessels will be regulated." Thus, for a vessel to be considered an OCS source, it must meet the three statutory criteria of the OCS source definition and

[35] 40 C.F.R. § 55.2 references section (4)(a)(1) of OCSLA, which states in relevant part that laws of the United States are "extended to the subsoil and seabed of the outer Continental Shelf and to all artificial islands, and all installations and other devices permanently or temporarily attached to the seabed, which may be erected thereon for the purpose of exploring for, developing, or producing resources, including non-mineral energy resources, therefrom." 43 U.S.C. § 1333(a)(1).

one of the two additional criteria in the portion of the regulatory OCS source definition that specifically applies to vessels.

Since all OCS sources are stationary, the EPA considers engines on a vessel to be stationary sources when the engines are operating while the vessel meets the definition of an OCS source.

Moreover, the regulatory definition of OCS source in 40 C.F.R. § 55.2 provides that, for vessels physically attached to an OCS facility, "only the stationary sources [sic] aspects of the vessels will be regulated." For these types of OCS source-vessels, the "stationary source aspects" of the vessel attached to an OCS source are regulated by the permit. In other words, the engines on the vessels will be subject to specific permit conditions, and their operations emissions when at an OCS source *and its* to-and-fro vessels emissions within 25 NM of the source's centroid will count as direct emissions from the OCS source for determining the PTE of the source. If emissions from engines that comprise the emission units on the vessels were excluded from regulation as stationary sources, Congress's specific grant of authority to EPA in the 1990 CAA amendments to regulate OCS sources would be rendered meaningless. Given that an engine is a stationary source when located on an OCS source for purposes of Section 111 of the CAA[36], it is only logical to determine that these same engines are stationary sources for purposes of other CAA programs, including the PSD permit program.

The following subsections describe important categories of vessels in the construction and operations of windfarms and how these vessels' operations relate to the definition of an OCS source since for OCS sources, the stationary source aspects of those vessels will be subject to permitting requirements.

1. Jack-up vessels or jack-up barges

A jack-up vessel meets the definition of an OCS source because it will be performing an activity (i.e., constructing a WTG or an ESP) that meets all of the following criteria:

(1.) The diesel-fired or gasoline-fired generating sets on the vessel will emit air pollutants.
(2.) BOEM will approve, disapprove, or approve with modifications a construction and operation plan that allows the jack-up vessel to construct the WTGs and ESP(s) thus demonstrating the windfarm is authorized under the OCSLA (43 U.S.C. § 1331 *et seq.*); and
(3.) The jack-up vessel will be located on the OCS or in or on waters above the OCS.

Since the jack-up vessel is a vessel, it must meet one of the two criteria for a vessel to be considered an OCS source and thus be included as part of the OCS source that is covered in this permit. The EPA considers a jack-up vessel to meet the definition of an OCS source once three of the jack-up vessel's legs have attached to the seafloor, because the jack-up unit has become stationary at this point and is no longer operating as a vessel or a barge. Once that occurs, the jack-up vessel is "erected" on the seabed since the vessel will not be using its engines to maneuver itself at that time and it is in a position according to a plan to conduct OCS activities, i.e., to participate in the exploration, production, or development of resources from the seabed.

[36] CAA section 328(a)(4)(D) defines the term "new OCS source" to mean "an OCS source which is a new source within the meaning of section [111(a)] of [the CAA]." Inherent in the definition of "new source" under Section 111 is that the source to be regulated is a stationary source. *See* Section 111(a)(2) of the CAA.

From that point forward, the jack-up vessel's activity and emissions equipment involve developing or producing resources from the seabed by erecting a WTG on the seabed that will convert wind energy into electricity or an ESP to convey this electricity to shore. Once a jack-up vessel becomes an OCS source, all emission units on the jack-up vessel (including the construction equipment) are subject to the applicable terms and conditions of the permit. At the conclusion of the jack-up vessel's construction activities at a given location in the WDA, the construction equipment ceases to operate, and the jack-up legs are raised from the seafloor. The jack-up vessel's stationary source activities thereon remain regulated as part of the OCS source, and subject to the terms and conditions of the permit, until the point in time when fewer than three jack-up legs are attached to the seafloor[37,38]. Once the jack-up vessel is no longer attached to the seabed and no longer erected thereon for the purpose of exploration, production, or development of resources from the seabed, it returns to its status as a vessel and is no longer subject to the stationary source requirements of part 55. However, the jack-up barge and its associated emission units are still always included in the potential emissions calculations for the project when such vessel is within 25 NM of the source's centroid. The jack-up vessel is only subject to the specific emissions limits during the time it meets the definition of an OCS source (is attached to the seabed, erected thereon, and used for the purpose of producing, exploring, or developing resources from the seabed) and thus is regulated as a stationary source under part 55.

[37] See Vineyard Wind 1 Fact Sheet (pdf): pg 20-23 (2019-06-28) which can be located at https://www.epa.gov/caa-permitting/outer-continental-shelf-wind-energy-database and page 12 of EPA's Response to Comments on the Cape Wind Energy Project, available at https://www.epa.gov/sites/default/files/2015-08/documents/cape-wind-final-response2comments-2011jan7.pdf.

[38] The Environmental Appeals Board (EAB) has issued decisions interpreting the OCS source definitions in CAA Section 328 and the 40 C.F.R. part 55 regulations that may provide guidance when determining if a vessel meets the definition of an OCS source. In one decision, the EAB recognized that "attachment" for purposes of being an OCS source is not ordinarily "so broad" to mean "any physical connection." *In re Shell Gulf of Mex., Inc.*, 15 E.A.D. 193, 199 (E.A.B. 2011) ("*Shell 2011*"). However, in another case, the EAB affirmed EPA Region 10's determination that a drill ship satisfies the requirement of being "attached to" the seabed when one of its anchors is deployed. *In re Shell Gulf of Mex., Inc.*, 15 E.A.D. 470, 488 (E.A.B. 2012) ("*Shell 2012*"). Therefore, vessels operating in the WDA that deploy an anchor that connects to the seabed are similarly attached to the seabed and may be an OCS source if the vessel or other equipment also meet the two other criteria in the definition of "OCS source" contained in 40 C.F.R. part 55 and CAA section 328. In *Shell 2011*, EPA Region 10 determined an icebreaker vessel is not "attached" to a drill ship when the icebreaker is setting or receiving the drill ship's anchors. *Shell 2011* at 194. In making this determination, EPA Region 10 defined the purpose of "attachment" as to "prevent or minimize relative movement" between the vessel and the seabed. *Id*. at 199. Region 10 determined that the icebreaker is not "attached" to the drill ship sufficient to constitute being an OCS source because the icebreaker's anchor cable is "repeatedly connected and disconnected" from one of the drill ship's anchors and is "not intended in any way to restrict the location of" the icebreaker. *Id*. at 200. In finding Region 10's definition of "attachment" to be reasonable, the EAB also noted the anchor cable is "played out" as the icebreaker travels away from the drill ship, meaning the anchor cable is not intended to restrict the location of the icebreaker. *Id*. The EAB compared the intermittent connection of the icebreaker vessel to the drill ship to a vessel at dockside, noting that "attachment" in the context of an OCS source is more like the latter. *Id*. at 200. In *Shell 2012*, the EAB found reasonable EPA Region 10's definition of "erected thereon" as "intended to reflect the process by which a vessel becomes attached to the seabed and used thereafter for the purpose of exploring, developing, or producing resources from the seabed." *Shell 2012* at 491. EPA supported this definition by looking to the customary meaning of the verb "to erect," which is defined as "to construct" or "to build," and thus reasoned that attachment to the seabed must occur "at the location where OCS activity is reasonably expected to occur." *Id*. The phrase "erected thereon" for the purposes of an OCS source definition requires a secure, stationary activity. For example, when a drillship is "erected" on the seabed, it remains stationary while it conducts its OCS activity, and is at the location where the OCS activity (e.g., exploratory drilling) is expected to occur.

2. Cable-laying vessels

According to NEW1's application, the offshore cable-laying vessel (CLV) will move along the pre-determined route within the established corridor towards the ESPs. Cable laying and burial may occur simultaneously using a lay and bury tool, or the cable may be laid on the seabed and then trenched post-lay. Alternatively, a trench may be pre-cut prior to cable installation.

EPA has previously determined that cable-laying vessels that utilize pull-ahead anchors or DPS and are not erected on the seabed for the purpose of exploring for, developing, or producing resources therefrom are not considered part of the OCS source.[39] The emissions from these vessels are, however, included in the PTE of the OCS source when located at or traveling within 25 NM of the source's centroid.[40]

3. Crew transfer vessels

At least one CTV will be needed daily during both the construction and operational phases. During the O&M phase, typically only crew transfer vessels and/or support vessels/inflatable boats will be used, unless a major repair is needed. For major repairs to heavy components, jack-up or crane barges may be required. Smaller vessels that transport crew, parts, and equipment to and from the Phase 1 SWDA during both construction and operations and maintenance (O&M). These vessels may also transport marine mammal observers.

4. Support and other vessels

In addition to jack-up vessels, other types of vessels may meet the definition of an OCS source at some point during the construction or operations phase of the project.

These vessels may meet the definition of an OCS source if they will be performing an activity (i.e., supporting the construction or operations of a WTG or ESP) that meets all three of the following criteria:

1. The gasoline or diesel-powered engines on the vessels will emit air pollutants.
2. BOEM will approve, disapprove, or approve with modifications a construction and operation plan that allows vessels to support the construction of the WTGs and ESP(s) and authorizes a right-of-way for the cable, thus demonstrating the windfarm is authorized under the OCSLA (43 U.S.C. § 1331 *et seq.*); and
3. The vessels will be operating on the OCS or in waters above the OCS.

[39] *See* EPA's June 24, 2021, Fact Sheet and January 18, 2022, Response to Comments for the South Fork Wind, LLC's OCS air permit, *available at* https://www.epa.gov/caa-permitting/south-fork-wind-llcs-south-fork-windfarm-outer-continental-shelf-air-permit.

[40] As explained previously, "OCS Facility," means the entire wind development area once the first OCS source is established in the wind development area. The first OCS source is established once any equipment or activity that meets the definition of an OCS source is located within the wind development area. EPA has included this term in the permit, "OCS Facility" to differentiate from the term "OCS source" when that term is used in the permit to refer to individual pieces of equipment or vessels that meet the definition of "OCS source".

As stated earlier in this section, the definition of an OCS source in 40 C.F.R. part 55 has further criteria that must be met before a vessel can be considered an OCS source. Servicing fleet vessels used in the windfarm may temporarily attach to a structure that is part of the OCS source, another vessel that meets the definition of an OCS source, or to the seabed itself and be erected thereon (the seabed) and used for the purpose of exploring, developing, or producing resources therefrom. The criteria within the definition of an OCS source for when a vessel becomes an OCS source depends on how a vessel is, in essence, remaining stationary on the OCS (i.e., how it attaches itself to an existing OCS facility or to the seabed) and, in the case of attachment to the seabed, whether the vessel is also erected thereon and used for the purpose of exploring, developing, or producing resources therefrom. For service fleet vessels attached to an OCS facility, only the stationary source activity occurring on the vessel will be regulated by permit conditions. The EPA has determined that all air emission units on a service fleet vessel, while that vessel meets the definition of an OCS source, constitute a stationary source activity because the vessel will be stationary and the reason for the vessel to be on the waters above the OCS is to assist in the construction of a stationary source, i.e., a WTG or an ESP.

For service fleet vessels that do not attach to an OCS facility, but temporarily or permanently attach to the seabed, the service fleet vessel will be considered an OCS source when it is erected on the seabed and is used for the purpose of exploring, developing, or producing resources from the seabed.[41] Like the jack-up vessels, the criteria "erected thereon" is met when in the WDA the service fleet vessel attaches itself to the seabed and is in a location where it can reasonably be expected to conduct OCS activities; thus becoming stationary and used thereafter for the purpose of exploring, developing, or producing resources from the seabed like constructing a WTG or an ESP. From that point forward, the service fleet vessel's operations and emissions are related to developing or producing resources from the seabed by erecting a WTG or the ESP on the seabed that will convert wind energy into electricity.

[41] Per Section 328 of the CAA, emissions from any vessel servicing or associated with an OCS source, including emissions while at the OCS source or en route to or from the OCS source within 25 miles of the OCS source, shall be considered direct emissions from the OCS source. Therefore, emission from the service fleet vessel are still subject to the permit's NNSR offset requirements during the operational phase of the project and once the service fleet vessel is no longer meeting the criteria for an OCS source.

IV. Prevention of Significant Deterioration

As discussed above, the EPA must determine whether PSD regulations apply to the NEW 1 windfarm project based on the regulations that determine the applicability of this CAA permitting program. PSD permitting requirements apply to the pollutants subject to a NAAQS for which an area is classified as attainment or unclassifiable, and to other pollutants regulated under the Clean Air Act. This program does not apply to hazardous air pollutants, or pollutants for which an area is classified as nonattainment with the NAAQS.[42]

A. Project Aggregation

In the 2009 NSR Aggregation Action, the EPA called for sources and reviewing authorities to aggregate emissions from nominally separate activities when they are "substantially related" for the purpose of determining whether they are a single modification resulting in a significant emissions increase under NSR at Step 1.[43] The 2009 NSR Aggregation Action also included a statement that the EPA would, as a matter of policy, apply a rebuttable presumption that activities that occurred more than three years apart are not "substantially related" and therefore, generally, should not be aggregated for purposes of determining whether they are a single modification at Step 1. EPA used the "substantially related" test described in the 2009 action[44] for this evaluation. Substantial relatedness centers around interrelationships and interdependence of activities, such as those likely to be jointly planned as part of the same capital improvements or engineering study and occur close in time and at components that are functionally interconnected.

<u>VW1 Project and NEW1 Project</u>

The initial permit application for VW1 was received by EPA on February 1, 2018, and a subsequent permit application for a modification was submitted on March 18, 2022.[45] The initial permit application for NEW1 was received by EPA on October 7, 2022.[46] Since the applications for the VW1 and NEW1

[42] 40 C.F.R. 52.21(b)(50)(iv); 40 C.F.R. 52.21(i)(2).

[43] See 74 Fed. Reg. 2378. ("When there is no technical or economic relationship between activities or where the relationship is not substantial, their emissions need not be aggregated for NSR purposes." (Emphasis added)). That is, mere relatedness is not sufficient to upend the source's definition of its project, but sources cannot circumvent NSR by artificially separating a series of emissions-increasing projects into separate projects that fall below the significance thresholds.

[44] Also retained in the EPA rulemaking *Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR): Aggregation; Reconsideration*, 83 FR 57324 (Nov. 11, 2018).

[45] EPA issued Permit No. OCS-R1-03 (M-1) on August 19, 2022. The modification: (1) removed the requirements for pull-a-head anchor cable-laying vessels and the requirement to obtain offsets for construction emissions, consistent with EPA decisions made in the OCS air permit for the South Fork Wind Farm issued on January 18, 2022; (2) revised the engine requirements in the permit to allow for the installation of one 150 kW engine instead of three 40 kW engines; and (3) authorized an 18-month extension to the commence construction deadline for activities subject to the permit.

[46] VW1 submitted a NOI on December 11, 2017. NEW1 submitted an initial NOI on January 28, 2022. VW1's Permit No. OCS-R1-03 was issued on May 19, 2021, and Permit No. OCS-R1-03 (M-1) was issued on August 19, 2022.

projects were submitted more than three years apart, EPA presumed these were separate projects and did not consider further whether these projects were substantially related.[47]

NEW1 Project and NEW2 Project

EPA also received a permit application for another Park City Wind, LLC project (New England Wind 2 "NEW2") at the same time as NEW1. Since the applications for the NEW1 and NEW2 projects were submitted less than three years apart, EPA evaluated whether these projects were substantially related.

Based on the supplemental information received from the applicant,[48] EPA concludes that the projects are not functionally interconnected and are not dependent upon each other to be technically or economically viable. Because there is no technical or economic relationship between the two projects, their emissions do not need to be aggregated for purposes of New Source Review permitting. The primary purpose of this project aggregation assessment is to prevent a source from separating a higher-emitting project into two or more lower-emitting 'projects' and avoid triggering major NSR requirements. However, the increased emissions from the NEW1 and NEW2 projects are individually high enough for each project to trigger major NSR requirements on its own. Thus, the applicability of NSR requirements to these projects is not affected by this conclusion that the projects are separate.

B. Major Modification Applicability

The PSD program, as set forth in 40 C.F.R. § 52.21 ("PSD regulations"), is incorporated by reference into the OCS Air Regulations at 40 C.F.R. § 55.13(d)(1) for OCS sources located within 25 NM of a state's seaward boundary if the requirements of 40 C.F.R. § 52.21 are in effect in the COA. The EPA has determined that the requirements of sections 160 through 165 of the Clean Air Act (the authority for the PSD program) are not met in Massachusetts law or regulations; therefore, the provisions of 40 C.F.R. § 52.21, except paragraph (a)(1)[49], are incorporated and made a part of the applicable state implementation plan for the Commonwealth of Massachusetts. *See* 40 C.F.R. § 52.1165. Therefore, the provisions within 40 C.F.R. § 52.21 are in effect in the COA.[50]

The PSD program applies to the construction of any new major sources of criteria pollutants or major modifications to existing sources in an area designated as being in attainment with, or unclassifiable with, the ambient air quality standards in relation to pollutants. A source is major for PSD purposes if it has the potential to emit a "regulated NSR pollutant"[51] in amounts equal to or greater than the

[47] This "substantially related" test is used by EPA to determine the scope of a project and ensure that nominally separated projects occurring at a source are treated as a single project for NSR applicability purposes where it is appropriate. In the 2018 NSR Aggregation Action, the EPA affirmed the "substantially related" test as an appropriate standard for assessing project aggregation. 83 Fed. Reg. 57324 (Nov. 15, 2018).
[48] Supplemental Letter Received by EPA on July 8, 2022, and contained in the docket for this permitting action.
[49] Paragraph (a)(1) contains the requirements for when a PSD program is disapproved. In this case, MA (COA) has been delegated the federal PSD program, therefore it is unnecessary for EPA to incorporate the provisions of paragraph (a)(1).
[50] The Commonwealth of Massachusetts has taken delegation of EPA's PSD permitting program at 40 C.F.R. § 52.21 by virtue of an agreement for delegation signed by then-Regional Administrator Curtis Spaulding on April 11, 2011. See https://www.epa.gov/sites/default/files/2015-08/documents/epa-massdep-psd-delegation-agreement.pdf
[51] 40 C.F.R. § 52.21(b)(50);

specified major source threshold (100 or 250 tons per year[52]) and is "subject to regulation." [53] A proposed new major source is required to conduct PSD permitting for each pollutant that will be emitted from the source in significant amounts.[54] Once a source is classified as major for one regulated NSR pollutant, it may have several additional pollutants subject to PSD permitting if those pollutants exceed the associated significant emission rate (SER). Also note that regulated NSR pollutants (and their precursors) for which an area is in nonattainment are not subject to PSD review even if the project emission increase and net emission increase is significant. Instead, they are subject to major NNSR permitting.

Since the source[55] is considered an existing PSD major source for NO_2 and $PM_{10/2.5,}$ the emissions increase from the NEW1 project must be evaluated for PSD applicability based on exceedances to the applicable significance levels. The PSD requirements apply to each regulated pollutant that a major source emits in significant amounts per 40 C.F.R. 52.21(j).

1. Emission Increase Calculation (Project Emission Increase (PEI))

For projects that only involve the construction of new emission units, like NEW1, the significant emissions increase is the new emissions unit's PTE.[56] For a new emission unit, the baseline actual emissions (BAE) for purposes of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and thereafter, for all other purposes, shall equal the unit's PTE. The applicant has considered fugitive emissions[57] in the PTE of the NEW1 project[58].

For assessing the emission increases from the NEW1 project, emissions from the equipment or activities considered an OCS source and all emissions from vessels servicing or associated with an OCS source while at the source and while enroute to or from the source when within 25 NM of the source's centroid, are included. This includes emissions from vessels, regardless of whether the vessel itself meets the definition of an OCS source, when the vessels are at or going to or from an OCS source and are traveling within 25 NM of the source's centroid. Thus, emissions from vessels servicing or associated with an OCS source that are within 25 NM of the source's centroid are considered in determining the PTE or "potential emissions" of the OCS source for purposes of applying the PSD regulations.

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[52] 100 tpy for the 28 sources categories named in 40 C.F.R. § 52.21(b)(1)(i)(a). Any other stationary source, i.e., one that is not on a list of named source categories, is considered a major stationary source if it emits or has a PTE of 250 tpy.

[53] As defined in 40 C.F.R. § 52.21(b)(49);

[54] As defined in 40 C.F.R. § 52.21(b)(23).

[55] See Section III.D for an explanation of why NEW1 and the previously permitted VW1 project are considered one stationary source for CAA permitting purposes.

[56] Under the PSD program, "potential to emit" or PTE is defined as the maximum capacity of a source to emit a pollutant under its physical and operational design. 40 C.F.R. §52.21(b)(4). Typically, emissions from mobile sources and secondary emissions do not count for determining a stationary source's PTE. However, the definition of "potential emissions" in the OCS Air regulations includes emissions from all vessels servicing or associated with an OCS source when within 25 NM of the source's centroid.

[57] For purposes of assessing whether a major modification has occurred, exclusion of the fugitives still results the non-fugitive NSR pollutants associated with the project exceeding the respective PSD SER.

[58] See permit application for NEW1 for fugitive emission sources from the NEW1 project.

The emissions increases from this project are calculated on a pollutant-by-pollutant basis for each regulated NSR pollutant. The increases include both project emissions and any emissions from the source associated with the project. The applicant has not identified any emission units from the existing source, i.e., sources associated with the VW1 project, that are affected by the NEW1 project.[59] Therefore, emission decreases were not considered in this step, under a process known as Project Emissions Accounting.

Table 5 Emission Increase from the New England Wind 1 Project

New England Wind 1 - Project Emission Increase		**Regulated NSR Pollutant (TPY)**						
	NO_2	**CO**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**GHG (As CO_2e)**	**H_2S Mist**	**Pb**
BAE	0	0	0	0	0	0	0	0
PTE	2,771	640	87	84	26	169,631	1.2	0.01
Δ (PTE-BAE)	**2,771**	**640**	**87**	**84**	**26**	**169,631**	**1.2**	**0.01**

As shown in Table 6, a significant emissions increase (per the definition of significant at 40 C.F.R. § 52.21(b)(23))[60] of at least one regulated NSR pollutant has occurred. In addition, the pollutant GHG is subject to regulation if the stationary source is an existing major stationary source, a regulated NSR pollutant that is not GHG has triggered a SER and the project results in a GHG emission increase of 75,000 TPY CO_2e or more, which is the case for NEW1.

Table 6 Worst Case Annual Emission Estimate Compared with PSD Significant Emissions Rate (SER)

NSR Regulated Pollutant	Project Emission Increase (TPY)	PSD SER (TPY)	SER Triggered? (Y/N)
NO_2 (1)	2,771	40	**Y**
CO	640	100	**Y**
PM_{10}	87	15	**Y**
$PM_{2.5}$	84	10	**Y**
SO_2	26	40	N
GHG (as CO_2e)	169,631	75,000	**Y**
Sulfuric Acid Mist	1.2	7	N
Lead	0.01	0.6	N

(1) Nitrogen dioxide is the compound regulated as a criteria pollutant under PSD; however, the NSR significant emissions rate is based on the sum of all oxides of nitrogen, i.e., NO_X.

2. Emission Netting (Contemporaneous Netting)

Per 40 C.F.R. § 52.21(b)(3), the definition of a "net emission increase" consists of two components:

[59] There are circumstances in which the addition of a new unit or modification of an existing unit may result in increased operation or utilization of other units upstream or downstream.

[60] Per 40 C.F.R. § 52.21(b)(49), for the pollutant GHGs, an emissions increase shall be based on CO_2e, and shall be calculated assuming the pollutant GHGs is a regulated NSR pollutant and "significant" is defined as 75,000 TPY CO_2e.

1) Any increases in actual emissions from a particular physical change or change in the method for operation from a stationary source (i.e., Emission Increase Calculation (Project Emission Increase (PEI))); and
2) Any other increase and decrease in actual emissions at the source that are contemporaneous with the change and are otherwise creditable.

In other words, netting looks at the other projects that may have been or will be undertaken at a given facility over the contemporaneous period. Consideration of contemporaneous emission changes is only allowed in cases involving existing major sources.

The applicant has not identified any source-wide creditable contemporaneous emissions decreases or increases and is therefore not pursuing a Step 2 contemporaneous netting analysis.

3. Summary

Based on the emission levels for the project, as presented in Table 6, NO_2, CO, PM_{10}, $PM_{2.5}$, and GHG are the NSR regulated pollutants that will be emitted by NEW1 in quantities exceeding the respective PSD SER. The applicant has identified no anticipated contemporaneous creditable emissions increases or decreases for the proposed project (NEW1). Therefore, the NEW1 project is considered a major modification to an existing major stationary source (i.e., Vineyard Wind 1).

Note that ozone (and therefore its precursors NOx and VOC) is subject to NNSR and is therefore not explored further in this section.[61] *See* Section V.B for details on the applicable NNSR requirements.

C. Best Available Control Technology (BACT)

PSD permits must contain an emissions limitation based on application of the Best Available Control Technology (BACT) for each regulated NSR pollutant emitted in significant amounts. 40 C.F.R. 52.21(j). BACT is defined in the applicable permitting regulations at 40 C.F.R. § 52.21(b)(12), in relevant part, as

> an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event, shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 C.F.R. part 60, 61, or 63. If the Administrator

[61] Dukes County is a designated nonattainment area for ozone, and Massachusetts is also part of the Ozone Transport Region (OTR). Therefore, for permitting purposes Dukes County is treated as a moderate nonattainment and the ozone precursors NO_X and VOC are not subject to PSD review. NOx and VOC are subject to major NNSR permitting. The pollutants subject to LAER are NO_X and VOC. *See* Section VI.

> determines that technological or economic limitations on the application of measurement technology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology.

The CAA contains a similar BACT definition, although the 1990 CAA amendments added "clean fuels" after "fuel cleaning or treatment" in the above definition. *See* CAA § 169(3).

Therefore, the permitting authority must establish a numeric emissions limitation that reflects the maximum degree of reduction achievable for each pollutant subject to BACT through the application of the selected technology or technique. However, if the permitting authority determines that technical or economic limitations on the application of a measurement methodology would make a numerical emission standard infeasible for one or more pollutants, it may establish design, equipment, work practices, or operational standards to satisfy the BACT requirements.

1. Methodology

The EPA's longstanding approach to implementing BACT is to use a "top-down" BACT analysis to demonstrate that the BACT requirement is satisfied for each emission unit that emits a regulated NSR pollutant subject to PSD review. This methodology is outlined in EPA guidance and has been applied in EPA permitting decisions and review of those decisions by the EPA Environmental Appeals Board (EAB).[62, 63]

Step 1 – Identify All Control Technologies

Available control technologies are identified for each emission unit in question. The following methods are used to identify a comprehensive list of potential technologies:

1. Researching the Reasonability Available Control Technology (RACT)/Best Achievable Control Technology (BACT)/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) database;[64]
2. Researching the CARB (California Air Resource Board) and South Coast Air Quality Management District (SCAQMD) database;
3. Surveying air pollution control equipment vendors;
4. Surveying available literature; and
5. Reviewing previously issued permits.

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[62] *See* EPA's "Guidance for Determining BACT Under PSD" at https://www.epa.gov/sites/production/files/2015-07/documents/bactupsd.pdf and New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting (draft Oct. 1990) at https://www.epa.gov/sites/production/files/2015-07/documents/1990wman.pdf

[63] *See, e.g.*, *In re: Prairie State Generating Co.*, 13 E.A.D. 1, 12 (EAB 2006).

[64] The RBLC permit database was designed to help permit applicants and reviewers make pollution prevention and control technology decisions for stationary air pollution sources, and includes data submitted by several U.S. territories and all 50 States on over 200 different air pollutants and 1,000 industrial processes. *See* https://cfpub.epa.gov/rblc/index.cfm?action=Search.BasicSearch&lang=en.

Step 2 – Eliminate technically infeasible options

After the identification of control options, an analysis is conducted to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that prohibit the implementation of the control technology or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits.

Step 3 – Rank remaining control technologies

Once technically infeasible options are removed from consideration, the remaining options are ranked based on their control effectiveness. If there is only one remaining option or if all the remaining technologies could achieve equivalent control efficiencies, ranking based on control efficiency is not needed.

Step 4 – Evaluate most effective controls and document results.

Beginning with the most efficient control option in the ranking, detailed economic, energy, and environmental impact evaluations are performed. If a control option is determined to be economically feasible without adverse energy or environmental impacts, it is not necessary to evaluate the remaining options with lower control efficiencies. The economic evaluation centers on the cost effectiveness of the control option.

Step 5 – Select BACT

In the final step, one pollutant-specific control option is proposed as BACT for each emission unit under review based on evaluations from the previous step.

2. BACT Analysis for the NEW1 Project

BACT is required for each pollutant which exceeds an applicable PSD significant emissions rate (SER). *See* 40 C.F.R. § 52.21(b)(23), (j). Based on the emission levels for the project, as presented in Table 6, NO_2, CO, PM, PM_{10}, $PM_{2.5}$, and GHG are the NSR regulated pollutants that will be emitted by NEW1 and subject to PSD.

Since the source has been determined to be a major modification, all applicable pollutant emissions at the source, including fugitive, are subject to subsequent NSR review steps (e.g., BACT/LAER review, air quality impacts) according to NSR program requirements.

a. Emission Unit Applicability

The NEW1 project is required to apply BACT to all the new emission units proposed in this project. The Project's emission sources will primarily be compression-ignition internal combustion engines (CI-ICE). These include engines on vessels while operating as OCS source(s) and engines on the WTGs and ESP(s). Emission units that can be evaluated in a similar way under BACT are separated into emission unit groups (EUG) within the analysis below.

EUG 1 – OCS Generator Engine(s) Installed on the ESP(s) and/or WTG(s)

Table 7 Emission Unit Group (EUG) 1 – OCS Generator Engine(s) Installed on the ESP(s) and/or WTG(s)

EU ID	Description	Type of Equipment	Engine Count	Engine Rating, kW	Hours per Engine
Construction Equipment					
ENG-1	Offshore WTG Installation & Commissioning	Non-Emergency Generator on WTGs	1	150	14,880[1]
ENG-2, ENG-3	Offshore ESP Installation & Commissioning	Non-Emergency Generators on ESP(s)	2	450	1,440 [1]
Operating Equipment					
ENG-2, ENG-3	ESP Permanent Generators	Non-Emergency Generators on ESP(s)	2	450	500 hpy
ENG-7 through ENG-12	WTG O&M Emergency Backup	Emergency Generator on WTGs	6	150	100 hpy

[1] Note that this represents the total hours of operation during the entire construction period of the project.

EUG 2 – Marine Engines on Vessels when Operating as OCS Source(s)

A marine vessel typically has two (2) kinds of engines: 1) Propulsion engines, also referred to as main engines, which supply power to move the vessel but could also be used to supply power for purposes of performing a given stationary source function (e.g., to lift, support, and orient the components of each WTG during installation), and 2) Auxiliary engines, which supply power for non-propulsion (e.g., electrical) loads. Note that while vessels servicing or associated with an OCS Facility, when either at the Facility or enroute to or from the OCS Facility (within 25 NM of the source's centroid) are included in the OCS Facility's potential to emit, as required by section 328(a)(4)(C) of the Clean Air Act, no control technology requirements, e.g., BACT, are placed on those vessels unless and until the vessels themselves meet the definition of an OCS source. The permit will impose control technology requirements, on only vessels that meet the definition of an OCS source.[65]

At the time of publication of this fact sheet, the applicant has stated that NEW1 has not finalized contracts for any vessels that are expected to become OCS sources. Therefore, the specific vessels anticipated to be utilized in the project are unknown. However, the applicant has included the various vessel types associated with each activity and the anticipated engines' horsepower ratings. Vessel availability is constrained by the limited number of vessels capable of conducting the work, the availability of those vessels at a given time, and the limitations imposed by the Jones Act.[66] In addition, the procurement of the vessels, which are indicated to change on short notice, require contracts within short timeframes due to the specific nature of the OCS project. EPA is considering these facts in this top-down BACT analysis.

[65] Note that the definition of an OCS source includes vessels only when they are: (1) Permanently or temporarily attached to the seabed and erected thereon and used for the purpose of exploring, developing or producing resources therefrom, within the meaning of section 4(a)(1) of OCSLA (43 U.S.C. § 1331 et seq.); or (2) Physically attached to an OCS Facility, in which case only the stationary sources aspects of the vessels will be regulated.

[66] Generally, the Jones Act is a U.S. law that requires vessels that ship merchandise and passengers between two U.S. points to be U.S. built and registered (flagged), as well as owned and crewed by U.S. citizens or residents. *See generally*, Charlie Papavizas, *Jones Act Considerations for the Development of Offshore Windfarms*, 20 BENEDICT'S MAR. BULL. [1] (First Quarter 2022) (available at https://www.winston.com/images/content/2/6/v2/262961/First-Quarter-2022-Benedict-s-Maritime-Bulletin-Papavizas.pdf). 46 U.S.C. § 55102(b), part of the Merchant Marine Act of 1920, also known as the Jones Act, precludes a vessel from providing "any part of the transportation of merchandise by water, or by land and water, between points in the United States to which the coastwise laws apply, either directly or via a foreign port, unless the vessel —(1) is wholly owned by citizens of the United States for purposes of engaging in the coastwise trade; and (2) has been issued a certificate of documentation with a coastwise endorsement under chapter 121 or is exempt from documentation but would otherwise be eligible for such a certificate and endorsement." Also part of the Jones Act, 46 U.S.C. § 55103(a) precludes a vessel from transporting passengers between ports or places in the United States to which the coastwise laws apply, either directly or via a foreign port, unless the vessel--(1) is wholly owned by citizens of the United States for purposes of engaging in the coastwise trade; and (2) has been issued a certificate of documentation with a coastwise endorsement under chapter 121 or is exempt from documentation but would otherwise be eligible for such a certificate and endorsement.

Table 8 EUG 2 - Marine Engines on Vessels Operating as Potential OCS Source(s)

Vessel Type	Main Engine Rating (kW)	# Main Engines	Auxiliary Engine Rating (kW)	# Auxiliary Engines
WTG & ESP Foundation Installation - Construction				
Tugboat to support main foundation installation vessel(s) / Tugboat	2,540	2	199	1
Foundation transport vessel 1 of pair 1 (TPs) / Tugboat	2,540	2	199	1
Foundation transport vessel 2 of pair 1 (TPs) / Tugboat	2,540	2	199	1
Foundation transport vessel 3 of pair 2 (TPs) / Tugboat	2,540	2	199	1
Foundation transport vessel 4 of pair 2 (TPs) / Tugboat	2,540	2	199	1
Secondary work and grouting vessel / Tugboat	2,540	2	199	1
Crew transfer vessel 1 / Crew transfer vessel	749	2	20	2
Acoustic monitoring vessel / Tugboat	2,540	2	199	1
Marine mammal observation vessel 1 / Crew transfer vessel	749	2	20	2
Marine mammal observation vessel 2 / Crew transfer vessel	749	2	20	2
Environmental monitoring vessel / Crew transfer vessel	749	2	20	2
WTG Installation - Construction				
WTG main installation jack-up vessel 1 / Jack-up vessel	3,736	4	1,900	1
WTG main installation jack-up vessel 2 / Jack-up vessel	3,150	6	3,150	2
Articulated tug-barge (ATB) for WTG transport 1 / Ocean-going tug & barge (feeder)	2,710	2	280	2
Articulated tug-barge (ATB) for WTG transport 2 / Ocean-going tug & barge (feeder)	2,710	2	280	2
Articulated tug-barge (ATB) for WTG transport 3 / Ocean-going tug & barge (feeder)	2,710	2	280	2
Articulated tug-barge (ATB) for WTG transport 4 / Ocean-going tug & barge (feeder)	2,710	2	280	2
Offshore Site Assistance Tug 1 / Tugboat	2,525	2	180	2
Offshore Site Assistance Tug 2 / Tugboat	2,525	2	180	2
Crew transfer vessel for WTG installation / Crew transfer vessel	749	2	20	2
WTG Commissioning - Construction				
Crew transfer vessel for commissioning 1 / Crew Transfer Vessel	749	2	20	2
Crew transfer vessel for commissioning 2 / Crew Transfer Vessel	749	2	20	2
ESP Overseas Transport - Construction				

Vessel Type	Main Engine Rating (kW)	# Main Engines	Auxiliary Engine Rating (kW)	# Auxiliary Engines
ESP jacket overseas transport assisting tug / Tugboat	2,540	2	199	1
ESP topside overseas transport assisting tug / Tugboat	2,540	2	199	1
ESP Installation and Commissioning - Construction				
Crew transfer vessel	749	2	20	2
Service boat (for accommodation vessel) / Crew transfer vessel	749	2	20	2
Walk-to-work accommodation vessel / Jack-up vessel (accommodation)	2,350	2	1,000	2
Daily Operations - O&M				
Daily crew transfer vessel 1 / Crew transfer vessel	515	4	20	2
Daily crew transfer vessel 2 / Crew transfer vessel	515	4	20	2
SOV Daughter Craft 1 / Crew transfer vessel	246	2	NA -Battery	NA -Battery
SOV Daughter Craft 2 / Crew transfer vessel	246	2	NA -Battery	NA -Battery
WTG Inspection/Maintenance/Replacement - O&M				
WTG main repair jack-up vessel / Jack-up vessel (installation)	one 5,760kW, two 4,230 kW	3	2,880	1
Jack-up vessel to support repair / Jack-up vessel	2,350	2	1,000	2

EUG 3 – Gas-Insulated Switchgears (GIS) on WTG and ESP

Other units at this facility that are subject to a top-down BACT analysis include the low voltage (LV) gas-insulated switchgears on the WTGs, and the medium voltage (MV) and high-voltage (HV) gas-insulated switchgears on the ESPs. The Gas-Insulated Switchgears (GIS) on the WTGs and ESP(s) have the potential to emit SF_6, which is a GHG. Therefore, the LV, MV and HV GIS located on the WTGs and ESP(s) are required to apply BACT. *See* Table 9.

Table 9 EUG 3 – Gas-Insulated Switchgears (GIS) on WTG and ESP

EU ID	Description	Count (# GIS)	Maximum Quantity
LV-GIS	LV GIS on WTGs	LV-GIS: 62	19 kg of SF_6 per WTG[(1)]
MV-GIS, HV-GIS	MV GIS (66kV-132 kV) on ESP & HV GIS (220 kV-275 kV) on ESP	MV-GIS: 22 HV-GIS: 18	4,120 kg of SF_6 [(2)]

[(1)] Note that this quantity does not consider application of BACT.

[(2)] The NEW1 OCS Air Permit application provides the total quantity of SF_6 in the ESP(s). The total quantity of SF_6 was based on a preliminary design for an 800 MW ESP that contained eighteen 220 kV GIS and twenty-two 66 kV GIS. However, because the design and electrical configuration of the ESP(s) has not been finalized, the number of individual GIS on the ESP(s) is not yet final. Similarly, the NEW1 OCS Air Permit application provides the total quantity of SF_6 in each WTG. Since the design and electrical configuration of the WTGs has not been finalized, the number of individual GIS on each WTG is not yet final.

(1) Step 1 – Identify All Available Control Technologies

The first step in the top down BACT process is to identify all "available" control options. To satisfy the statutory requirements of BACT, the applicant must focus on technologies that have been demonstrated to achieve the highest levels of control for the pollutant in question, regardless of the source type in which the demonstration has occurred.

EUG 1—OCS Generator Engine(s) Installed on the ESP(s) and/or WTGs

A RACT/BACT/LAER Clearinghouse (RBLC) search was completed for the last 10 years of determinations using the following process types: 1.) 17.110 – Large ICEs (> 500 HP) - Fuel Oil (ASTM #1, 2, includes kerosene, aviation, diesel fuel); 2.) 17.210 – Small ICEs (< 500 HP) - Fuel Oil (ASTM #1, 2, includes kerosene, aviation, diesel fuel). The resulting determinations were divided into three searches: large emergency/non-emergency engines (>500 HP), and small emergency/non-emergency engines (<500 HP). These results are summarized within the permit application and can be found within the RBLC database after performing a search using the criteria mentioned above. Other BACT options from previously issued OCS wind energy air permit determinations (South Fork Wind, Vineyard Wind 1, and Revolution Wind) were also considered.

The applicable air pollution control technologies or techniques (including lower-emitting processes and practices) that have the potential for practical application to the emissions unit are listed in the table below.

Table 10 Options of Control Technologies or Techniques for EUG 1

Control Technology	**Pollutant(s)**	**Note(s)**
Good Combustion Practices	NO_2, PM, PM_{10}, $PM_{2.5}$, CO, GHG	The RBLC included a requirement for the permittee to develop a Good Combustion and Operating Practices (GCOP) Plan. The plan shall be incorporated into the plant standard operating procedures (SOP) and shall be made available for inspection. The plan was specifically to include, but not be limited to 1) a list of combustion optimization practices to minimize emissions of pollutants and a means of verifying the practices have occurred; 2) a list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred; and 3) a list of the design choices determined to be BACT and verification that designs were implemented in the final construction.
Most Stringent Emission Standards required under 40 C.F.R. part 60 NSPS IIII [1]	NO_2, PM, PM_{10}, $PM_{2.5}$, CO	Tier 2 and Tier 3 certified engines are designed to incorporate pre-combustion controls such as fuel injection timing, exhaust gas recirculation, and other engine-based technologies to meet emissions standards. In addition to the pre-combustion controls, Tier 4 certified engines may be equipped with an integrated Selective Catalytic Reduction (SCR), Diesel Particulate Filter (DPF), and/or Diesel Oxidation Catalyst (DOC).

Control Technology	Pollutant(s)	Note(s)
Use of Ultra-Low Sulfur Diesel	$PM_{2.5}$	SO_2 emissions are proportional to the amount of sulfur in the fuel. The use of ULSD (15 ppm) will reduce condensable PM and SO_2 emissions.

Notes: [1] Per 40 C.F.R. § 60.4201(f)(2), the EPA recognizes in its NSPS that for some engines (i.e., displacement < 30 L/cylinder) an owner of a stationary source in a marine environment can certify its engine based on the marine engine requirements at 40 C.F.R. part 1042 (including appendix I) rather than the nonroad engine requirements at 40 C.F.R. part 1039 (including appendix I). See Section VIII.A for more details about the NSPS IIII requirements.

EUG 2—Marine Engines on Vessels when operating as OCS Source(s)

A RBLC search was completed for the last 10 years of determinations. Note that the RBLC only contained permit information from facilities with an air permit for oil production in the eastern Gulf of Mexico since that is the only part of the Gulf where EPA has OCS permitting jurisdiction (RBLC ID: FL 0350, FL 0347, FL 0338, FL 0348). The western and central Gulf of Mexico are under BOEM jurisdiction and are not subject to CAA OCS permitting requirements. EPA also reviewed the previous OCS Permits Determinations issued to South Fork Wind, Vineyard Wind 1, and Revolution Wind.

The applicable air pollution control technologies or techniques (including lower-emitting processes and practices) that have the potential for practical application to the emissions unit are listed in the table below.

Table 11 Options of Control Technologies or Techniques for EUG 2

Control Technology	Pollutant(s)	Note(s)
Good Combustion Practices	NO_2, PM, PM_{10}, $PM_{2.5}$, CO, GHG	The RBLC included a requirement for the permittee to develop a GCOP Plan. The plan shall be incorporated into the plant SOPs and shall be made available for inspection. The plan was specifically to include, but not be limited to 1) a list of combustion optimization practices to minimize emissions of pollutants and a means of verifying the practices have occurred; 2) a list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred; and 3) a list of the design choices determined to be BACT and verification that designs were implemented in the final construction.
Most Stringent Emission Standards required under 40 C.F.R. part 60 NSPS IIII [1]	NO_2, PM, PM_{10}, $PM_{2.5}$, CO	Tier 2 and Tier 3 certified engines are designed to incorporate pre-combustion controls such as fuel injection timing, exhaust gas recirculation, and other engine-based technologies to meet emissions standards. In addition to the pre-combustion controls, Tier 4 certified engines may be equipped with an integrated SCR, DPF, and/or DOC.
Most Stringent Emission Standards at 40 C.F.R. Part 1042	NO_2, PM, PM_{10}, $PM_{2.5}$, CO	

Control Technology		Pollutant(s)	Note(s)
Add-on air pollution control devices	Selective Catalytic Reduction (SCR)	NO_2	Add-on air pollution control devices. SCR is identified as a potential option for control of NOx emissions from the engines. SCR is a post combustion NOx control that is placed in the exhaust stream. The SCR reduces NOx emissions by injecting ammonia (NH_3) or urea into the exhaust stream.
	Diesel Particulate Filter (DPF)	PM, PM_{10}, $PM_{2.5}$	Add-on air pollution control devices. One or more DPFs or DOCs may be installed (retrofitted) on a Tier 2 or Tier 3 engine to further reduce emissions.
	Diesel Oxidation Catalyst (DOC) or Catalytic Diesel Particular Filter (CDPF)	PM, PM_{10}, $PM_{2.5}$, CO	
	Electrostatic Precipitators	PM, PM_{10}, $PM_{2.5}$	Add-on air pollution control devices. The technology that is the basis of the 2006 NSPS IIII development of the PM standards for non-emergency stationary CI ICE with a displacement of greater than or equal to 30 liters per cylinder. No other feasible technologies were identified for the control of PM from these engines in the development of the standards within NSPS IIII, and an Electrostatic Precipitators was selected as the best demonstrated technology (BDT) for PM for engines with a displacement greater than or equal to 30 liters per cylinder. The technology was deemed available at that time and capable of reducing PM emissions by 60 percent or more from stationary CI ICE.[1]
Use of Ultra-Low Sulfur Diesel (15 ppm) when possible for Engines with a displacement greater than or equal to 30 L/cylinder		$PM_{2.5}$	SO_2 emissions are proportional to the amount of sulfur in the fuel. The use of ULSD (15 ppm) will reduce condensable PM and SO_2 emissions. This also includes prioritizing the use of ULSD in C3 engines in lieu of ECA Marine Fuel (1000 ppm) when possible. [3]
Use of Ultra-Low Sulfur Diesel (15 ppm) for Engines with a displacement less than 30 L/cylinder		$PM_{2.5}$	SO_2 emissions are proportional to the amount of sulfur in the fuel. The use of ULSD (15 ppm) will reduce condensable PM and SO_2 emissions.

[1] Per 40 C.F.R. § 60.4201(f)(2)), the EPA recognizes in its NSPS IIII for engines with a displacement less than 30 L/cylinder, an owner of a stationary source in a marine environment can certify its engine based on the marine engine requirements at 40 C.F.R. part 1042 (including appendix I) as a means of demonstrating compliance with NSPS IIII. However, for engines that have a displacement greater than or equal to 30 L/cylinder, subpart IIII does not contain the same compliance provision. Specifically, engines that have a displacement greater than or equal to

30 L/cylinder are subject to emission standards for NOx and PM as contained in 40 C.F.R. § 60.4204(c) in Subpart IIII.[67]

[3] Engines with a displacement greater than 30 L/cylinder that are not able to use ULSD meeting the 15-ppm sulfur content limit will use fuel with a sulfur content less than 1,000 ppm in accordance with the MARPOL Annex VI requirements and NSPS Subpart IIII.

EUG 3—Gas-Insulated Switchgears (GIS) on WTGs and ESPs

The applicable air pollution control technologies or techniques (including lower-emitting processes and practices) that have the potential for practical application to EUG 3 include consideration of regulatory requirements since the Massachusetts Department of Environmental Protection (MassDEP) implements regulations under 310 CMR 7.72 to assist in GHG emission reduction goals by reducing SF_6 emissions from GIS through the imposition of declining annual aggregate emission limits and other measures. These declining annual aggregate emission limits and other measures include: 1.) Per 310 CMR 7.72 (4)(a), any newly manufactured GIS that is placed under the ownership, lease, operation, or control of any GIS owner on or after January 1, 2015, must be represented by the manufacturer to have a 1.0% maximum annual leak rate; 2.) Per 310 CMR 7.72 (4)(b), any GIS owner that places GIS under ownership, lease, operation, or control on or after January 1, 2015, shall comply with any manufacturer-recommended maintenance procedures or industry best practices that have the effect of reducing leakage of SF_6; and 3.) Annual reporting requirements contained in 310 CMR 7.72 (6), including but not limited to, the number of pounds of SF_6 emitted from GIS equipment owned, leased, operated, or controlled by the federal reporting GIS owner and located in Massachusetts during the year, using the equation specified in 40 C.F.R. § 98.303.

In addition to the identified BACT from regulatory requirements mentioned previously, the following options, which have been considered in prior OCS wind energy permit reviews, are also considered in this BACT analysis, depending on the voltage of the switchgear.

For low voltage switchgears:

- SF_6-free equipment (air insulated switchgears) is considered for BACT.

For medium and high voltage switchgears:

- SF_6-free equipment (air insulated switchgears) is considered for BACT.
- Alternative fluorinated chemicals (fluoronitrile) are considered for BACT.
- Where SF_6-free or SF_6-alternative equipment cannot be used:
    - A maximum annual leak rate not to exceed 0.5%, which is more stringent than the requirement contained in 310 CMR 7.72(4)(a), is considered for BACT.

[67] Noting that for a similar sized engine (i.e., >= 30 L/cylinder), the NOx emission limit within 40 C.F.R. part 1042 is equivalent to the NOx emission limit contained in 40 C.F.R. § 60.4204(c). However, for a similar sized engine (i.e., >= 30 L/cylinder), no PM emission limit exists within part 1042.

- Operating a Sealed System with leak detection and alarms and to complete any repairs of detected SF_6 leaks from switchgears within 5 days of discovery, which complies with the requirement contained in 310 CMR 7.72(4)(a), is considered for BACT.

(2) Step 2: Eliminate Technically Infeasible Option(s)

Below is a summary of the reasons for eliminating from further consideration, or justification for not eliminating from further consideration, each of the air pollution control options listed above for Step 1 of the top down BACT analysis for this project. For more details on technical feasibility, please refer to the permit application and support documents in the docket. In general, the EPA considers a technology technically feasible if: 1) it has been demonstrated and operated on the same type of source, or 2) it is "*available*" and "*applicable*." Therefore, technical feasibility for "demonstrated and operated" or "available and applicable" control technologies is included in the analysis for the different BACT options listed in Step 1 of the top down BACT analysis.

EUG 1—OCS Generator Engine(s) Installed on the ESP(s) and/or WTGs

All the control technologies identified in Step 1 are all considered technically feasible to continue to be considered as BACT.

EUG 2—Marine Engines on Vessels when operating as OCS Source(s)

For marine engines on vessels operating as an OCS source where the availability of the specific vessel at the time of the application is unknown, the EPA is not eliminating the use of the Most Stringent Emission Standards as technically infeasible because the "applicability" of technology-based federal standards, like NSPS, to marine engines is technically viable based on chemical, physical, and engineering principles. However, EPA is considering the inherent limitation on the number of specialized vessels that are currently available to the offshore wind industry in the permit conditions being proposed for this project. The number of specialized vessels available to the offshore wind industry is limited for various reasons including:

- The specific vessel capabilities required to perform the work.
- Limitations imposed by the Jones Act.[68]
- Inability to delay the project's construction timeline. As described in the permit application, slowing down, delaying, or extending the project's schedule to wait for a higher vessel could prevent the project from being built because many of the larger, more specialized, vessels are in limited supply.[69]

[68] *Supra* note 66.

[69] *See* https://www.energy.gov/sites/default/files/2022-08/offshore_wind_market_report_2022.pdf.

Considering the limited supply of vessels able to perform the work, it would be technically infeasible to require all the emission units contained in EUG 2 to comply with the most stringent emission standards. Instead of eliminating the option that would require the permittee to use vessels to meet the most stringent emission standards altogether, EPA is considering that in some circumstances it would be necessary to allow use of another vessel based on the limited availability of specific vessel at the time the activity is needed to be conducted (in other words, at time of deployment). With this consideration, EPA is retaining for some pollutants the use of the cleanest vessels with an option that would allow for flexibility in the BACT requirement based on vessel availability. For example, if a vessel meeting the most stringent emission standard for that pollutant is not available at time of deployment, a vessel with an engine meeting the next most stringent emission standard for that pollutant can be used.

The EPA is, however, proposing to determine that the replacement and/or retrofit of the engines (e.g., add on control technology: SCR, diesel particulate filters, diesel oxidation catalyst, catalytic diesel particulate filter and ESPs) on the marine vessels is technically infeasible for this project for the following reasons. The vessels that will be utilized during construction will be leased, chartered, or rented by the developer and will be owned by third-party entities. Since it does not own the vessels, the applicant does not have the ability to replace engines or retrofit a vessel to add pollution controls. The vessels could be U.S.-flagged or foreign-flagged vessels. While EPA acknowledges that procuring vessels to conduct the work on the project is the responsibility of the developer, even if a retrofit by the owner could be made a condition of procurement, extensive lead time is necessary for retrofitting an engine with after treatment control technologies. The replacement or retrofit of specific third-party vessel engines would prevent the developer from being able to substitute vessels on short notice due to schedule changes or other construction issues. Therefore, the EPA finds that the replacement and/or retrofit of the third-party engines on the marine vessels is technically infeasible for this project.

Sole use of ULSD (at 15 ppm sulfur content) on marine engines with a displacement ≥ 30 L/cylinder - in comparison to ECA marine residual and distillate fuel (at 1000 ppm sulfur content) reduces condensable PM and SO_2 emissions. However, for marine engines with a displacement ≥ 30 L/cylinder, it is problematic to require ULSD as the only fuel due to technical feasibility concerns[70]. Specifically, the permittee has noted that low viscosity fuel, i.e., ULSD, could have potentially harmful effects on some marine engines[71]. For example, ULSD's lack of lubricity can promote sticking and seizing of fuel pumps, requiring the use of fuel additives that can increase emissions. According to DNV GL (2014)[72], "due to explosion risks related to the use of highly volatile fuels on board ships," the IMO, per SOLAS requirements, has banned the use

[70] See the permit application within the docket for the permit action.
[71] American Bureau of Shipping. 2015b. Fuel switching advisory 2015. https://ww2.eagle.org/content/dam/eagle/advisories-anddebriefs/ABS_Fuel_Switching_Advisory_15076.pdf
[72] Sulphur limits 2015 — Guidelines to ensure compliance. https://datospdf.com/download/guidelines-to-ensure-compliance-_5a449ffeb7d7bc422b7af31f.pdf\

of fuels with a flashpoint lower than 60°C on vessels. In addition, the use of fuel with a flashpoint lower than 60°C is often not allowed by insurers. Numerous studies and safety data sheets indicate that ULSD often has a flashpoint lower than 60°C. Consequently, the slightly lower flashpoint limits applicable to automotive diesel (above 55°C in the European Union, minimum 52°C in the US) preclude the supply of automotive ULSD fuel to the marine market (Wright and Wilson 2012[73]). ULSD that meets the low-volatility safety requirements for larger marine engines is not widely available. Therefore, vessels can only use ULSD as permitted by SOLAS requirements and to the extent that it is available.

EUG 3—Gas-Insulated Switchgears (GIS) on WTG and ESP

For low voltage switchgears, the applicant did not provide adequate justification to support a conclusion that SF_6-free equipment was technically infeasible.[74] Rather, NEW1's reasoning suggests that SF_6-free switchgears on WTGs that meet the site-specific requirements may be technically feasible because use of SF_6-free switchgears on WTGs "has been demonstrated and operated successfully on the same type of source under review."[75]

In addition, EPA has concluded that NEW1's January 12, 2023, letter does not adequately explain why SF_6-free switchgears for WTGs should be excluded from its BACT analysis. Specifically, the applicant did not provide adequate justification on the preliminary configuration for NEW1 as indicated in the application (i.e., SF_6 insulated SWG on the WTGs) is necessary to achieve the stated goals, fundamental business objectives, purpose, and basic design of the proposed project under Step 1 of the BACT analysis, nor what factors SF_6-free switchgears for WTGs are devoid of that NEW1 considered in selecting a WTG design.

For medium voltage switchgears, the EPA is proposing to eliminate the consideration of SF_6-free equipment because the applicability of the technology to this project is unknown, and the technology has not been demonstrated and operated on the same type of source. In addition, GE's SF_6-free medium-voltage switchgear line, the F35g4, is only presently available in a 50 Hz International Electrotechnical Commission (IEC) configuration (for use in the European Union and Asian markets) and is therefore not compatible with the 60 Hz electrical standard here in the United States. Although Siemens 8VM11 is an available SF_6-free medium voltage switchgear, it is only suited for use on ESP(s) in a bus configuration, and it is unknown if this is an applicable technology configuration for the NEW1 project.

[73] Flashpoint of marine distillate oil fuels issues and implications associated with the harmonization of the minimum flashpoint requirement for marine distillate oil fuels with that of other users. https://www.dendanskemaritimefond.dk/wp-content/uploads/2016/02/Item-7e- Flashpoint-of-Marine-Distillate-Oil-Fuels-for-DSA-by-LR-FOBASV6.pdf

[74] See December 16, 2022, letter from EPA to NEW1 in the docket for this permit action regarding NEW1's feasibility reasoning for the low voltage switchgear.

[75] See PSD and Title V Permitting Guidance for Greenhouse Gases regarding adequacy demonstrations, EPA-457/B-11-001, pg.33, March 2011).

For high voltage switchgears, the EPA is proposing to eliminate the consideration of SF_6-free equipment too because the applicability of the technology to this project is unknown, and the technology has not been demonstrated and operated on the same type of source. At the present time, there is no alternative to SF_6 for HVDC switchgear. Siemens remains the market leader for HVDC switchgear, but it does not currently have any SF_6-free options, and the switchgear, g3 from GE3, is for High-Voltage Alternating Current (HVAC) transmission only.

Therefore, SF_6-free equipment for medium voltage switchgears and SF_6-alternative gas-insulated equipment for high voltage switchgears are not considered further in the BACT analysis due to technical infeasibility.

(3) Step 3 – Rank Control Technologies by Control Effectiveness (each engine described in Table 8 and controls for each are listed below)

EUG 1— OCS Generator Engine(s) Installed on the ESP(s) and/or WTGs

For EUG 1, the most effective control techniques in the ranking (Step 3) are a GCOP Plan, engines certified to the most stringent emission standards under 40 C.F.R. part 60, NSPS IIII (i.e., the highest applicable EPA Tier 4 Marine Engine at 40 C.F.R. part 1042 or EPA Tier 4 Nonroad Engine at 40 C.F.R. part 1039), and ULSD.

EUG 2—Marine Engines on Vessels when operating as OCS Source(s)

For EUG 2, the most effective control technique in the ranking are a GCOP plan and use of marine engines that meet the most stringent emission standard in NSPS IIII[76] or the most stringent emission standard set by EPA for those engines that are not subject to NSPS IIII. However, the specific emission standard that may apply to an engine is difficult to determine for this project because the specific vessels that will be used for a given activity is not known at the time of permit application. Therefore, the following paragraphs describe the most stringent emission standards depending on whether the engine is subject to NSPS IIII or not, and the size of the engine (i.e., engine displacement) considering that EPA currently does not have specific information on what vessels will be used for a given activity.

If a foreign-flagged vessel meets the definition of an OCS source and is constructed or reconstructed after the applicability dates contained within NSPS IIII, it is considered applicable and subject to the requirements of NSPS IIII.

NSPS IIII Covered Engines[77]

For marine engines with a displacement < 30 L/cylinder that meet the definition of an OCS source, the most effective control technique in the ranking at step 3 are the GCOP plan, utilizing ULSD (15 ppm), and the Tier 4 emission standards for Marine Engines (Category 1 and 2 Marine Engines) for NO_X, HC, CO, and PM at 40 C.F.R. part 1042. Per 40 C.F.R. § 60.4201(f)(2)), the EPA recognizes in its NSPS IIII that for some engines with a displacement less than 30 L/cylinder, a manufacturer of a stationary source in a marine environment can certify its engine based on the marine engine requirements at 40 C.F.R. part 1042 (including appendix I) as a means of demonstrating compliance with NSPS IIII.

[76] 40 C.F.R. part 60 NSPS IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, if NSPS is applicable to the engine. Otherwise, 40 C.F.R. part 1042, Federal Marine Compression-Ignition (CI) Engines: Exhaust Emission Standards would be the appropriate emission standards for EUG 2.

[77] See Section VII.A for more information about NSPS IIII. See 40 C.F.R. 60.4201(f). NSPS IIII applies to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that both commence construction after July 11, 2005, and were manufactured after April 1, 2006, as well as those engines modified or reconstructed after July 11, 2005.

For marine engines with a displacement ≥ 30 L/cylinder that meet the definition of an OCS source the most effective control technique in the ranking at step 3 are the GCOP plan, prioritizing the use of ULSD (with a sulfur content of 15 ppm) when technically feasible, and the emission standards for NOx and PM at 40 C.F.R. part 60, subpart IIII. That is because for engines with a displacement ≥ 30 L/cylinder, NSPS IIII sets emissions standards for NOx and PM only. For the other pollutants being emitted by these engines, which are HC and CO, the EPA is considering the applicable emissions standards for these pollutants at 40 C.F.R. part 1042 as the highest ranked option under BACT. Establishing emission standards for HC and CO in accordance with the Marine Tier 3 emission standards required by 40 C.F.R. part 1042 represent the most stringent level of emissions control required for this class or category of source (i.e., Federal Marine Compression-Ignition (CI) Engines)[78].

Non-NSPS IIII Covered Engines[79]

For marine engines with a displacement < 30 L/cylinder that meet the definition of an OCS source, and *not* subject to NSPS IIII, the most effective control technique in the ranking at step 3 are the GCOP plan, utilizing ULSD (15 ppm) and the Tier 4 emission standards for Marine Engines (Category 1 and 2 marine engines) for NO_X, HC, CO, and PM emission standards at 40 C.F.R. 1042. Establishing emission standards for NO_X, HC, CO, and PM in accordance with the Marine Tier 4 emission standards required by 40 C.F.R. Part 1042 represent the most stringent level of emissions control required for this class or category of source (i.e., Federal Marine Compression-Ignition (CI) Engines).

For marine engines with a displacement ≥ 30 L/cylinder, that meet the definition of an OCS source and *not* subject to NSPS IIII, the most effective control techniques in the ranking at step 3 are the GCOP Plan and the Marine Engines emission standards for NOx, HC, and CO at 40 C.F.R. part 1042. Part 1042 does not contain any PM emission limits for Category 3 marine engines (i.e., engine displacement ≥ 30 L/cylinder). Therefore, for PM, the most effective control technique in the ranking at step 3 is the GCOP Plan and prioritizing the use of ULSD (with a sulfur content of 15 ppm) in lieu of ECA Marine Fuel (with a sulfur content of 1000 ppm) when technically feasible.

For all units in EUG 2, the highest ranking BACT option for GHG is the use of a good combustion practices plan (GCOP).

[78] Note that the Marine Tier 1 emission standards do not contain any HC or CO emission standards for Category 3 marine engines. Therefore, for those engines which fall between model year dates of 2004 through 2010, the most effective control technique in the ranking at for HC and CO step 3 is the GCOP Plan.

[79] Engines might not be covered by NSPS IIII if they were manufactured outside the model years specified in NSPS IIII. As explained previously, NSPS IIII applies to owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that both commence construction after July 11, 2005, and were manufactured after April 1, 2006, as well as those engines modified or reconstructed after July 11, 2005. Commence construction is the date the engine is ordered by the owner or operator.

EUG 3 – Gas Insulated Switchgears (GIS) on the WTGs and ESPs

For low voltage switchgears, SF_6-free equipment is considered the highest ranked option under BACT.

For medium and high voltage switchgears, SF6-free equipment was not technically feasible for this project as explained previously in Step 2. Therefore, the following options remain as BACT:

- A maximum annual leak rate not to exceed 0.5%.

- A sealed system with leak detection and alarms and to complete repairs of detected SF_6 leaks from switchgear within 5 days of discovery.

(4) Step 4 – Evaluate most effective controls and document results.

EUG 1 – OCS Generator Engine(s) on the ESP(s) and WTGs

NEW1 has accepted the highest ranked control technology in Step 3 as BACT for all engines on the ESPs and WTGs. Since the top-option is selected, no economic or energy analysis is required.

EUG 2 – Marine Engines on Vessels when operating as OCS Source(s)

NEW1 has accepted the highest ranked control technology in Step 3 as BACT for all engines on vessel when operating as OCS Source(s). Since the top-option is selected, no economic or energy analysis is required.

EUG 3 – Gas Insulated Switchgears (GIS) on the WTGs and ESPs

NEW1 could not adequately justify the elimination of SF_6-free low-voltage gas insulated switchgears (LV-GIS) on the WTGs based on technical, energy, environmental and economic impacts. See Step 2 of this top down BACT analysis. Therefore, SF_6-free low-voltage gas insulated switchgears (LV-GIS) remains the most effective control option in the analysis.

For medium and high voltage switchgears, SF_6-free equipment was not technically feasible for this project as explain previously in Step 2. Therefore, the following options remain as the BACT: (1) A maximum annual leak rate not to exceed 0.5% and (2) A sealed system with leak detection and alarms and to complete leak detection repairs of detected SF_6 leaks from switchgear within 5 days of discovery.

(5) Step 5 – Select BACT

Using the "top-down" process, the option selected as BACT is the highest level of control (ranked at Step 3) for which the applicant could not adequately justify its elimination based on energy, environmental and economic impacts. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 C.F.R. part 60, 61, or 63.

Based on the preceding analysis, the following combination of control technologies and associated emissions limitations have been determined to be BACT for this project.

EUG 1 - OCS Generator Engine(s) on the ESP(s) and WTGs

OCS generator engines installed on the ESP(s) and WTGs certified to the highest emission standards contained in 40 C.F.R. part 60, subpart IIII.

OCS generator engines on the ESP(s) and WTGs shall be operated in accordance with the GCOP Plan for the facility. The plan shall be incorporated into the facility SOPs and shall be made available for

inspection. The plan specifically should include, but is not limited to: i.) a list of combustion optimization practices and a means of verifying the practices have occurred for each engine type based on the manufacturer's most recent specifications issued for the engines at the time that they are certified (and any updates from the manufacturer should be noted and amended in the plan); ii.) a list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred (if applicable); and iii.) a list of the design choices determined to be BACT and verification that designs were implemented in the final construction.

Utilizing ULSD (15 ppm) in engines that have a displacement less than 30 L/cylinder.

EUG 2 - Marine Engines on Vessels when operating as OCS Source(s)

A good combustion practices plan (GCOP) is selected for all units in EUG 2. All engines covered by EUG 2 shall be operated in accordance with the GCOP Plan for the facility. The plan shall be incorporated into the facility SOPs and shall be made available for inspection. The plan specifically should include, but is not limited to: i.) a list of combustion optimization practices to minimize emissions of pollutants and a means of verifying the practices have occurred for each engine type based on the manufacturer's most recent specifications issued for the engines at the time that they are certified (and any updates from the manufacturer should be noted and amended in the plan); ii.) a list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred (if applicable); and iii.) a list of the design choices determined to be BACT and verification that designs were implemented in the final construction.

The Permittee is required to prioritize the use of ULSD (with a sulfur content of 15 ppm) in EUG 2 engines that have a displacement greater than or equal to 30 L/cylinder when technically feasible.

The Permittee is required to use ULSD (15 ppm) in EUG 2 engines that have a displacement less than 30 L/cylinder.

NSPS IIII Covered Engines

For Marine Engines with a displacement < 30 L/cylinder that meet the definition of an OCS source, and subject to NSPS IIII, meeting the emission standards for NO_X, HC, CO, and PM Emission Standards at 40 C.F.R. part 60, subpart IIII at time of deployment. At a minimum, all engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards (for Category 1 and Category 2 Marine Engines) for NO_X, HC[80], CO, and PM contained within 40 C.F.R. part 1042.

For Marine Engines with a displacement ≥ 30 L/cylinder that meet the definition of an OCS source and are subject to NSPS IIII, vessels meeting the emission standards for NOx and PM at 40 C.F.R. part 60, subpart IIII and highest applicable emission standards for HC and CO within 40 C.F.R. part 1042 at time of deployment. At a minimum, all engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards

[80] Note that the marine engine emission limits may be presented as NOx + HC or NOx and HC separately and the nonroad engine emission limits may be presented as NOx + NMHC or NOx and NMHC separately.

for (Category 3 Marine Engines) for NOx contained within 40 C.F.R. part 1042 and the NOx and PM emission standards within 40 C.F.R. part 60, subpart IIII.[81] Note that the Marine Tier 1 emission standards do not contain any HC or CO emission standards for Category 3 marine engines. Therefore, for those engines which fall between model year dates of 2004 through 2010, BACT for HC and CO is the GCOP Plan.

Non-NSPS IIII Covered Engines

For all other marine engines with a displacement < 30 L/cylinder that meet the definition of an OCS source and are not subject to NSPS IIII, vessels meeting the highest applicable emission standards for NO_X, HC, CO, and PM within 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards (for Category 1 and Category 2 Marine Engines) for NO_X, HC, CO, and PM contained within 40 C.F.R. part 1042. Currently, the Tier 1 marine engine emission standard in 40 C.F.R. part 1042 does not contain any HC, CO, or PM emission limits for Category 1 or 2 Marine Engines. Therefore, for these cases, BACT for HC, CO, and PM is GCOP and prioritizing the use of ULSD (15 ppm) in engines that have a displacement less than 30 L/cylinder.

For Marine Engines with a displacement ≥ 30 L/cylinder that meet the definition of an OCS source and *not* subject to NSPS IIII, vessels meeting the highest applicable emission standards for NOx, HC, and CO, within 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards for NOx contained within 40 C.F.R. part 1042. Note that the Marine Tier 1 emission standards do not contain any HC or CO emission standards for Category 3 marine engines. Therefore, for those engines which fall between model year dates of 2004 through 2010, BACT for HC and CO is the GCOP Plan.
Other Considerations:

It is important to note the distinction in BACT and LAER determination for certain vessel types in EUG 2. Specifically, the LAER determination for EUG 2 is presumed to be the more stringent determination (thus resulting in the more stringent floor requirement) due to NNSR regulating NOx (which thereby include N_2O and NO_2 by proxy), and LAER being able to consider the SIP limitations for similar class of source. This means that certain specified vessel types shall at a minimum comply with emission limits equal to or more stringent than EPA Tier 2 marine engine emission standards. See Section V.B.2.b(5).

Note that for purposes of this section, to use a lesser Tier engine, the Permittee shall ensure one of the following conditions is met at time of deployment: 1) A vessel with a higher Tier engine is not available within two hours of when the vessel must be deployed; or 2) The total emissions associated with the use of a vessel with the higher Tier engine(s) would be greater than the total emissions associated with the use of the vessel with the next lower Tier engine(s).[82] When determining the total emissions

[82] EPA understands that offshore wind developers hold contracts with several vessel supply companies that may have multiple vessels of various tier levels capable of performing certain tasks. The condition was developed to require the selection of the cleanest vessel available within the contracted fleet. Note that the 2-hour requirement is not relative to the amount of time to travel to the WDA or conduct work on the WDA facility but rather to ensure construction isn't delayed if a cleaner vessel is available after 2 hours from the scheduled deployment time.

associated with the use of a vessel with a particular engine, the permittee will include the emissions of the vessel that would occur when the vessel would be in transit to the WDA from the vessel's starting location.[83]

EUG 3 – Gas Insulated Switchgears (GIS) on the WTGs and ESPs

The BACT requirements for the LV-GIS will consist of SF_6-free equipment. The BACT requirements for the MV and HV GIS will consist of a Sealed System with leak detection and alarms, repair of detected SF_6 leaks from switchgear within 5 days of discovery, and a maximum annual leak rate not to exceed 0.5%.

[83] For example, if the contracted fleet of vessels has a higher tiered vessel that is not located near the project (e.g., several hundred miles away), the permittee may compare the total emissions (tons) that would be emitted if a higher tiered vessel were to travel the longer distance to the project location verses the total emissions (tons) resulting from the use of a lower tiered vessel located and traveling a shorter distance to the project location.

D. Ambient Air Impact Analysis

A source impact analysis is required under 40 C.F.R. § 52.21(k) for a proposed major source to demonstrate that the allowable emission increase from the project will not cause or contribute to a violation of a National Ambient Air Quality Standard (NAAQS) or PSD increment. The regulations at 40 C.F.R. part 51, appendix W (*Guideline on Air Quality Models* or the *Guideline*) provide the requirements for analyses of ambient air quality impacts. The *Guideline* specifies EPA's preferred models and other techniques, as well as guidance for their use in regulatory application in estimating ambient concentrations of regulated NSR air pollutants. The analyses of ambient air impacts described in this section were conducted in accordance with the *Guideline*.

The ambient air impact analysis for the project was conducted to assess impacts during both the construction phase and the operations & maintenance ("O&M") phase of the project. Modeling was conducted using a conservative estimate of emissions associated with both phases of the project. This section provides a summary of the assumptions and inputs used to conduct the modeling analysis for both phases of the project. The results of the modeling demonstrate that both phases of the project will not cause or contribute to a violation of an ambient air quality standard or cause any significant impacts to a Class I area.

The construction phase of the project was determined to result in only "temporary emissions" and was therefore exempt from the source impact analysis requirements of 40 C.F.R. § 52.21(k), as described in detail below. However, as part of the qualification process for the exemption, the EPA has determined a modeling analysis was required to demonstrate the source would not significantly impact a Class I area. Therefore, the modeling analysis for the construction phase of the project is only a demonstration that the project does not significantly impact any Class I areas in terms of Class I PSD increment and Air Quality Related Values (AQRVs).

The modeling analysis of the O&M phase of the project is focused on an assessment of project emission impacts on ambient air quality. Project impacts are compared to the NAAQS and PSD increments to demonstrate the project will not cause or contribute to a violation of these standards. Details of the modeling analysis and results are provided below.

Table 12 provides the applicable NAAQS, PSD increment, and significant impact levels ("SILs"), which were used in determining air quality impacts from the Project.

Table 12 NAAQS, PSD Increments, and Significant Impacts Level

Pollutant	**Averaging Time**	**NAAQS (1)**		**PSD (2) Class II Increment**	**Class II SIL**	**PSD (2) Class I Increment**	**Class I SIL**
		Primary	**Secondary**				
CO	1-hr	35 ppm	--	--	2,000	--	--
	8-hr	9 ppm	--	--	500	--	--
$PM_{2.5}$	Annual	12.0 ug/m^3	15.0 ug/m^3	4	0.2 (3)	1	0.05 (3)
	24-hr	35 ug/ m^3	35 ug/ m^3	9	1.2 (3)	2	0.27 (3)
PM_{10}	Annual	--	--	17	1 (5)	4	0.2 (4)
	24-hr	150 ug/ m^3	150 ug/ m^3	30	5 (5)	8	0.3 (4)

Pollutant	Averaging Time	NAAQS [1]		PSD [2] Class II Increment	Class II SIL	PSD [2] Class I Increment	Class I SIL
		Primary	Secondary				
NO_2	Annual	53 ppb	53 ppb	25	1 [5]	2.5	0.1 [4]
	1-hr	100 ppb	--	--	7.5 [6]	--	--

[1] *See* 310 CMR 6.04: Standards

[2] *See* 40 C.F.R. § 52.21(c)

[3] EPA's April 17, 2018, Guidance and associated legal memorandum and technical support documents, included as part of the permit record.

[4] Values proposed by the applicant. These values are consistent with values proposed by EPA. *See* 61 Fed. Reg. 38250, "Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)."

[5] See 40 C.F.R. § 51.165(b)(2).

[6] EPA, June 29, 2010, "Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program." The interim SIL value of 4 ppb (or 7.5 µg/m^3) was used.

1. Construction Phase

The PSD permitting regulations for proposed major new sources require applicants to perform an air quality impact analysis for those pollutants emitted in significant quantities, under 40 C.F.R. § 52.21(k). For temporary emission sources subject to the PSD permitting requirements, the PSD regulations at 40 C.F.R. § 52.21(i)(3) provide an exemption to the source impact analysis if the source will impact no Class I area and no area where an applicable increment is known to be violated. For sources within proximity to a Class I area, it is inferred an assessment is necessary to qualify for the exemption. The assessment may need to include a modeling demonstration to show that the project will not cause a significant ambient air impact to any Class I area.

An assessment of the construction emissions was provided by the applicant in the January 13, 2023, NEW1 OCS Air Permit Application. The emissions calculations and inventory were included as Appendix A of the Application. Appendix B of the Application contained the air quality modeling report. Calculation spreadsheets and modeling files were provided to the EPA electronically and were reviewed to confirm the conclusions made in the application.

The following sections provide the information EPA considered in determining the appropriate ambient air impacts analysis requirements to which the source is subject for the construction period, and whether those requirements have been satisfied. Specifically, the sections below describe, for the construction period: 1) the qualification as temporary; 2) the assessment of ambient air impacts at areas where PSD increment is known to be violated; 3) the assessment of ambient air impacts at Class I areas; 4) results of the assessment for the source; and 5) EPA's overall conclusion about the ambient air impacts during the construction phase for the source.

a. Qualification as a Temporary Source

The subject emissions associated with the construction of the source are anticipated to last no longer than a period of two years. The EPA considers construction sources operating for two years to be temporary sources for PSD permitting purposes, however a longer period could be considered at the

Administrator's discretion. *See* Amended Regulations for Prevention of Significant Deterioration of Air Quality, 45 Fed. Reg. 52676, 52719, 52728 (Aug. 7, 1980). Since the construction emissions for the source are anticipated to last no longer than two years, the construction emissions are considered temporary.

b. Assessment of Ambient Air Impacts at Areas Where PSD Increment Is Known to be Violated

The impact-related criteria that must be met for a temporary source under 40 C.F.R. § 52.21(i)(3) require that emissions must not impact any area where the applicable increment is known to be violated. The proposed windfarm will be located approximately 15 NM southeast of the Noman's Land Island National Wildlife Refuge, Massachusetts. Based on consultation between New England Wind, the Commonwealth of Massachusetts, and EPA[84], there are no areas in the vicinity of the proposed project where an applicable PSD increment is known to be violated. Therefore, because of the absence of areas known to be in violation of the PSD increment in the vicinity of the source, EPA concludes that construction emissions for the source will not impact any such area where applicable PSD increment is known to be violated.

c. Assessment of Ambient Air Impacts at Class I Areas

The impact-related criteria that must be met for a temporary source under 40 C.F.R. § 52.21(i)(3) require that the emissions must not impact any Class I area. Class I areas are defined in 40 C.F.R. § 52.21. The Class I areas closest to the construction area are the Lye Brook Wilderness Area, located in southwestern Vermont, the Brigantine Wilderness Area, located in Southeastern New Jersey, and the Dry River Wilderness located in New Hampshire. A map of the location of the nearest Class I areas with respect to the NEW1 project is presented in Figure 2.

[84] See March 30, 2023, Email from MassDEP to EPA in Docket # EPA-R01-OAR-2023-0526

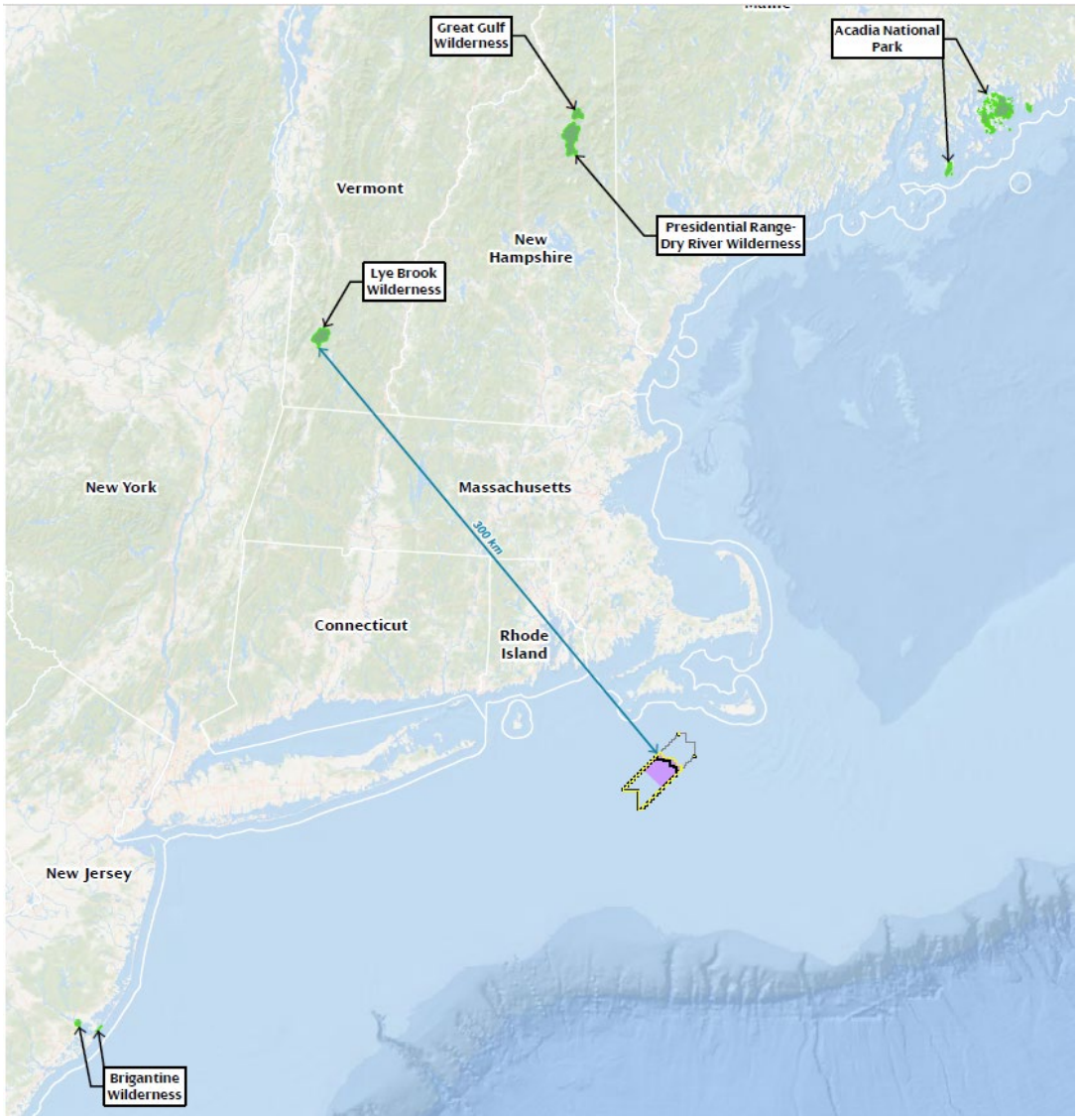

Figure 2 New England Wind 1 Area and Closest Class I Areas.

For those pollutants for which Class I PSD SILs have been established, the applicant has compared the modeled impacts at Class I areas with Class I PSD SILs to assess whether ambient air quality will be significantly affected. The *Guideline* specifies a two-tier screening approach for long-range transport assessments. The first-tier approach, described in section 4.2.c.i of the *Guideline*, is an assessment of near-field impacts at or within 50 km of the source, using a regulatory near-field dispersion model. The first-tier approach was sufficient to demonstrate annual-average $PM_{2.5}$ and PM_{10} impacts would not be significant. The $PM_{2.5}$ first-tier assessment accounted for both the primary and secondarily formed contributions at 50 km distance from the source; both annually averaged $PM_{2.5}$ and PM_{10} impacts were shown to be below the SIL using the first-tier analysis.

The second-tier approach, described in section 4.2.c.ii of the *Guideline*, sets forth a case-specific assessment in consultation with the EPA Regional Office. The applicant used a second-tier approach to assess the impacts of construction emissions on the annual NO_2 24-hour average $PM_{2.5}$, and 24-hour average PM_{10} Class I increments at the nearest three Class I areas to the NEW1 facility. For the second-

tier analysis of PM_{10} and $PM_{2.5}$ impacts to Class I areas, the applicant used existing technical information to demonstrate impacts will be insignificant, discussed in detail below.

To assess the far-field impacts for annual NO_2, the applicant selected the CALPUFF model (version 5.8.5) consistent with Section 4.2.c.ii of the *Guideline.* The CALPUFF model was applied with no chemistry or deposition consistent with Section 4.2.c.ii of the *Guideline*. The applicant prepared representative meteorological data for use with the CALPUFF model based on prognostic meteorological data provided by EPA. The meteorological data were extracted from the EPA CONUS Weather Research and Forecasting (WRF) prognostic model for the three-year period of 2018–2020 using the Mesoscale Model Interface Program (MMIF", version 3.4.2) and a horizontal grid resolution of 12 km.

The applicant provided a prognostic model evaluation[85] to demonstrate the suitability of the prognostic meteorological dataset for this purpose. The EPA's assessment of the NEW1 evaluation of the WRF simulation is that it provides a sufficient basis for use in a screening analysis with CALPUFF for estimating PM_{10}, $PM_{2.5}$, and NO_2 impacts from the project at distant Class I areas. The submitted evaluation was originally intended to demonstrate favorable model performance for use of prognostic data for the CALPUFF modeling. However, the EPA found the evaluation was thorough and sufficient to also support use of the prognostic model for use in near-field dispersion modeling.

The CALPUFF modeling was conducted to assess NO_2 impacts on the nearest three Class I areas. A total of 103 receptors were in the Lye Brook Wilderness Area, 46 receptors for Brigantine Wilderness, and 188 receptors for the Presidential Range - Dry River Wilderness. These receptors used were those provided by the National Park Service.[86]

d. Assessment of NO_2 Impacts at Class I Areas

Consistent with section 4.2.c.ii of the *Guideline*, the applicant assessed the significance of ambient impacts for NO_2 at the three Class I areas using a second-tier analysis. The source inventory included 197 point and 10,640 volume NO_x sources in a configuration identical to that used with the near-field dispersion modeling. Chemical transformation of NO_x was not applied in the model, in accordance with long-standing EPA policy. CALPOST was used to determine NO_2 concentrations using a table of conversion rates which vary by NO_x concentration, set to be consistent with the ARM2 method. Assessment of NO_2 by the CALPUFF model demonstrated impacts below the Class I significance level at the Class I areas modeled. EPA has evaluated the applicant's approach for assessing NO_2 impacts and believes it is suitable to identify those impacts resulting from the source in the Class I area. Comparison of construction period impacts for the source to the respective SILs are presented in Table 13.

[85] The prognostic model evaluation titled "WRF Performance Evaluation for New England Wind Phase I" was provided on August 17, 2022, available as part of the administrative record for the draft permit.

[86] Pre-processed receptors provided by the National Park Service for Class I AQRV analysis, downloaded from: https://irma.nps.gov/DataStore/Reference/Profile/2249830

e. Assessment of 24-hour average $PM_{2.5}$ Impacts at Class I Areas

To determine the total impact on $PM_{2.5}$ concentrations from the facility at the nearest Class I area, which is the Lye Brook Wilderness Area, NEW1 summed the impact of direct $PM_{2.5}$ emissions with the impact of $PM_{2.5}$ precursor emissions on the secondary component of $PM_{2.5}$ concentrations. The total $PM_{2.5}$ concentration, consisting of the direct and secondary components of $PM_{2.5}$ impacts, was then compared to the $PM_{2.5}$ SILs. Consistent with section 4.2.c.ii of the *Guideline*, the applicant assessed the impacts of direct $PM_{2.5}$ emissions at a 300 km distance using a second-tier analysis to assess impacts at Class I areas. For assessment of the secondary component of $PM_{2.5}$ impacts resulting from the $PM_{2.5}$ precursor emissions from the facility, the applicant used a Tier 1 demonstration tool based on existing technically credible and appropriate relationships between emissions and impacts developed from previous modeling, as described in section 5.2(e) of the *Guideline*. Additional details on the approach used by the applicant to assess the direct and secondary component of $PM_{2.5}$ impacts are provided in the following paragraphs.

As explained in its April 17, 2018, memorandum, "Guidance on Significant Impact Levels (SIL) for Ozone and Fine Particles in the Prevention of Significant Deterioration Permitting Program" (EPA's April 17, 2018, Guidance), the EPA has recognized that permitting authorities have the discretion to apply SILs on a case-by-case basis in the review of individual permit applications. In 2010, the EPA finalized a rule to codify, among other things, $PM_{2.5}$ SIL values and specific applications of those values. In litigation over that rule, the EPA conceded the regulation was flawed because it did not preserve the discretion of permitting authorities to require additional analysis in certain circumstances. The court granted the EPA's request to vacate and remand the rule so that the EPA could address the flaw. *See Sierra Club v. EPA*, 705 F.3d 458 (D.C. Cir. 2013). The EPA subsequently addressed the use of SILs in the EPA's April 17, 2018, Guidance. For the purposes of this permitting action, the EPA is using $PM_{2.5}$ SILs as a compliance demonstration tool based on the technical and legal bases accompanying its April 17, 2018, Guidance. These documents (i.e., the SILs memorandum, technical analysis, and legal memorandum) are provided in the administrative record associated with the draft permit.[87] The use of the $PM_{2.5}$ SIL as an indication of a significant impact on a Class I area was not the basis for the court's $PM_{2.5}$ SIL vacatur. Given this fact, the previous use of the $PM_{2.5}$ SILs as a significant impact indicator, and the lack of any other objective concentration metric, EPA is using the SIL value as a concentration which is considered small enough to qualify for the temporary source exemption (i.e., no impact to Class I areas).

For both primary and secondary $PM_{2.5}$ impacts, the applicant used a Tier 1 demonstration tool (for secondarily formed air pollutant analysis) based on existing technically credible and appropriate relationships between emissions and impacts developed from previous modeling, as described in sections 5.2(e) and 5.4.2(b) of the *Guideline*. The applicant's approach for assessing secondary $PM_{2.5}$ impacts is consistent with EPA's April 30, 2019, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program" (EPA's April 30, 2019, Guidance).

In assessing the contribution of the primary impact of $PM_{2.5}$, the applicant used a set of transfer values provided by the EPA to provide a conservative estimate of long-range impacts. The EPA calculated primary PM_{10} concentrations from a subset of hypothetical 100 tpy sources modeled using CAMx in a

[87] The SILs memorandum, technical analysis, and legal memorandum can be found within the docket for this permit action.

nationwide domain.[88] The highest concentrations from all sources at 300 km was selected to estimate a conservative project impact using the ratio of project annual emissions to the modeled emission rate of 100 tpy.

In assessing secondary impacts for $PM_{2.5}$, the applicant relied on information provided by the EPA related to the EPA modeling of the secondary formation of $PM_{2.5}$ constituents due to precursor emissions for hypothetical NO_x and SO_2 sources. Instead of explicit modeling using CALPUFF, the applicant used existing technical relationships based on EPA CAMx modeling of primary $PM_{2.5}$ emissions from hypothetical sources. Information about the EPA hypothetical source modeling is provided in the EPA's April 30, 2019, guidance. To identify atmospheric chemistry that is suitably representative of the area around the WDA, the applicant evaluated modeled secondary $PM_{2.5}$ impacts from the nearest three hypothetical sources to the project (Norfolk, MA, Franklin, MA, and Bronx, NY hypothetical sources).[89] From the three hypothetical sources, the applicant identified the highest annual and 24-hour nitrate and sulfate impact levels at 300 km. By selecting the highest impacts, the derived value is suitably conservative (i.e., likely to overestimate impacts) for use in this screening assessment. Then, the applicant scaled the hypothetical source impacts based on the ratio of the emissions to the EPA's hypothetical source modeling emissions (i.e., 3,000 tpy) to derive an expected secondary impact for nitrate and sulfate constituents for the 24-hour and annual averaging periods. The sum of these nitrate and sulfate impacts is the total secondary $PM_{2.5}$ impact.

The sum of the direct $PM_{2.5}$ impacts and the secondary $PM_{2.5}$ impacts from the Tier I analysis demonstrated total impacts below the $PM_{2.5}$ significance levels at 300 km distance as a conservative estimate of impacts to Class I areas. EPA has evaluated the applicant's approach for assessing $PM_{2.5}$ impacts and believes it is suitable to identify those impacts resulting from the source in the Class I areas. Comparison of construction period impacts for the source to the respective SILs are presented in Table 13.

f. Assessment of PM_{10} Impacts at Class I Areas

Consistent with section 4.2.c.ii of the *Guideline*, NEW1 assessed the impacts of PM_{10} emissions at the Lye Brook Wilderness Area using a second-tier analysis. Instead of explicit modeling using CALPUFF, the applicant used existing technical relationships based on EPA CAMx modeling of primary PM_{10} emissions from hypothetical sources. The applicant adopted a PM_{10} transfer coefficient used in the VW1 application from a national subset of hypothetical sources. Recent work published in December 2022 by the EPA[90] has identified more appropriate PM_{10} coefficients for OCS sources in the region. The EPA compared the primary PM_{10} impacts at 300 km calculated in the NEW1 application to those calculated using the December 2022 OCS hypothetical sources and found the values the applicant originally used to be higher and more conservative. EPA has evaluated the applicant's approach for assessing PM_{10}

[88] Primary $PM_{2.5}$ far-field concentrations provided in Table 4-2 of "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program." EPA-454/R-19-003, April 2019.

[89] Figure 3-4 of EPA's April 30, 2019, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program" (EPA's April 30, 2019 Guidance).

[90] Primary PM10 impact transfer coefficients for hypothetical OCS sources on the east coast have been published in "Photochemical Model Estimated Relationships Between Offshore Wind Energy Project Precursor Emissions and Downwind Air Quality Impacts," EPA-454/R-22-007, Dec. 2022.

impacts and believes it is suitable to identify those impacts resulting from the source in the Class I area. Comparison of construction period impacts for the source to the respective SILs are presented in Table 13.

(1) Ambient Air Impacts for the Construction Phase

Consistent with section 4.2.c.ii of the *Guideline*, the applicant assessed the significance of ambient impacts for NO_2, $PM_{2.5}$, and PM_{10} at the nearest Class I areas using a combination of first tier and second-tier analyses. The applicant assessed the impacts of direct $PM_{2.5}$ emissions at 300 km using the CALPUFF model to conservatively estimate impacts at the Class I areas. To assess secondary $PM_{2.5}$ impacts, the applicant used a Tier 1 demonstration tool based on existing technically credible and appropriate relationships between emissions and impacts developed from previous modeling, as described in section 5.2(e) of the *Guideline*. The total $PM_{2.5}$ concentration, consisting of the direct and secondary component of $PM_{2.5}$ impacts, was then compared to the appropriate SIL.

The total ambient air impacts for pollutants emitted from construction of the source are presented in Table 13. below. Concentrations in air are given in micrograms per cubic meter (µg/m^3). Impacts for each pollutant and associated averaging time, for which Class I area SILs have been established, are shown to be below significance levels at the Lye Brook Wilderness Area.

Table 13. Assessment of Construction Period Ambient Air Impact for the Source

Pollutant	Averaging Time	Primary Impact (ug/m^3)	Secondary Impact (ug/m^3)	Highest Total Impact (ug/m^3)	Class I PSD SIL (ug/m^3)	Impact Below SIL?
$PM_{2.5}$	Annual	0.026	0.019	0.045[(1)]	0.05	Yes
	24-hr	0.010	0.075	0.085[(2)]	0.27	Yes
PM_{10}	Annual	0.026	--	0.026[(1)]	0.2	Yes
	24-hr	0.017	--	0.017[(2)]	0.3	Yes
NO_2	Annual	0.011	--	0.011[(3)]	0.1	Yes

[(1)] $PM_{2.5}$ and PM_{10} annual values determined by Tier 1 analysis using AERMOD at 50km ring; secondary PM2.5 determined at 40km using the MERPs guidance and related EPA MERPs Qlik tool (https://www.epa.gov/scram/merps-view-qlik)
(2) $PM_{2.5}$ and PM_{10} 24-hour average values determined by Tier 2 analysis at 300 km distance for conservative estimate of impacts to all Class I areas in the region. Primary and secondary impacts determined using technical relationships established in the 2019 MERPs guidance referenced above (EPA-454/R-19-003).
(3) Annual NO_2 value determined through a Tier 2 analysis using CALPUFF modeling and CALPOST post-processing assuming NO_2/NO_x ratios based on ARM2.

The predicted impacts from the proposed NEW1 facility are compared to the Class I PSD increments in Table 14. As shown in the table, all predicted impacts are well below the Class I increments.

Table 14 Comparison of Construction Period Impacts to Class I PSD Increments

Pollutant	Averaging Time	Highest Total Impact (ug/m^3)	Class I PSD Increment (ug/m^3)	Percent of Increment
$PM_{2.5}$	Annual	0.045	1.0	5%
	24-hr	0.085	2.0	4%

Pollutant	Averaging Time	Highest Total Impact (ug/m^3)	Class I PSD Increment (ug/m^3)	Percent of Increment
PM_{10}	Annual	0.026	4.0	<1%
	24-hr	0.017	8.0	<1%
NO_2	Annual	0.011	2.5	<1%

(2) EPA Conclusion About Ambient Air Impacts During Construction Phase

The EPA has reviewed the ambient air quality demonstration submitted by the applicant and concludes that it is appropriate for its intended purpose of estimating construction period impacts from the source. Therefore, the EPA concludes that there will be no significant impacts at Class I areas resulting from construction of the source. Predicted impacts for all pollutants and averaging periods are also well below the Class I PSD increments and the Federal Land Managers' have raised no concerns regarding impacts to AQRVs[91]. Therefore, the EPA concludes that the source is exempt from a full air quality impact analysis required under 40 C.F.R. § 52.21(k). Details of the applicant's modeling are provided in the applicant's modeling reports included in the administrative record.

2. Operational Phase

The PSD permitting regulations for proposed major new sources require applicants to perform an air quality impact analysis for those pollutants with significant emissions (refer to 40 C.F.R. § 52.21(k)). All pollutants with emissions greater than these thresholds during both the construction and operational phases must be appropriately assessed to ensure that emissions from the source do not cause or contribute to a violation of the NAAQS or PSD increment (though, it is noted the project is exempt from assessment of temporary construction emissions based on the findings summarized above).

Assessment of the O&M emissions was provided by the applicant in a January 13, 2023, OCS Air Permit Application submitted to EPA. The application contained emissions calculations and an air quality modeling report in its appendices. Modeling input and output files were also provided in digital format as part of the permit application.

The following sections provide the EPA's assessment of information provided by the applicant in determining whether ambient air impacts from the source are protective of air quality standards. Specifically, the sections below describe: 1) an overview of the air modeling conducted by the applicant; 2) comparison of operational phase impacts against the SILs; 3) comparison of operational phase impacts against the NAAQS; 4) comparison of operational phase impacts against the PSD increments for Class I and Class II areas; 5) assessment of operational phase impairment to visibility, soils, and vegetation; and 6) EPA's conclusion about the ambient air impacts during the operational phase of the facility.

[91] See March 7, 2023, email from Ralph Perron, US Forest Service, available as part of the administrative record for the draft permit.

a. Overview of the Air Modeling Conducted by NEW1

To assess direct near-field impacts within a 50-km distance, the applicant submitted an alternative model request to EPA Region 1 to use the AERCOARE-AERMOD modeling system on August 9, 2021. The request provided evidence and arguments supporting the use of the AERCOARE-AERMOD system in place of the default regulatory model, the Offshore and Coastal Dispersion (OCD) model (Version 5). Region 1 conducted a thorough investigation of the request and supporting evidence and found the proposed alternative model application to be satisfactory under the requirements of 40 C.F.R. part 51, appendix W § 3.2.2(e). Region 1 approved the use of the AERCOARE-AERMOD model, with prognostic model inputs, on December 22, 2021. The EPA Model Clearinghouse concurred with the Region 1 approval on January 28, 2022. All records of the approval are available on the Model Clearinghouse website.[92]

The applicant prepared hourly representative offshore meteorological data for use with the AERMOD model using the AERCOARE meteorological preprocessor. Input meteorological data for AERCOARE was based on prognostic meteorological modeling data provided by EPA, developed using the MMIF tool. The meteorological data were extracted from the EPA CONUS 12-km resolution WRF prognostic model dataset for the three-year period of 2018-2020 using the MMIF, Version 3.4.2. Prior to using the datasets for AERMOD modeling, the applicant submitted an evaluation to demonstrate the suitability of the prognostic meteorological data for such a purpose.[93] The EPA's assessment of the applicant's evaluation of the WRF simulation is that it provides a sufficient basis for use in near-field modeling of air pollutant dispersion of emissions from the project.

The analysis of impacts for the short-term average NAAQS was conducted using a set of conservative scenarios, using the assumed highest emitting activities that could occur in proximity to each other. Each scenario required a different domain configuration. The analysis for the "daily/routine" O&M was conducted using a domain representing a subset of four adjacent sites representing three WTG positions and an ESP position (ESP located in the northwest corner), shown in Figure 3.[94] This scenario assumes receptors up to 25 meters distance from the edge of vessels, WTGs, and the ESP. Vessel transits from the WTG/ESP site positions are accounted for using lines of volumes sources and assumed to be a conservatively small amount of space in which vessels would truly occupy. Emission sources on the WTGs and ESPs are point sources, such as the ESP generators, and downwash is applied. The support vessels are also modeled as point sources adjacent to the WTG/ESP positions to account for the period they are at the locations. At night, the SOV and CTV are parked away from any structures and stay within one general area, represented as a volume source at the center of the grid.

[92] AERCOARE-AERMOD Alternative Model Application in support of OCS PSD permitting – Park City Wind (later renamed as New England Wind 1): https://cfpub.epa.gov/oarweb/MCHISRS/index.cfm?fuseaction=main.resultdetails&recnum=22-I-01

[93] The prognostic model evaluation titled "WRF Performance Evaluation for New England Wind Phase I" was provided on August 17, 2022, available as part of the administrative record for the draft permit.

[94] The green triangles are positions of the WTGs and ESP (ESP is upper left), the blue lines are sets of volume sources to account for transiting vessels, and the inner cyan circle is a volume source representing vessel over-night positioning. Red markers indicate AERMOD receptor locations.

This configuration of sources was considered sufficient to account for the overlap of short-term emission impacts that could occur due to daily operations across a subset of the windfarm area.

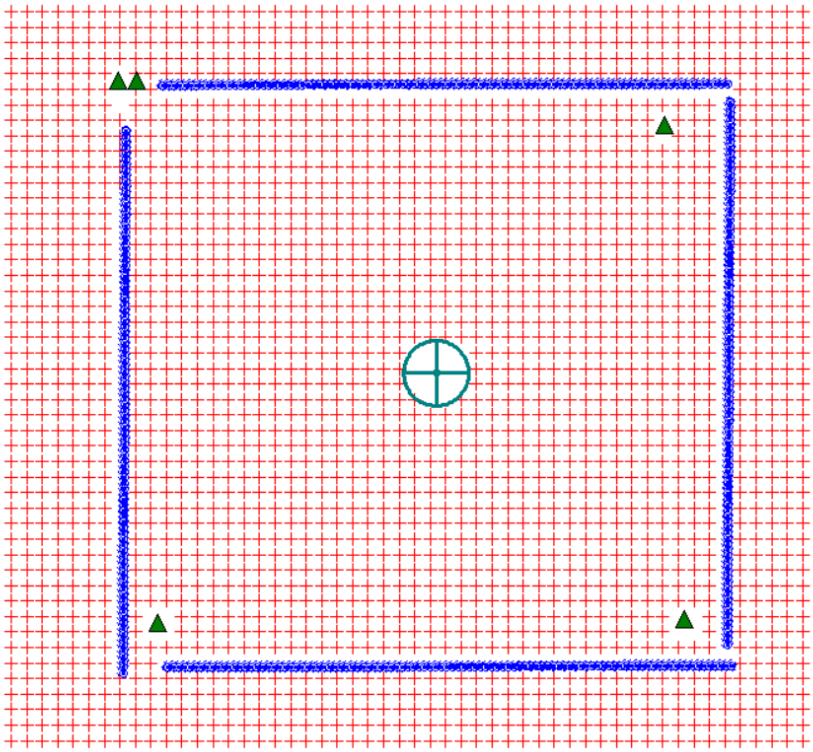

Figure 3. Receptors and source layout for the short-term NAAQS modeling domain for the "typical/routine O&M activity" scenario.

A "WTG Inspection and maintenance" scenario was also modeled, representing a "heavy repair" operation at a WTG site. In this scenario, a 500-meter Coast Guard safety buffer is applied. The scenario includes a main jack-up vessel and supporting vessel point sources plus a CTV to serve as a guard vessel and facilitate transfer of materials and personnel.

For annual modeling, sources were modeled at all WTG and ESP locations across the lease area, and the applicant assessed impacts at an array of receptors centered around the project centroid.

The facility must also account for secondary formation of $PM_{2.5}$ resulting from precursor emissions of SO_2 and NO_x. To do so, the applicant employed the "MERPs" approach, which is an appropriate Tier 1 demonstration tool consistent with requirements in section 5.4.2.b of the *Guideline*, as described in the EPA's April 30, 2019, Guidance. Specifically, the applicant relied on the most conservative MERPs value from the three nearest hypothetical sources to the project to estimate secondarily formed $PM_{2.5}$ impacts from the project. The applicant combined the maximum predicted secondary $PM_{2.5}$ impacts with the modeled primary (i.e., resulting from direct emissions) $PM_{2.5}$ impacts to calculate total $PM_{2.5}$ impacts for comparison with the SIL, NAAQS, and Class II PSD increment.

Modeling methodologies, inputs, and techniques were used consistent with the *Guideline* and EPA guidance. The applicant justified treatment of certain emissions as intermittent with regards to the 1-hour NO_2 NAAQS as addressed in the EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" (EPA's March 1, 2011, Guidance). As such, the applicant applied a ratio of the number of operating hours per year by 8,760 hours to the 1-hour NO_2 emissions. The EPA agrees that the applicant has appropriately represented the intermittent sources and accounted for their expected operation with respect to the 1-hour NO_2 standard. For modeling 1-hour NO_2 impacts, the applicant applied EPA's ambient ratio method 2 (ARM2) screening method consistent with Section 4.2.3.4.d of the *Guideline*. The EPA has evaluated the methods and techniques included in the air quality impact analyses for the operational period provided by the applicant and determined that they are appropriate for assessing compliance with the SILs, NAAQS, and PSD increment.

As discussed earlier in this section, in the short-term modeling scenarios, the assumption was made that the vessels would be operating continuously at or near a subset of WTGs. The O&M vessels will be moving from location to location throughout the windfarm spending only one or two days near each WTG and ESP each year. By modeling the vessels near a single grid "square" location within the windfarm representing three WTGs and one ESP, the predicted air quality impacts are highly conservative. The air quality impacts will be distributed across all the WTGs and the ESPs and will therefore be lower than predicted by the modeling.

The applicant also provided additional analysis to account for the cumulative impact of nearby sources on the Class II PSD increment in the vicinity of the project. The Vineyard Wind I project is under construction and located adjacent to the project. Cumulative modeling accounted for multiple adjacent WTG locations from the Vineyard Wind source and their contribution to increment consumption from the project. This analysis was highly conservative for short-term increments because it assumed all emissions occur at the WTG locations along the boundary between the two adjacent windfarms.

b. Assessment of Significant Impacts

The $PM_{2.5}$ SILs used in this portion of the assessment were established in the EPA's April 17, 2018, Guidance, as described earlier, with associated legal memorandum and technical support documents. The EPA is relying on the SIL recommended in the April 17, 2018, Guidance as appropriate for the project.

The applicant's single-source modeling results for CO, NO_2, PM_{10}, and $PM_{2.5}$ for the O&M phase of the project are presented in Table 15. This screen modeling indicates that impacts for annual NO_2, annual $PM_{2.5}$, annual PM_{10}, 1-hour CO, and 8-hour CO were below the Class II significance threshold and no further analysis is warranted, recognizing that the project will not cause or contribute to a respective NAAQS violation for the respective air pollutants and averaging times.

Cumulative analysis was required for 1-hour NO_2, 24-hour PM_{10}, and 24-hour $PM_{2.5}$. The sections below provide summaries of these refined cumulative analyses. The modeling found a significant impact area (SIA) for 1-hour NO_2 that extended about 13.5 km during the typical O&M scenario and an SIA for 24-hour $PM_{2.5}$ that extended about 6 km during the same scenario. The PM_{10} SIA extended to only 0.4 km.

Table 15 Comparison of the OCS Source Operational Period Impacts Against Class II SILs

Pollutant	Averaging time	Maximum modeled conc. (ug/m^3)	Secondary formation (ug/m^3)	Total conc. (ug/m^3)	Class II SIL (ug/m^3)	Exceeds SIL? (Yes/No)
CO	1-hr	1,022	--	1,022	2,000	No
	8-hr	419	--	419	500	No
$PM_{2.5}$	Annual	0.10(2)	0.0056	0.11	0.2	No
	24-hr	7.5	0.2	7.7	1.2	**Yes**
PM_{10}	Annual	0.1(2)	--	0.1	1.0	No
	24-hr	7.8	--	7.8	5.0	**Yes**
NO_2	Annual	0.9(2)	--	0.9	1.0	No
	1-hr	95.4	--	95.4	7.5	**Yes**

(1) The scenario "typical/routine O&M operations" resulted in the maximum impacts of all scenarios in all cases.
(2) Annual results are the maximum 3-year averages at the maximum receptor.

c. Cumulative NAAQS assessment

The applicant completed a refined cumulative modeling analysis for 1-hour NO_2, 24-hour PM_{10}, and 24-hour $PM_{2.5}$. In a cumulative analysis, total ambient concentrations are determined for comparison with the NAAQS. Project impacts are combined with impacts from nearby sources and a background concentration. The applicant selected onshore monitoring data to represent background air quality in the area. The EPA finds that this assumption is protective of air quality because it overestimates concentrations near the windfarm. The EPA concludes that the monitored background values adequately and conservatively account for all other sources not explicitly modeled.

The applicant originally did not include nearby sources in the cumulative analysis, finding that the SIAs from any nearby source would not overlap. The EPA requested that the applicant expand the cumulative analysis for PSD increment consumption to account for contribution from the adjacent VW1 project, given its proximity. The EPA did not request additional modeling be conducted to account for the cumulative contribution of VW1 to 1-hour NO_2, 24-hour $PM_{2.5}$, and 24-hour average PM_{10} NAAQS because conservative assumptions could be used in conjunction with the cumulative modeling from the 2018 Vineyard Wind modeling report to support the conclusion that the NAAQS will be protected.

VW1 was recently permitted and is currently under construction. Vineyard Wind will be located immediately adjacent to NEW1, northeast of the project. The cumulative analysis approach and results are provided in Attachment 5 to the air quality modeling report (Appendix B) submitted with the permit application. The modeling was conducted using the "typical O&M" scenario that resulted in the

greater impacts in the screening analysis. For VW1, the cumulative modeling was conducted using the "O&M Scenario 18" setup from the November 2018 project air quality modeling analysis. This scenario included two CTVs at a WTG position closest to NEW1, along with emergency engine use on the WTG, and a second set of two CTVs and emergency engine on next closest WTG. The results of the total cumulative pollutant concentrations are shown in Table 16 below.

All cumulative modeling was performed in accordance with the *Guideline* and in consultation with the EPA. Total impacts of $PM_{2.5}$ included both primary and secondary impacts. The EPA concludes that NEW1's modeling was appropriate to assess impacts for these pollutants. A summary of the refined modeling, which demonstrates compliance with the 24-hour average $PM_{2.5}$, 24-hour average PM_{10} and 1-hr NO_2 NAAQS, is presented in Table 16 below.

Table 16 Cumulative NAAQS Assessment Results

Pollutant	Avg. Time	Form of standard	NEW1 Impact (ug/m^3)	Background Level (ug/m^3)	Vineyard Wind I Impact (ug/m^3)(1)	Total Conc. (ug/m^3)	NAAQs (ug/m^3)	Exceeds NAAQs?
NO_2	1-hr	H8H	23.4	68.3	25.0	117	188.0	No
$PM_{2.5}$	24-hr	H8H	4.5(2)	15.7	5.5(2)	25.7	35.0	No
PM_{10}	24-hr	H4H	6.1	23.0	11.3	40.4	150.0	No

(1) Highest Vineyard Wind 1 impacts from the O&M scenario modeling from the November 2018 air quality modeling report were used as highly conservative estimates of contribution to cumulative concentrations.
(2) $PM_{2.5}$ concentrations include both primary and secondary impacts.

The EPA concludes that the assessment provided by the applicant sufficiently demonstrates that air quality impacts will not violate the NAAQS for any pollutant.

d. Compliance with Class II PSD Increment

The applicant is required to demonstrate compliance with the PSD increment for PM_{10}, $PM_{2.5}$, and NO_2 because the project is a major source for these pollutants. The significance analysis presented above demonstrates compliance with the PSD increments for annual PM_{10}, annual NO_2, and annual $PM_{2.5}$. The applicant provided a PSD increment analysis for 24-hour PM_{10} and $PM_{2.5}$, for which the project was shown to have significant impacts (*See* Table 15).

In Massachusetts, the PSD increment, the maximum amount of pollution an area is allowed to increase, is tracked by county for $PM_{2.5}$ and by municipality for NO_2. No previous major source project has triggered the minor source baseline date, the date used to determine the baseline concentration in the area, in any of the nearest counties to NEW1. Because the windfarm is not located within the jurisdiction of any town or county in Massachusetts, the project does not establish a minor source baseline date for any onshore areas corresponding to the project. Instead, the EPA considers the OCS lease area as the baseline area for which the minor source baseline date is set for this OCS project. That is, the minor source baseline date for BOEM Lease Area OCS-A 0534 for PM_{10}, $PM_{2.5}$, and NO_2 is the date of receipt of the NEW1 Permit Application. Similarly, for the neighboring VW1 facility, the

minor source baseline date for BOEM Lease OCS-A 0501 is January 29, 2019 (set by Vineyard Wind) for NO_2, PM_{10}, and $PM_{2.5}$.[95]

Therefore, the VW1 facility is a $PM_{2.5}$ increment consumer also. The applicant performed a near-field modeling analysis to determine the potential cumulative consumption of the 24-hour PM_{10} and $PM_{2.5}$ increment from NEW1 and VW1. The New England Wind 2 windfarm facility (NEW2), which will be located just south of NEW1 will also be a $PM_{2.5}$ and PM_{10} increment consumer. The cumulative increment consumption assessment for NEW1 and NEW2 is addressed in the NEW2 OCS air permit application, so will not be addressed in this analysis since protection of PSD increment must be ensured before NEW2 can be permitted. The modeling was performed using the "O&M Scenario 18" emissions configuration for VW1, the same as used for the cumulative NAAQS assessment. A tight configuration of gridded receptors, with spacing at 25 meters in the inner grid, was used in the modeling. Again, the modeling is highly conservative because the emissions are assumed to occur continuously at the location modeled, whereas the emissions will be distributed across the entire source area throughout the year. The results are reported in Table 17.

The EPA has reviewed the modeling assessment for PSD increment performed by the applicant and concludes that the analysis was performed appropriately.

Table 17 Class II PSD Increment Assessment Results

Pollutant	Averaging Time	Form	Impact (ug/m^3)	Class II PSD Increment (ug/m^3)	Percent of Increment Consumed
$PM_{2.5}$	24-hr	H2H	7.6 (1)	9	84%
PM_{10}	24-hr	H2H	7.8	30	26%

(1) This value includes both primary and secondary $PM_{2.5}$ impacts.

e. Significance of O&M emission impacts at Class I areas

Given the distances of the nearest Class I areas to NEW1 and the findings that construction emissions (which are more substantial in magnitude) impact are insignificant at Class I areas, the EPA determined that additional analysis was unnecessary to address Class I PSD increment consumption.

f. Impairment to Visibility, Soils, Vegetation, and Growth

The applicant provided an analysis consistent with the requirements of 40 C.F.R. § 52.21(o) to assess air quality impacts and impairment to visibility, soils, and vegetation due to operational period emissions of the OCS Source and general commercial, residential, industrial, and other growth

[95] The PSD regulations at 40 C.F.R. § 52.21(b)(14)(ii) define the minor source baseline date as the earliest date after the trigger date on which a major stationary source or a major modification subject to 40 C.F.R. § 52.21 or to regulations approved pursuant to 40 C.F.R. § 51.166 submits a complete application under the relevant regulations. The trigger date for $PM_{2.5}$ is October 20, 2011.

associated with the operational period of the windfarm. The EPA has evaluated the analyses provided by the applicant to address these requirements.

The applicant did not conduct any additional modeling analysis to address visibility impacts. The applicant concluded that given the distance of the project to inhabited areas and Class I areas, any visibility impacts were not likely to be significant. Also, considering the distribution of emissions across a wide area during both phases of the project, any visibility impacts are likely to be highly localized and short-term. The EPA agrees with these conclusions and did not require any additional near-field or far-field visibility assessment.

For soil and vegetation analysis, the applicant referenced NAAQS secondary standards and vegetation screening thresholds found in 1990 EPA guidance. Findings and analysis presented by the applicant present a strong argument that project emissions are very unlikely to cause impacts to soils and vegetation. Emissions are to occur over a wide area far from shore over a variety of meteorological conditions throughout the year; it is very unlikely emissions could impact any area of soil and vegetation in any significant manner.

For analysis of growth, the applicant addressed the creation of jobs and economic activity that is likely to occur because of the project. The applicant assumed 80% of new jobs and associated activity will be in the Bridgeport, Connecticut area. However, the applicant assumed any significant buildup in housing, infrastructure, and commercial development was unlikely due to the existing mature level of development in the area. The EPA agrees the project is unlikely to result in any significant increase in emissions due to associated population and economic growth.

Based on the results of the analyses and the EPA's evaluation, the EPA finds that the operational period emissions and associated impacts from commercial, residential, industrial, and other growth will not result in an impairment to visibility, soils, or vegetation.

g. EPA Conclusion About Ambient Air Impacts During Operational Phase

The EPA has assessed the analyses submitted by the applicant related to ambient air impacts during the operational period. Based on this information and the EPA's assessment, as described above, the EPA concludes that the operational period emissions will not cause or contribute to violations of the NAAQS or PSD increment. Therefore, the ambient air impact requirements of the PSD regulations for the operational period of the source have been satisfied. Under the applicable Massachusetts regulations at 310 CMR 7.00 incorporated into 40 C.F.R. part 55, EPA has authority to require additional modeling for pollutants that are non-major for this project. Based on the location of the project in an area that is remote from residences, the diffuse nature of the emissions sources, and the anticipated environmental benefits of the project, EPA is choosing not to exercise its authority to require additional modeling for the operational phase of this project.

3. Consultation with Federal Land Managers

For sources impacting Federal Class I areas, 40 C.F.R. § 52.21(p) requires the EPA to consider any demonstration by the Federal Land Manager that emissions from the proposed source would have an adverse impact on air quality related values, including visibility impairment. If EPA concurs with the demonstration, the rules require that the EPA shall not issue the PSD permit.

The EPA consulted with the United States Forest Service (USFS) during the development of the modeling protocol. On July 13, 2022, Forest Supervisor John Sinclair, the Federal Land Manager responsible for management of Lye Brook Wilderness Area, informed the EPA that an Air Quality Related Value (AQRV) analysis of visibility and acid deposition would not be necessary. The USFS noted that given the distance of NEW1, temporary nature of construction emissions, low emissions during operations, and the spatial distribution of emissions through the year, AQRV impacts are not likely to be of concern from the project. Therefore, no additional Class I AQRV analysis was required for NEW1 by the EPA.

V. Nonattainment New Source Review (NNSR)

Within Massachusetts, Dukes County is currently designated as a marginal Nonattainment area for the 2008 ozone NAAQS. *See* 40 C.F.R. § 81.322. However, portions of the OCS source are closer to Bristol County, Massachusetts, than they are to Dukes County, and Bristol County is not a Nonattainment area for ozone. Nevertheless, because Massachusetts is part of the Ozone Transport Region (OTR),[96] and areas within the OTR are treated, at a minimum, as moderate Nonattainment areas for ozone, the ozone precursors NO_x and VOC are subject to the state's NNSR program requirements. The NNSR regulations in Massachusetts are implemented under 310 CMR 7.00, *Appendix A.* The regulations specify that new major stationary sources or major modifications to an existing major source within an air quality Nonattainment area must undergo a NNSR review and obtain all applicable federal and state preconstruction permits prior to commencement of construction. The intent of the NNSR review and conditions are to ensure that the increased emissions from a new or modified source are controlled to the greatest degree possible; and to ensure that more than an equivalent offsetting emission reduction (emission offsets) for operational emissions be achieved by existing sources; so that there will be reasonable further progress toward achievement of the NAAQS. Regulated NSR pollutants (and their precursors) for which an area is Nonattainment are not subject to PSD review even if the project emission increase and net emission increase is significant. Instead, they are subject to major NNSR permitting. Therefore, the ozone precursors NO_x and VOC are not subject to PSD review and instead are subject to major NNSR permitting review as described below. The NNSR program applies to new major sources and major modifications at existing major sources as defined and described in 310 CMR 7.00*, Appendix A.*

Per 310 CMR 7.00*, Appendix A*, "Major Stationary Source means any stationary source of air pollutants which emits or has the federal potential emissions greater than or equal to, 100 tpy or more of any pollutant subject to regulation under the Act, except those lower emissions thresholds shall apply as follows: 50 TPY of volatile organic compounds (VOC), or 50 TPY of oxides of nitrogen (NO_x)." Since the source[97] is an existing major source and subject to COA requirements for NNSR, the emissions increase from the project must be evaluated under NNSR to determine if it exceeds the significant emissions rate of *Appendix A* (see Table 18). The NNSR requirements apply to each regulated NNSR pollutant that a "major source emits in significant amounts" per 310 CMR 7.00, *Appendix A. See* Table 18 *below for a summary of these applicable thresholds.*

Table 18 NNSR SER Thresholds under 310 CMR 7.00, Appendix A

NNSR Regulated Pollutant	NNSR Significant Emission Rate (SER)
Ozone	25 tpy of nitrogen oxides (NO_x) where an administratively complete application was received on or after November 15, 1992, for the physical change or change in the method of operation.
Ozone	40 tpy of VOC

[96] In the CAA amendments of 1990, Congress created the OTR, located in the northeast portion of the country, to address ozone formation due to transport of air emissions. Congress included all of Massachusetts as one of the states or commonwealths within the OTR.

[97] EPA issued an OCS permit to Vineyard Wind 1, LLC on August 19, 2022.

NNSR Regulated Pollutant	NNSR Significant Emission Rate (SER)
	25 tpy of VOC where an administratively complete application was received on or after November 15, 1992, for the physical change or change in the method of operation.

A. Major Modification Applicability

"Major Modification" means any physical change in or change in the method of operation of a major stationary source that would result in a significant net emission increase of any pollutant, for which the existing source is major, subject to regulation under the Act: (a) Any net emissions increase that is considered significant for VOCs shall be considered significant for ozone; and (b) For the purpose of applying the requirements of 310 CMR 7.00: *Appendix A* to major stationary sources of NO_x, any significant net emissions increase of NO_x is considered significant for ozone, in addition to any separate requirements for NO_x under part C or D of Title I of the Act.[98]

1. Emission Increase Calculation (Project Emission Increase)

For projects that only involve the construction of new emission units, like NEW1, the significant emissions increase is the new emissions units' PTE.[99] For a new emission unit, the baseline actual emissions (BAE) for purposes of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and thereafter, for all other purposes, shall equal the unit's PTE.

For assessing the emission increases from the NEW1 project, emissions from the equipment or activities considered part of the OCS source, and all emissions from vessels servicing or associated with the project, are included in the PTE. This includes emissions from vessels, regardless of whether the vessel itself meets the definition of an OCS source, when the vessels are at or going to or from an OCS source and are within 25 NM of the source's centroid. Thus, emissions from vessels servicing or associated with an OCS source that are within 25 NM of the source's centroid are considered in determining the PTE or "potential emissions" of the OCS source for purposes of applying the NNSR regulations.

The emissions increases from this Project are calculated pollutant by pollutant for each regulated NSR pollutant. The increases include both project emissions and any emissions from the source associated with the Project. The applicant has not identified any emission units from the existing source, i.e.,

[98] Per 310 CMR 7.00, Appendix A, "Major Stationary Source" also specifies that OCS sources shall include fugitive emissions in determining, for any of the purposes of 310 CMR 7.00: Appendix A, whether the stationary source is a major stationary source. Therefore, fugitive emissions are considered in evaluating LAER and ambient impacts due to the regulations not distinguishing between stack and fugitive emissions for these purposes.

[99] Under 310 CMR 7.00, "potential to emit" is defined as the maximum capacity of a source to emit a pollutant under its physical and operational design (pg. 430). Typically, emissions from mobile sources and secondary emissions do not count when determining a stationary source's PTE. However, the definition of "potential emissions" in the OCS Air Regulations is expanded to include emissions from all vessels servicing or associated with an OCS source when within of the source's centroid.

sources associated with the VW1 project, that are affected by the NEW1 project.[100] Emission decreases are not considered in this step.

Table 19 Emission Increase from the NEW1 Project (NNSR)

New England Wind 1 Project Emission Increase	Regulated NNSR Pollutant (TPY)	
	NO_x	VOC
BAE	0	0
PTE	2,771	61
Δ (PTE-BAE)	+2,771	+61

As shown in Table 20, a significant emissions increase (per the definition of significant at *310 CMR 7.00, Appendix A)* of ozone exists. Note that NOx and VOC are considered precursors for the criteria pollutant ozone.

Table 20 Worst Case Annual Emission Estimate Compared with NNSR SER Thresholds

NNSR Regulated Pollutant	Project Emission Increase (TPY)	NNSR Significant Emission Rate (TPY)	SER Triggered? (Y/N)
NO_x	2,771	25	**Y**
VOC	61	25	**Y**

2. Emission Netting (Contemporaneous Netting)

Per 310 CMR 7.00: *Appendix A*, the definition of a "net emission increase" consists of two components: (1) Any increases in actual emissions from a particular physical change or change in the method for operation from a stationary source (i.e., Emission Increase Calculation (Project Emission Increase (PEI)); and (2) Any other increases and decreases in actual emissions at the source shall be included for netting purposes, that are contemporaneous with the change and are otherwise creditable as described in 310 CMR 7.00: *Appendix A* Net Emissions Increase (b), (c), (d), (e) and (f). In other words, netting looks at the other projects that may have been or will be undertaken at a given facility over the contemporaneous period. NEW1 is not pursuing a Step 2 contemporaneous netting analysis, because either there are no contemporaneous increases or decreases foreseeable or any increases or decreases would not impact the applicant's conclusions on NNSR review for the pollutants that exceed the SER threshold.

3. Summary

Based on the emission levels for the project, as presented in Table 20, NO_x and VOC will be emitted by the project in quantities exceeding the respective NNSR SER. The applicant has identified no anticipated contemporaneous creditable emissions increases or decreases for the proposed project NEW1, and therefore, the NEW1 project is considered a major modification to a major source (Vineyard Wind 1, LLC) and therefore subject to NNSR requirements for NO_x and VOC.

[100] There are circumstances in which the addition of a new unit or modification of an existing unit may result in increased operation or utilization of other units upstream or downstream.

B. Lowest Achievable Emission Rate (LAER)

As defined in 310 CMR 7.00*, Appendix A*, LAER "means, for any source, the more stringent rate of emissions based on the following: (a) The most stringent emissions limitation which is contained in any state SIP for such class or category of stationary source, unless the owner or operator of the proposed stationary source demonstrates that such limitations are not achievable; or (b) The most stringent emissions limitation which is achieved in practice by such class or category of stationary source. . . . In no event shall LAER allow a proposed new or modified stationary source to emit any pollutant more than the amount allowable pursuant to an applicable NSPS."

NEW1 does not yet know specifically which vessels will be utilized for the project. The procurement of the vessels requires contracts within short timeframes due to the specific nature of the OCS project which is described in more detail below. Thus, the vessel engine types that can be secured at the projected time of construction are unknown at the time of this fact sheet. In addition, NEW1 has indicated that some of the marine vessels will be owned by third parties; however, the procurement of the vessels for purposes of conducting the work on the Project is decided by the developer (i.e., Park City Wind, LLC). These third-party vessels are noted to have the potential to be considered an OCS source. The EPA is considering these facts in determining LAER for those emission units proposed in the Project.

1. Methodology

Although the definition for LAER differs from BACT, the BACT and LAER analysis have overlap in the methodology used to perform this analysis. EPA follows the equivalent Step 1 and Step 2 procedure[101] outlined in the "top-down" process used to satisfy the BACT requirements (see Section IV.C.1 above) in its analysis of paragraph (a) of the definition of LAER. Paragraph (b) of the definition of LAER follows Steps 3 through 5 of the "top-down" BACT analysis closely with only one major distinction. In Step 4 of a BACT analysis, where energy, environmental, and economic impacts are assessed, the EPA can remove a technology from consideration based on any of those criteria. However, for LAER determinations, when determining the emission limit and identifying at least one technology that can be used to achieve the emission limit, the EPA cannot consider the energy, environmental, or economic impacts associated with that technology. Furthermore, the LAER analysis is on a per pollutant basis, like PSD, but the regulated NSR pollutants that are evaluated are only the pollutants for each emission unit that could emit the nonattainment pollutant (and its precursors). In the case of this NEW1 permit application, NOx and VOC are both subject to NNSR and thus LAER review. EPA has conducted a "top-down" LAER analysis consistent with the definition of LAER in 310 CMR 7.00*, Appendix A*.

[101] Paragraph (a) of the definition for LAER is addressed within Steps 1 and 2 of a BACT analysis. Step 1 of the BACT analysis requires the identification of all emission control technologies that are possible for the sources, including technologies used to comply with the most stringent emission limit in a state SIP. Step 2 of the BACT analysis requires the permitting authority, in this case EPA, to document whether a particular control technology is technically infeasible for the source category. Unless the proposed LAER is indicated by the applicant to be technically infeasible, EPA must consider that LAER unless the cost is so great that project could not be built. In this analysis, the remaining highest ranked technically feasible technology after Step 3 of the BACT analysis was carried through to Step 5.

2. LAER Analysis for the NEW1 Project

a. Emission Unit Applicability

The project is required to apply LAER to all emission units which meet the definition of an OCS source. See Section IV.C.2.a.

b. Pollutant Applicability

A LAER analysis is required for each new emission unit for each pollutant which exceeds the NNSR SER. Based on the emission levels for the project, as presented in Table 20, NO_X and VOC are the precursors for the Nonattainment NSR regulated pollutant ozone which will be subject to LAER.

(1) Step 1 – Eligible LAER Controls

EUG 1—OCS Generator Engine(s) Installed on the ESP(s) and/or WTG(s)

Identified LAER control options for EUG 1 do not differ from those identified in the BACT section and therefore are not repeated here. See Section IV.C.2.a(1).

EUG 2—Marine Engines on Vessels when operating as OCS Source(s)

Identified LAER control options for EUG 2 do not differ from those identified in the BACT section, other than the inclusion of the SIP limitations outlined below, and therefore are not repeated here. See Section IV.C.2.a(1).

As part of the LAER review, the following SIP limitations for similar class of sources to EUG 2 were identified:

- Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port (13 CCR § 2299.3 and 17 CCR § 93118.3, dated January 2, 2009).

- *Airborne Toxic Control Measure for Commercial Harbor Craft* (17 CCR § 93118.5, excluding (e)(1), dated July 20, 2011)

California's "At-Berth Regulation" at 13 CCR § 2299.3 and 17 CCR § 93118.3 requires vessel operators visiting California ports to reduce at-berth emissions from auxiliary engines on ocean-going vessels by either: 1) turning off auxiliary engines and connecting the vessel to some other source of power (grid-based shore power); or 2) using alternative control technologies that achieve equivalent emission reductions. This requirement does not apply to the project's OCS sources because project-related vessels will not be OCS sources while at-berth.

California's "Commercial Harbor Craft Regulation" at 17 CCR § 93118.5 requires all engines in "newly acquired" harbor craft that are intended to operate in any Regulated California Waters to be certified

to meet the EPA Tier 2, Tier 3, or Tier 4 marine engine emission standards in effect at the time of acquisition. *See* 17 CCR § 93118.5(e)(3), (4). Under this regulation, marine engines for newly acquired in-use harbor craft are not required to meet Tier 4 marine standards, but engines that are already certified as meeting Tier 4 marine standards cannot be replaced with lower Tier engines. 17 CCR § 93118.5(e)(3). Any engines in newly acquired new harbor craft must meet applicable EPA Tier 2, 3, or Tier 4 marine standards in effect at the date of vessel acquisition. 17 CCR § 93118.5(e)(4). At the time of application, EPA is not aware of vessels that will be "newly acquired" by the Permittee. However, if "newly acquired" by the Permittee, 17 CCR § 93118.5(e)(3) and (4) would apply to the project.

The Commercial Harbor Craft Regulation also requires the eventual replacement or cleanup of pre-Tier 1 or Tier 1 engines used in ferries, excursion vessels, tugboats, towboats, push boats, crew and supply vessels, barges, and dredge vessels. Under 17 CCR § 93118.5(e)(6), Tier 1 and earlier engines in these vessel types must be brought into compliance with emission limits equal to or more stringent than EPA Tier 2 marine engine emission standards through engine replacement, modification, or retrofit by the dates provided in the compliance schedules. The compliance dates are designed to clean up the fleet's oldest and dirtiest engines first, while giving more time for newer, Tier 1 engines to be upgraded or replaced. Based on the EPA-approved 2011 version of the Commercial Harbor Craft Regulation that is incorporated into the California SIP, *see* 83 Fed. Reg. 23,232 (May 18, 2018), these vessel types are defined as:

- Ferry: A harbor craft that has provisions only for deck passengers or vehicles, operating on a short run, on a frequent schedule between two points over the most direct water route, and offering a public service of a type normally attributed to a bridge or tunnel.

- Excursion vessel: A self-propelled vessel that transports passengers for purposes including, but not limited to, dinner cruises; harbor, lake, or river tours; scuba diving expeditions; and whale watching tours. "Excursion Vessel" does not include crew and supply vessels, ferries, and recreational vessels.

- Tugboat: Any self-propelled vessel engaged in, or intending to engage in, the service of pulling, pushing, maneuvering, berthing, or hauling alongside other vessels, or any combination of pulling, pushing, maneuvering, berthing, or hauling alongside such vessels in harbors, over the open seas, or through rivers and canals. Tugboats can be divided into three groups: harbor or short-haul tugboats, ocean-going or long-haul tugboats, and barge tugboats. "Tugboat" is interchangeable with "towboat" and "push boat" when the vessel is used in conjunction with barges.

- Towboat or push boat: Any self-propelled vessel engaged in or intending to engage in the service of pulling, pushing, or hauling alongside barges or other vessels, or any combination of pulling, pushing, or hauling alongside barges or other vessels. Push boats and towboats are interchangeable terms.

- Crew and supply vessel: A self-propelled vessel used for carrying personnel and/or supplies to and from off-shore and in-harbor locations (including, but not limited to, off-shore work platforms, construction sites, and other vessels).

- Barge: A vessel having a flat-bottomed rectangular hull with sloping ends and built with or without a propulsion engine.

- Dredge: A vessel designed to remove earth from the bottom of waterways, by means of including, but not limited to, a scoop, a series of buckets, or a suction pipe. Dredges include, but are not limited to, hopper dredges, clamshell dredges, or pipeline dredges.

The following vessel types and engines are exempt from 17 CCR § 93118.5(e)(6), as incorporated into the California SIP:

- Temporary replacement vessels (a temporary replacement vessel is only exempt upon written approval and can only be used as a replacement for up to one year)
- Temporary emergency rescue/recovery vessels
- Recreational vessels, registered historic vessels, US Coast Guard (USCG) vessels, and military tactical support vessels.
- Near-retirement vessels (must be taken out of service within one year of its engines' compliance date)
- Engines less than 50 horsepower
- Ocean-going vessels other than ocean-going tugboats and towboats.[102] Ocean-going vessels are defined as a commercial, government, or military vessels meeting any one of the following criteria:
    a) a vessel greater than or equal to 400 feet in length overall as defined in 50 C.F.R. § 679.2, as adopted June 19, 1996.

    b) a vessel greater than or equal to 10,000 gross tons per the convention measurement (international system) as defined in 46 C.F.R. § 69.51.61, as adopted September 12, 1989; or

    c) a vessel propelled by a marine compression-ignition engine with a per cylinder displacement of greater than or equal to 30 liters.

The EPA's review of SIPs found no other NO_X or VOC emission limitations relating to marine compression-ignition internal combustion engines.

[102] Ocean-going tugboats and towboats are defined as tugboats and towboats with a "registry" (foreign trade) endorsement on its USCG certificate of documentation, or tugboats and towboats that are registered under the flag of a country other than the U.S.

(2) Step 2 – Eliminate Technically Infeasible Options

Below is a summary of the reasons for eliminating, or justification for not eliminating, each of the control options from further consideration in the top down LAER analysis for this project. For more details, please refer to the permit application and support documents in the docket.

EUG 1 - OCS Generator Engine(s) Installed on the ESP(s) and/or WTGs

The reasoning for excluding certain control options identified for EUG 1 does not differ from the justification given in the BACT section and therefore is not repeated here. See Section IV.C.2.a(2).

EUG 2 - Marine Engines on Vessels when operating as OCS Source(s)

The reasoning for excluding certain control options identified for EUG 2 does not differ from the justification given in the BACT section and therefore is not repeated here.IV.C.2.a(2).

(3) Step 3 – Rank remaining control technologies.

EUG 1 - OCS Generator Engine(s) Installed on the ESP(s) and/or WTGs

The ranking of control options identified for EUG 1 does not differ from ranking as presented in the BACT section and is not repeated here. See Section IV.C.2.a(3).

EUG 2 - Marine Engines on Vessels when operating as OCS Source(s)

The ranking of control options identified for EUG 2 does not differ from ranking as presented in the BACT section, other than the inclusion of the SIP limitations outlined below, and is not repeated here. See Section IV.C.2.a(3).

The project will require, at a minimum, that all engines on “newly acquired” harbor craft meet the EPA Tier 2, Tier 3, or Tier 4 marine engine emission standards in effect at the time of acquisition. *See* 17 CCR § 93118.5(e)(3) and (4).

The project will require, at a minimum, that all pre-Tier 1 or Tier 1 engines marine engines on vessels that are applicable vessel types under 17 CCR § 93118.5(e)(6) (i.e., ferries, excursion vessels, tugboats, towboats, push boats, crew and supply vessels, barge, and dredge vessels) meet the emission standards equal to or more stringent than EPA Tier 2 marine engine emission standards through engine replacement, modification, or retrofit.

(4) Step 4 – Evaluate most effective controls and document results.

The LAER determination does not consider economic, energy, or other environmental factors. Therefore, the cost effectiveness of each control technology is not necessary for the selection of LAER.

(5) Step 5 – Select LAER

Based on the preceding analysis, the following combination(s) are proposed as LAER for NO_X and VOC emissions from the regulated compression ignition internal combustion engines in the project.

EUG 1 - OCS Generator Engine(s) Installed on the ESP(s) and WTGs

OCS generator engines installed on the ESP(s) and WTGs certified to the highest emission standards contained in 40 C.F.R. part 60, subpart IIII.

OCS Generator Engine(s) Installed on the ESP(s) and WTGs shall be operated in accordance with the GCOP Plan for the facility. The plan shall be incorporated into the facility SOPs and shall be made available for inspection. The plan specifically should include, but is not limited to: i.) a list of combustion optimization practices to minimize emissions of pollutants and a means of verifying the practices have occurred for each engine type based on the most recent manufacturers' specifications issued for the engines at the time that they are certified (and any updates from the manufacturer should be noted and amended in the plan); ii.) a list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred (if applicable); and iii.) a list of the design choices determined to be LAER and verification that designs were implemented in the final construction.

EUG 2 - Marine Engines on Vessels when operating as OCS Source(s)

A good combustion practices plan (GCOP) is selected for all units in EUG 2. All engines covered by EUG 2 shall be operated in accordance with the GCOP Plan for the facility. The plan shall be incorporated into the facility SOPs and shall be made available for inspection. The plan specifically should include, but is not limited to: i.) a list of combustion optimization practices to minimize emissions of pollutants and a means of verifying the practices have occurred for each engine type based on the manufacturer's most recent specifications issued for the engines at the time that they are certified (and any updates from the manufacturer should be noted and amended in the plan); ii.) a list of combustion and operation practices to be used to lower energy consumption and a means of verifying the practices have occurred (if applicable); and iii.) a list of the design choices determined to be LAER and verification that designs were implemented in the final construction.

NSPS IIII Covered Engines

For Marine Engines with a displacement < 30 L/cylinder that meet the definition of an OCS source, and subject to NSPS IIII, and that satisfy the definition of a tugboat, towboat, push boat, crew and supply vessel, dredge, or barge and which do not meet definition of an "exempt vessel" must meet the most stringent emission standards for NO_X and HC at 40 C.F.R. part 60, subpart IIII at time of deployment. At a minimum, all engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 2 marine engine emission standards (for Category 1 and Category 2 Marine Engines) for NO_X and HC contained within 40 C.F.R. part 1042.

For all other Marine Engines with a displacement < 30 L/cylinder that meet the definition of an OCS source, and subject to NSPS IIII, must meet the most stringent emission standards for NO_X and HC Emission Standards at 40 C.F.R. part 60, subpart IIII at time of deployment. At a minimum, all engines

subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards (for Category 1 and Category 2 Marine Engines) for NO_X and HC contained within 40 C.F.R. part 1042.

For Marine Engines with a displacement ≥ 30 L/cylinder, subject to NSPS IIII, and that satisfy the definition of an OCS source and the definition of a *tugboat, towboat, push boat, crew and supply vessel, dredge,* or *barge* and which do not meet definition of an "*exempt vessel*"[103] must meet the most stringent emission standards for NOx at 40 C.F.R. part 60, subpart IIII and highest applicable emission standards for HC within 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards for NOx and HC (in terms of g/kW-hr) equal to or cleaner than EPA Tier 2 marine engine emission standards (Category 3 Marine Engines) as contained within 40 C.F.R. part 1042.

For Marine Engines with a displacement ≥ 30 L/cylinder that meet the definition of an OCS source and are subject to NSPS IIII, meeting the emission standards for NOx and PM at 40 C.F.R. part 60, subpart IIII and highest applicable emission standards for HC and CO within 40 C.F.R. part 1042 at time of deployment. At a minimum, all engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards for (Category 3 Marine Engines) for NOx contained within 40 C.F.R. part 1042 and the NOx emission standards within 40 C.F.R. part 60, subpart IIII. Note that the Marine Tier 1 emission standards does not contain an HC emission standard for Category 3 marine engines. Therefore, for those engines which fall between model year dates of 2004 through 2010, LAER for HC is the GCOP Plan.

Non-NSPS IIII Covered Engines

For Marine Engines with a displacement < 30 L/cylinder, *not* subject to NSPS IIII, and that satisfy the definition of a *tugboat, towboat, push boat, crew and supply vessel, dredge,* or *barge* and which do not meet definition of an "*exempt vessel*"[104] must meet the most stringent emission standards for NOx and HC at 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 2 marine engine emission standards (for Category 1 and Category 2 Marine Engines) for NO_X and HC contained within 40 C.F.R. part 1042.

For all other Marine Engines with a displacement < 30 L/cylinder and not subject to NSPS IIII, meeting the stringent emission standards for NO_X and HC Emission Standards at 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards (for Category 1 and Category 2 Marine Engines) for NO_X and HC contained within 40 C.F.R. part 1042. Currently, the Tier 1 marine engine emission standard in 40 C.F.R. part 1042 does not contain any HC emission limits for Category 1 or 2 Marine Engines. Therefore, for these cases, LAER for HC is GCOP.

[103] Exempt Vessel means any vessel identified in 17 C.C.R. Section 93118.5.(c), dated July 20, 2011 (and approved by EPA into the California SIP at 83 Fed. Reg. 23232, May 18, 2018).
[104] Exempt Vessel means any vessel identified in 17 C.C.R. Section 93118.5.(c), dated July 20, 2011 (and approved by EPA into the California SIP at 83 Fed. Reg. 23232, May 18, 2018).

For Marine Engines with a displacement ≥ 30 L/cylinder, *not* subject to NSPS IIII, and that satisfy the definition of a *tugboat, towboat, push boat, crew and supply vessel, dredge,* or *barge* and which do not meet definition of an "*exempt vessel*"[105] must meet the most stringent emission standards for NOx and HC at 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 2 marine engine emission standards contained within 40 C.F.R. part 1042.

For all other Marine Engines with a displacement ≥ 30 L/cylinder *not* subject to NSPS IIII, meeting the most stringent emission standards for NOx, and HC within 40 C.F.R. part 1042 at time of deployment. At a minimum, all applicable engines subject to this condition shall comply with emission standards (in terms of g/kW-hr) equal to or cleaner than EPA Tier 1 marine engine emission standards for NOx contained within 40 C.F.R. part 1042. Note that the Marine Tier 1 emission standards does not contain an HC emission standard for Category 3 marine engines. Therefore, for those engines which fall between model year dates of 2004 through 2010, LAER for HC is the GCOP Plan.

C. Offset Requirements

EPA has applied the offset requirements in the NNSR program on the OCS only to emissions associated with the operation of the OCS source. EPA finds this approach consistent with how the NNSR program, and specifically the offset requirement, has been implemented by EPA and states per the CAA, EPA's implementing regulations and the regulations in approved state NNSR programs, including Massachusetts, which is the COA for this action. [106] As defined in the permit itself, the Operational Phase Start Date is the critical point at which the new source has "commenced operations" and offset reductions must be in effect and enforceable.

To offset operating emissions, the permit requires a continuous emission reduction credit (CERC), or simply an ERC, which is referred to as a rate-based ERC in 310 CMR 7.00, Appendix B. The CERC is defined a rate-based ERC in tons per year, to recognize that the emission credit can offset yearly emissions as they occur each year the source operates. Per 310 CMR 7.00, *Appendix A*, Section 6(e)(1), offsets for the project are subject to the adjustment factor of 1.2:1 for VOC or NO_X. In addition, per the requirement of 310 CMR 7.00, Appendix B, Section 3(e)(2), persons seeking to use ERCs from the Massachusetts ERC bank must obtain an amount of credit equal to five (5) percent (%) more than the amount needed for the offset calculation, this results in a 1.26:1 offset ratio.

Based on the potential emissions from the operational phase of the project, the offsets required for the NEW1 project are presented below.

Table *21* Maximum NO_X Offsets Needed for Operational Phase of Project (assuming a 1.26:1 offset ratio)

Project Phase	**NO_X Emissions**	**NO_X Offsets Needed**	**Units**
Operation and Maintenance	283	356.58*	tons per year

* 339.6 tpy (adjustment factor of 1.2:1)

[105] Exempt Vessel means any vessel identified in 17 C.C.R. Section 93118.5.(c), dated July 20, 2011 (and approved by EPA into the California SIP at 83 Fed. Reg. 23232, May 18, 2018).

[106] As stated in the South Fork Wind Supplemental Fact Sheet (October 20, 2021) and in the EPA Response to Comment Document for the Revolution Wind, LLC (September 28, 2023). See ASOW Comment B.5.

Table *22* Maximum VOC Offsets Needed for Operational Phase of Project (assuming a 1.26:1 offset ratio)

Project Phase	**VOC Emissions**	**VOC Offsets Needed**	**Units**
Operation and Maintenance	5.0	6.3**	tons per year

**6.0 tpy (adjustment factor of 1.2:1)

The Permittee can obtain rate-based offsets in the following manner:

- Purchasing ERCs identified in the Massachusetts ERC bank which have been created in accordance with 310 CMR 7.00, *Appendix B*. *Appendix B* allows companies to certify emission reductions by over-controlling their emissions, shutting down emission units or entire facilities, or taking enforceable restrictions on their operations that lead to emission reductions. 310 CMR 7.00, *Appendix B* was approved into the Massachusetts state implementation plan on August 8, 1996. *See* 61 Fed. Reg. 41,335. Thus, ERCs in the Massachusetts ERC bank are federally enforceable.

- Enter into a third-party agreement that requires the third-party to lower its emissions. Such an agreement would need to be made federally enforceable prior to issuance of the final permit; or,

- From a facility that has ceased operations and had its CAA permits revoked or rescinded and has not had the resulting emissions reductions certified under the Massachusetts trading bank regulations under 310 CMR 7.00, *Appendix B*. Offsets obtained in this manner must be memorialized in a document from the Commonwealth of Massachusetts to ensure that the offsets from such a shutdown are fully in compliance with the CAA and have not been relied on by Massachusetts to meet other CAA requirements. Once the offsets are used by a source pursuant to this option, the offsets would be retired and would no longer be available to be used by another company, or by the Commonwealth in meeting another CAA requirement.

NNSR offsets are required to be obtained from sources within the same nonattainment area or may be obtained from another area if two criteria are met. *See* 310 CMR 7.00, *Appendix A*(6)(b). Based on 2014 emission data from the EPA's National Emission Inventory database, total anthropogenic NO_X emissions in Dukes County were 1,034 tons. Due to the lack of availability of potential NO_X offsets (i.e., ERCs) within the Dukes County 2008 ozone nonattainment area, the EPA anticipates that NEW1 will obtain NNSR offsets using ERCs from another classified area. The two criteria that must be met when obtaining NNSR offsets from another classified area are:

1. The other area has an equal or higher nonattainment classification than the area in which the source is located; and

2. Where the proposed new source or modified source is in a nonattainment area, emissions from such other area contribute to a violation of a national ambient air quality standard in the nonattainment area in which the proposed new or modified source would construct.

However, areas within the OTR, like Massachusetts, are required to meet the requirements of a moderate nonattainment area, regardless of whether the area is classified as marginal nonattainment or unclassifiable/attainment.[107] All counties within Massachusetts, except for Dukes County, were designated unclassifiable/attainment for the 2008 ozone standard. All counties in Massachusetts were designated unclassifiable/attainment for the 2015 ozone standard.[108] Despite this, and for applicability and offset ratios purposes, 310 CMR 7.00 Appendix A effectively treats the entire state as serious nonattainment. Therefore, NNSR offsets from sources within Massachusetts meet the first criterion since all of the Commonwealth is required to meet same nonattainment requirements.[109] To meet the second criterion, a demonstration that emissions from the other area contribute to a violation of the ozone standard within Dukes County is required.[110] Based on recent air dispersion modeling that EPA conducted to assist states with their ozone transport analysis for the 2015 ozone NAAQS, sources within Massachusetts are projected to only contribute 10.54 ppb of ozone emissions in Dukes County in 2023, which will not contribute to a violation of the NAAQS in this nonattainment area.[111] Therefore, with both criteria met, the EPA is determining that NEW1 can obtain offsets from anywhere within Massachusetts.

If offsets were obtained from another state, a separate analysis would need to be performed and submitted to the EPA and concurred upon prior to relying on those offsets for compliance with offset obligations.

1. Compliance Demonstration

For nonattainment pollutants, the OCS source will have to obtain offsets as required by the COA, as presented in Table 21 and Table 22 of this fact sheet. Furthermore, the required amount of NO_X and VOC offsets is calculated based on the OCS source's potential emissions during operations.

To ensure that the appropriate amount of NNSR offsets are obtained and that the source does not exceed these emission levels during operations, EPA has established federally enforceable facility-wide NO_X and VOC emission limits that apply once operations begin. The averaging period associated with the emission limits will be a daily rolling, 365-day total. The daily rolling, 365-day total for NO_X and VOC allows the facility the benefit and flexibility to operate the vessels it needs during operation while the daily emission calculations ensure that NO_X and VOC offsets for the operational phase of the project are properly accounted for. See Permit No. OCS-R1-07.

D. Alternative Site Analysis

[107] Notwithstanding any more stringent standards that may be applicable in each state.
[108] *See* 40 C.F.R. § 81.322.
[109] The EPA notes that 310 CMR 7.00, Appendix A requires new or modified sources of NO_X and VOC to meet the requirement of NNSR as if the source were being in a serious nonattainment area.
[110] The EPA determined that Dukes County attained the 2008 ozone standard by the July 20, 2015, attainment date. *See* 81 Fed. Reg. 26,697 (May 4, 2016).
[111] *See* https://www.epa.gov/Cross-State-Air-Pollution/memo-and-supplemental-information-regarding-interstate-transport-sips.The 2015 NAAQS Interstate Transport Assessment Design Values and Contributions spreadsheet can be found in the docket for this action.

The lease area auction and siting decisions by BOEM were the result of a multi-year effort by state and federal regulatory agencies to identify OCS areas suitable for offshore renewable energy development. An extensive review of site characterization data and the assessment of potential impacts was conducted, including environmental, economic, cultural, and visual resources, and use conflicts.

Alternative siting considerations are addressed extensively around BOEM's approval of the surrounding lease areas for the industry as outlined in the Construction and Operations Plan (COP) (06/22) for the project. EPA finds that NEW1 sufficiently satisfied the requirements of the alternative site analysis for the purposes of NNSR and 310 CMR 7.00, *Appendix A*, Section (8)(b) for this project by relying on the analysis outlined in the COP that weighed the necessary environmental, economic, cultural, and social factors and determined the best location for this project considering those factors.

E. Nonattainment NSR Compliance Certification

Massachusetts regulations at 310 CMR 7.00, *Appendix A*, specify that all major facilities owned or operated in the state by the owner or operator of the proposed source (or by any entity controlling, controlled by, or under common control with such owner or operator) must be complying or on a schedule for compliance with all applicable emissions limitations. There are no active Air Quality compliance or enforcement issues with the Vineyard Wind 1 permit, Permit No. OCS-R1-03 (M-1).[112] Issuance of the permit for NEW1 is recommended, contingent on public review.

[112] Issued to Vineyard Wind 1, LLC on August 19, 2022.

VI. Other COA Emission Control Requirements

As previously stated, the COA for the windfarm is the Commonwealth of Massachusetts. Thus, the project is subject to applicable provisions of the Massachusetts air pollution control regulations which are codified at 310 CMR 4.00 (Timely Action Schedule and Fee Provisions), 6.00 (Ambient Air Quality Standards for the Commonwealth of Massachusetts), 7.00 (Air Pollution Control), and 8.00 (The Prevention and/or Abatement of Air Pollution Episode and Air Pollution Incident Emergencies). These Massachusetts regulations are incorporated by reference in 40 C.F.R. part 55, appendix A. This section identifies which Massachusetts regulations incorporated into appendix A apply to the windfarm, including the vessels that meet the definition of an OCS source and which regulations result in terms and condition(s) specified in Permit No. OCS-R1-07.

For the purposes of fulfilling requirements for pollutants below major source thresholds but above the state's minor source permitting or plan approval threshold, a BACT determination[113] is made below for sulfur dioxide (SO_2). *See* Section VI.A

310 CMR 7.00 contains the following definitions, which are important to note when assessing the regulatory requirements of the COA.

Building, Structure, Facility, or Installation means all the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Any marine vessel is a part of a facility while docked at the facility. Any marine vessel is a part of an OCS source while docked at and within 25 NM en route to and from the OCS source's centroid.

Marine Vessel means any tugboat, tanker, freighter, barge, passenger ship, or any other boat, ship, or watercraft except those used primarily for recreation.

Stationary Source means any building, structure, facility, or installation which emits, or which may emit any air pollutant subject to regulation under the Act.

a) A stationary source may consist of one or more emissions units, and
    1. may be a land-based point or area source; or
    2. may be in, or on, the OCS or other submerged lands beneath navigable waters (lakes, rivers, and coastal waters adjacent to Outer Continental Shelf lands); or
    3. may be any internal combustion engine, or engine combination, greater than 175 horsepower (hp) used for any stationary application; or
    4. may be any internal combustion engine regulated under Sec. 111 (NSPS) of the Act, regardless of size; or
    5. may be any internal combustion engine of less than 175 horsepower (hp) not actually controlled to meet a regulation under Sec. 213 (Nonroad Engines and Vehicles) of the Act.
b) A stationary source does not include:
    1. emissions resulting directly from an internal combustion engine for transportation purposes; or

[113] In accordance with MassDEP's BACT guidance document https://www.mass.gov/doc/best-available-control-technology-bact-guidance/download.

2. tailpipe emissions from any source regulated under title II of the Act or any emissions from in-transit, non-OCS marine vessels.

Fuel Utilization Facility means any furnace(s), fuel burning equipment, boiler(s), space heaters or any appurtenance thereto used for the burning of fuels, for the emission of products of combustion, or in connection with any process which generates heat and emits products of combustion but does not mean a motor vehicle or an incinerator.

Distillate Fuel Oil means No. 1 or No. 2 fuel oil.

*Residual Fuel Oil m*eans No. 4, No. 5, or No. 6 fuel oil.

A. 310 CMR 7.02: Plan Approval and Emission Limitations

The project must meet the requirements for a comprehensive plan approval (CPA) under 310 CMR 7.02(5)(a)(7). To comply with a CPA, Massachusetts' regulations indicate that a BACT analysis is required. *See* 310 CMR 7.02(8)(a)(2).

Project emissions for (sulfur dioxide) SO_2 fall below PSD applicability thresholds but above thresholds for sources subject to Massachusetts minor NSR permitting and thus require a BACT analysis,[114,115] State BACT requirements derived from Massachusetts's regulations apply for SO_2. Massachusetts BACT analysis[116] utilizes the a 5-step top case BACT[117] procedure that is similar to the federal top-down BACT analysis to eliminate technically infeasible air pollution control technologies and arrive at the selected emission limit for the project. However, for this NEW 1 SO_2 BACT analysis, EPA is proposing to apply the top-down BACT analysis determination process as described in Section IV.C rather than the Massachusetts top case BACT analysis, which may subject a source to a BACT selected technology that has been demonstrated to be effective for a source from the same industrial sector in the state, due to the unique characteristics of wind farm permitting and the limited amount of information available about prior BACT determinations for the emerging OCS wind energy development industry. *See* 310 CMR 7.02(8)(a)2.c.

[114] 310 CMR 7.02(8)(a)(2) stipulates that a BACT analysis per state guidance is required for all plan approvals, i.e., comprehensive and limited plan approvals covering either major or minor sources emitting above the "significance" threshold for an air pollutant. MassDEP's has guidance available for these determinations at: https://www.mass.gov/doc/best-available-control-technology-bact-guidance/download.

[115] In Massachusetts, a comprehensive plan approval is required for "[a]ny facility where the construction, substantial reconstruction, alteration or subsequent operation would result in an increase in potential emissions of a single air contaminant equal to or greater than ten tons per year, calculated over any consecutive 12-month time period." 310 CMR 7.02(5)(a)(1). A limited plan approval is required for "[a]ny facility where the construction, substantial reconstruction, alteration or subsequent operation would result in an increase in potential emissions of a single air contaminant equal to or greater than one ton per year and less than ten tons per year, calculated over any consecutive 12-month time period." 310 CMR 7.02(4)(a).

[116] A BACT analysis is not required for lead, as the emissions from lead fall below the Massachusetts' permitting and approval plan thresholds.

[117] *See* MassDEP's "Top Case Best Available Control Technology (BACT) Guidelines" at https://www.mass.gov/doc/top-case-bact-guidelines/.

Therefore, in no event shall application of BACT result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 C.F.R. parts 60 and 61. SO_2 State BACT is proposed to be equivalent to the fuel sulfur content requirement to utilize ultra-low sulfur diesel (ULSD) fuel as required in 40 C.F.R. part 60, subpart IIII, and North American Emission Control Area (ECA) compliant marine fuel as contained in 40 C.F.R. part 1090, depending on engine type.

Furthermore, and per the requirements of 40 C.F.R. § 1090.325, sulfur content in fuel is restricted to using ULSD (at 15 ppm sulfur content) for all non-Category 3 marine engines and nonroad engines. ECA marine fuel must meet the 1000 ppm sulfur content limit for fuel used in category 3 vessels operating in ECAs. BACT also includes prioritizing the use of ULSD in Category 3 marine engines in lieu of ECA-compliant 1,000 ppm sulfur marine diesel fuel when it is feasible to do so. If ULSD is determined not feasible for use in Category 3 marine engines, the fuel sulfur limits of 1,000 ppm that apply to ships operating in specially designated ECAs is presumed to satisfy SO_2 State BACT.

B. 310 CMR 7.05: Fuels All Districts

310 CMR 7.05(1)(a)(1) specifies that no person owning, leasing, or controlling the operation of a fossil fuel utilization facility shall cause, suffer, allow, or permit the burning therein of any liquid fossil fuel having a sulfur content more than that listed in 310 CMR 7.05(1)(a)1.: Table 1 and in accordance with the associated timelines contained in the same table. For distillate oil (statewide), the sulfur content is restricted to 15 ppm which is equivalent to the fuel sulfur content requirement to utilize ULSD as contained in 40 C.F.R. part 60, subpart IIII.

310 CMR 7.05(1)(a)(3) specifies that on and after July 1, 2007, no person owning, leasing or controlling a stationary engine or turbine subject to the requirements of 310 CMR 7.02(8)(i), 310 CMR 7.03(10), or 310 CMR 7.26(40) through (44) shall accept for delivery for burning any diesel or other fuel unless said fuel complies with the applicable U.S. Environmental Protection Agency sulfur limits for fuel pursuant to 40 C.F.R. 80.29, 40 C.F.R. 80.500, and 40 C.F.R. 80.520(a) and (b) as in effect January 18, 2001.

EPA notes that the fuel regulations, previously within 40 C.F.R. part 80, have been incorporated into 40 C.F.R. part 1090 as of January 1, 2022. Per the definitions contained within 310 CMR 7.00, a marine vessel is an OCS source while docked at and/or within 25 NM en route to and from the OCS source. Therefore, any marine vessels that meet the definition of an OCS source are subject to this subpart when operating in the manner specified. All engines installed on WTGs or ESPs are also subject to the requirements of this section. All requirements contained in this regulation have been incorporated into the permit.

C. 310 CMR 7.06: Visible Emissions

310 CMR 7.06(1)(a) No person shall cause, suffer, allow, or permit the emission of smoke which has a shade, density, or appearance equal to or greater than No. 1 of the [Ringlemann Scale] Chart for a period, or aggregate period of time in excess of six minutes during any one hour, provided that at no time during the said six minutes shall the shade, density, or appearance be equal to or greater than No. 2 of the Chart.

310 CMR 7.06(1)(b) No person shall cause, suffer, allow or permit the operation of a facility so as to emit contaminant(s), exclusive of uncombined water or smoke subject to 310 CMR 7.06(1)(a) of such opacity which, in the opinion of the Department, could be reasonably controlled through the application of modern technology of control and a good Standard Operating Procedure, and in no case, shall exceed 20% opacity for a period or aggregate period of time in excess of two minutes during any one hour provided that, at no time during the said two minutes shall the opacity exceed 40%.

310 CMR 7.06(3) contains specific requirements that apply to marine vessels. All tailpipe emissions from OCS marine vessels (in-transit and when docked), and offshore engines installed on the WTGs and/or ESPs are subject to the visible emission standards contained in this section. Note that tailpipe emissions from any source regulated under Title II of the Act or any emissions from in-transit, non-OCS marine vessels are not subject to the requirements of this subpart. 310 CMR 7.06(3) specifies that marine vessels shall be subject to the provisions of 310 CMR 7.06(1)(a) and 7.06(1)(b). 310 CMR 7.06(3) shall apply only in the Merrimack Valley Air Pollution Control District, Metropolitan Boston Air Pollution Control District, and the Southeastern Massachusetts Air Pollution Control District.

310 CMR 7.06(6) specifies that no person shall cause, suffer, allow, or permit excessive emission of visible air contaminants, other than water, from non-stationary source diesel engines. All requirements contained in this regulation have been incorporated into the permit.

D. 310 CMR 7.11: Transportation Media

310 CMR 7.11(4) contains specific requirements for Marine Vessels. No person owning, operating, or having control of a seagoing vessel while it is in the district shall cause, suffer, allow, or permit, aboard said vessel, tube blowing or soot removal activities that cause or contribute to a condition of air pollution. 310 CMR 7.11 shall apply only in the Merrimack Valley Air Pollution Control District, Metropolitan Boston Air Pollution Control District, and the Southeastern Massachusetts Air Pollution Control District. All requirements contained in this regulation have been incorporated into the permit.

E. 310 CMR 7.12: Source Registration

310 CMR 7.12 requires owners/operators of facilities to submit an annual source registration to Massachusetts. Per 310 CMR 7.12(1), the regulations apply to any owner/operator of a facility if such facility meets any of the criteria in 310 CMR 7.12(1)(a)1 through 11. This facility meets criteria 6, 7, and 11 and is subject to the requirements of this section. All requirements contained in this regulation have been incorporated into the permit.

F. 310 CMR 7.18: Volatile and Halogenated Organic Compounds

The purpose of 310 CMR 7.18 (30) is to limit VOCs in adhesive, sealant, adhesive primer, or sealant primer. The NEW1 project has potential to use adhesive, sealant, adhesive primer, or sealant primer and thus could become subject to the standards contained this section. Per 310 CMR 7.18(30)(4), if the total facility-wide VOC emissions from all adhesives, sealants, adhesive primers, and sealant primers used are less than 200 pounds per calendar year, or an equivalent volume, the facility is exempt from the requirement of 310 CMR 7.18(30)(c)3 and 5. Any person claiming this exemption shall maintain

sufficient monthly operational records in accordance with 310 CMR 7.18(30)(e) to demonstrate compliance with this exemption. All requirements contained in this regulation have been incorporated into the permit.

G. 310 CMR 7.72: SF_6

The purpose of 310 CMR 7.72 is to assist the Commonwealth in achieving the greenhouse gas emissions reduction goals by reducing sulfur hexafluoride (SF_6) emissions from GIS through the imposition of declining annual aggregate emission limits and other measures on GIS. All requirements contained in this regulation have been incorporated into the permit.

Per 310 CMR 7.72 (4)(a), Any newly manufactured GIS that is placed under the ownership, lease, operation, or control of any GIS owner on or after January 1, 2015, must be represented by the manufacturer to have a 1.0% maximum annual leak rate.

- The applicant has accepted a best achievable control technology limit of a maximum annual leak rate not to exceed 0.5%, which is more stringent that the requirement contained in 310 CMR 7.72 (4)(a). See Section I.A.1.a(1).

Per 310 CMR 7.72 (4)(b), any GIS owner that places GIS under ownership, lease, operation, or control on or after January 1, 2015, shall comply with any manufacturer-recommended maintenance procedures or industry best practices that have the effect of reducing leakage of SF_6.

- The applicant has a BACT limit of a sealed system with leak detection and alarms and a commitment to repair detected leaks within 5 days of discovery, which complies with the requirement contained in 310 CMR 7.72 (4)(a). See Section I.A.1.a(1).

The facility may be required to comply with all annual reporting requirements contained in 310 CMR 7.72 (6), including but not limited to, the number of pounds of SF_6 emitted from GIS equipment owned, leased, operated, or controlled by the federal reporting GIS owner and located in Massachusetts during the year, using the equation specified in 40 C.F.R. §98.303 if 40 C.F.R. Part 98 subpart DD applies.

$$\text{User Emissions} = (\text{Decrease in } SF_6 \text{ Inventory}) + (\text{Acquisitions of } SF_6) - (\text{Disbursements of } SF_6) - (\text{Net Increase in Total Nameplate Capacity of Equipment Operated}) \quad \text{(Eq. DD-1)}$$

Figure 4 - Calculate the annual SF_6 emissions using the mass-balance approach.

Where:

Decrease in SF_6 Inventory = (pounds of SF_6 stored in containers, but not in energized equipment, at the beginning of the year) − (pounds of SF_6 stored in containers, but not in energized equipment, at the end of the year).

Acquisitions of SF_6 = (pounds of SF_6 purchased from chemical producers or distributors in bulk) + (pounds of SF_6 purchased from equipment manufacturers or distributors with or inside equipment, including hermetically sealed-pressure switchgear) + (pounds of SF_6 returned to facility after off-site recycling).

Disbursements of SF_6 = (pounds of SF_6 in bulk and contained in equipment that is sold to other entities) + (pounds of SF_6 returned to suppliers) + (pounds of SF_6 sent off site for recycling) + (pounds of SF_6 sent off-site for destruction).

Net Increase in Total Nameplate Capacity of Equipment Operated = (The Nameplate Capacity of new equipment in pounds, including hermetically sealed-pressure switchgear) − (Nameplate Capacity of retiring equipment in pounds, including hermetically sealed-pressure switchgear).

Note that Nameplate Capacity refers to the full and proper charge of equipment rather than to the actual charge, which may reflect leakage.

VII. Other Federal Requirements

Pursuant to 40 C.F.R. § 55.13(c) and (d), regulations at 40 C.F.R. part 60 (NSPS) and 40 C.F.R. part 61 (NESHAPs), together with any other provisions promulgated pursuant to section 112 of the Act, shall apply to OCS sources For example, NSPS IIII, Standards for Performance for Stationary Compression Ignition Internal Combustion Engines, and NESHAP ZZZZ for Stationary Reciprocating Internal Combustion Engines, apply to OCS sources even when marine vessel engines and offshore construction equipment are typically not considered stationary sources. The following subsections include information on how EPA and NEW1 propose to comply with these regulatory requirements.

A. New Source Performance Standards (NSPS)

Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. This subpart establishes technology-based federal emissions limitations and other requirements for stationary CI ICE based on the engine's function (emergency or non-emergency) model year, power (in kW or hp)) and engine displacement (L/cyl).
NSPS IIII applies to owners and operators of stationary CI ICE that both commence construction[118] after July 11, 2005, and were manufactured after April 1, 2006, as well as those engines modified or reconstructed after July 11, 2005.

For non-emergency engines with a displacement less than 30 L/cyl, NSPS IIII requires compliance with the emissions standards and other requirements specified in 40 CFR part 1039 ("Control of Emissions from New and In-Use Nonroad Compression Ignition Engines") ("part 1039"), 40 CFR part 1042 ("Control of Emissions from New and In-Use Marine Compression-Ignition Engines and Vessels") ("part 1042), or within NSPS IIII itself.[119] For certain non-emergency engines with a displacement of less than 10 L/cyl, 40 C.F.R. § 60.4201(f) provides that if these non-emergency engines will be used solely at

[118] "Commence construction" is the date the engine is ordered by the owner or operator. See 40 C.F.R. § 60.4200(a).
[119] See 40 C.F.R. §§ 60.4201 and 60.4204.

marine offshore installations, they may be certified[120] to the Tier standards in part 1042 for marine engines, instead of the more stringent emission standards in part 1039.[121] For non-emergency engines with a displacement of ≥ 30 L/cyl, NSPS IIII requires compliance with the emission standards and other requirements within NSPS IIII itself, which are mainly emission standards for NOx and PM. See 40 C.F.R. § 60.4204(c). Other NSPS IIII requirements, besides the emissions standards, that apply to non-emergency engines include, but are not limited to, fuel, monitoring, notification, reporting, recordkeeping, and compliance requirements.

For EUG 1, the permittee will comply with NSPS IIII by procuring certified engines that meet the highest applicable tier emission standards, complying with the applicable work practice standards and burning fuel that meets the sulfur content requirements as applicable in subpart IIII. Since the permittee indicated in the application that all engines associated with EUG 1 will have individual engine displacements less than 30 L/cylinder, the permittee is also proposing to procure new engines that are built to the standards contain in 40 C.F.R. part 1042 (including appendix I) or the non-road engine standards contained in 40 C.F.R. part 1039 (including appendix I) as a means of demonstrating compliance with NSPS IIII[122]. 40 C.F.R. part 1042 contains emission standards and certification requirements for Category 1 and Category 2 marine diesel engines on vessels[123] and 40 C.F.R. part 1039 sets emission standards and certification requirements for nonroad diesel engines. The emission standards are structured as a progression (Tiers 1 through 4), with Tier 4 including the most stringent air emissions standards. For both 1042 and 1039, the Tier 4 emission standards are fully in effect at the time of this fact sheet. The exact emission limits (in g/kW-hr) that apply to each engine depend on the engine's size, displacement, speed, and/or power density.

For the units within EUG 2 that are subject to NSPS IIII and have a displacement less than 30 L/cylinder, an owner of a stationary source in a marine environment can also certify its engine based on the marine engine requirements at 40 C.F.R. part 1042 (including appendix I) as a means of demonstrating compliance with NSPS IIII[124]. However, EUG 2 engines that have a displacement greater than or equal to 30 L/cylinder, are subject to NOx and PM emissions standards as described in 40 C.F.R. § 60.4204(c) and other requirements in Subpart IIII. The specific NOx emissions standards that apply to each engine are based on the date when the engine was constructed (or reconstructed) and the maximum engine speed (in revolutions per minute or RPM).

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[121] See 40 C.F.R. § 60.4201(f), which states that "Notwithstanding the requirements in paragraphs (a) through (c) of this section, stationary non-emergency CI ICE identified in paragraphs (a) and (c) of this section may be certified to the provisions of 40 CFR part 1042 for commercial engines that are applicable for the engine's model year, displacement, power density, and maximum engine power if the engines will be used solely in either or both of the following locations: (2) Marine offshore installations". See exceptions at 40 C.F.R. § 60.4201(a) and 40 C.F.R. § 60.4201(c).

[122] *See* 40 C.F.R. § 60.4201(f)(2).

[123] The 40 C.F.R. part 1039 non-road engine regulations set emissions standards and certification requirements for the same pollutants as 40 C.F.R. 1042: NO_x, HC, PM, and CO.

[124] Please note that NSPS IIII allows compliance with 40 C.F.R. 1042 in lieu of compliance with 40 C.F.R. 1039 for most engines with a displacement less than 30l/cyl except for a small subsect of engines for certain model years and sizes. For that small subset of engines, compliance with 40 C.F.R. 1039 is still required. See 40 C.F.R. § 60.4201(c) and 60.4204(b) for more information about those regulatory requirements.

B. National Emission Standard s for Hazardous Air Pollutants

Subpart ZZZZ, Reciprocating Internal Combustion Engines. This subpart establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. 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.

NEW1 is considered an area source of HAP.

The project's CI-ICE that become OCS sources and were built or reconstructed after June 12, 2006, are considered "a new or reconstructed stationary RICE located at an area source." Per 40 C.F.R. § 63.6590(c), an affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 C.F.R. part 60, subpart IIII, for compression ignition engines. Therefore, RICEs that become OCS sources and were built or reconstructed after June 12, 2006, must meet the requirements of NSPS IIII and by complying with the general provisions of 40 C.F.R. part 63, subpart A that are listed in Table 8 of NESHAP ZZZZ.

The Project's existing RICE (constructed or reconstructed before June 12, 2006) that are OCS sources are subject to emission limitations, operating limitations, and other requirements at 40 C.F.R. § 63.6603, which applies to existing stationary RICEs located at an area source of HAP emissions. *See* 40 C.F.R. § 63.6590(a)(1)(iii). However, existing stationary non-emergency compression-ignition RICEs with a rating greater than 300 horsepower located on an offshore vessel that is an OCS source do not have to meet the CO emission limitations specified in Table 2d of subpart ZZZZ; they must meet the management practices at 40 C.F.R. § 63.6603(c).

Table 23 Table 2d to Subpart ZZZZ of Part 63 - Requirements for Existing Stationary RICE Located at Area Sources of HAP Emissions

RICE Category	**You must meet the following requirement, except during periods of startup….**	**During periods of startup, you must….**
1. Non-Emergency, non-black start CI stationary RICE ≤300 HP	a. Change oil and filter every 1,000 hours of operation or annually, whichever comes first (1)	Minimize the engine's time spent at idle and minimize the engine's startup time at startup to a period needed for appropriate and safe loading of the engine, not to exceed 30 minutes, after which time the non-startup emission limitations apply.
	b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary;	
	c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	
2. Non-Emergency, non-black start CI stationary RICE 300<HP≤500	a. Limit concentration of CO in the stationary RICE exhaust to 49 ppmvd at 15 percent O2; or	

RICE Category	You must meet the following requirement, except during periods of startup….	During periods of startup, you must….
	b. Reduce CO emissions by 70 percent or more.	
3. Non-Emergency, non-black start CI stationary RICE >500 HP	a. Limit concentration of CO in the stationary RICE exhaust to 23 ppmvd at 15 percent O2; or	
	b. Reduce CO emissions by 70 percent or more.	
4. Emergency stationary CI RICE and black start stationary CI RICE.2	a. Change oil and filter every 500 hours of operation or annually, whichever comes first;	
	b. Inspect air cleaner every 1,000 hours of operation or annually, whichever comes first, and replace as necessary; and	
	c. Inspect all hoses and belts every 500 hours of operation or annually, whichever comes first, and replace as necessary.	

[1] Sources have the option to utilize an oil analysis program as described in § 63.6625(i) or (j) in order to extend the specified oil change requirement in Table 2d of this subpart.

[2] If an emergency engine is operating during an emergency and it is not possible to shut down the engine in order to perform the management practice requirements on the schedule required in Table 2d of this subpart, or if performing the management practice on the required schedule would otherwise pose an unacceptable risk under federal, state, or local law, the management practice can be delayed until the emergency is over or the unacceptable risk under federal, state, or local law has abated. The management practice should be performed as soon as practicable after the emergency has ended or the unacceptable risk under federal, state, or local law has abated. Sources must report any failure to perform the management practice on the schedule required and the federal, state, or local law under which the risk was determined to be unacceptable.

C. MARPOL Annex VI, the Act to Prevent Pollution from Ships, and 40 C.F.R. Part 1043

Annex VI of the International Maritime Organization's (IMO's) International Convention for the Prevention of Pollution from Ships (MARPOL) treaty is the main international treaty that addresses air pollution from marine vessels. The IMO has also adopted legally binding energy efficiency measures as amendments to MARPOL Annex VI. It was implemented in the United States through the Act to Prevent Pollution from Ships (APPS), 33 U.S.C. §§ 1901–1905. Annex VI requirements comprise both engine-based and fuel-based standards and apply to U.S.-flagged ships wherever located and to non-U.S. flagged ships operating in U.S. waters.

- Annex VI establishes:
    - Limits on NO_X emissions from marine diesel engines with a power output of more than 130 kW. The standards apply to both main propulsion and auxiliary engines and require the engines to be operated in conformance with the Annex VI NO_X emission limits.

- Limits on the sulfur content of marine fuels. 40 C.F.R. part 1090, subpart D contains the standards for Diesel Fuel and ECA Marine Fuel. ECA marine fuels, both ECA marine distillate and ECA marine residual, are limited to a maximum sulfur content of 1000 ppm for all marine vessels operating in the ECA area. However, per 40 C.F.R. § 1090.325, the use of ECA Marine Fuel (1000 ppm sulfur) is limited to use in Category 3 Marine Engines only, which is defined as a marine engine having a displacement greater than 30 L/cylinder. All other engines category's (Category 1, Category 2, and nonroad) will fall into the ULSD (15 ppm) limitation as contained in 40 C.F.R. § 1090.305 and subpart IIII.

- U.S.-flagged vessels are subject to inspection for compliance with Annex VI. Non-U.S. flagged ships are subject to examination under Port State Control while operating in U.S. waters. The USCG or EPA may bring an enforcement action for a violation.

- Ships operating up to 200 nautical miles off U.S. shores must meet the most advanced standards for NO_X emissions and use fuel with lower sulfur content. This geographic area is designated under Annex VI as the ECA.

- Each regulated diesel engine in U.S.-flagged vessels must have an EIAPP certificate, issued by EPA, to document that the engine meets Annex VI NO_X standards. Certain vessels are also required to have an IAPP Certificate which is issued by the USCG. Ship operators must also maintain records on board regarding their compliance with the emission standards, fuels requirements and other provisions of Annex VI.

VIII. Monitoring, Reporting, Recordkeeping and Testing Requirements

The following reports are required by the Specific Conditions of Permit No. OCS-R1-07, Section IX.

- Self-reporting (i.e., prompt reporting) of deviations from permit terms and conditions. The EPA is requiring the prompt reporting of permit deviations as a condition of the preconstruction permitting requirements of the draft permit.

- Submit to EPA a copy of the U.S. Coast Guard 500-meter safety buffer approval.

- The permit associated with this Fact Sheet contains the exact information that must be submitted. See Specific Conditions of Permit No. OCS-R1-07, Section IV. through IX.

Demonstrating compliance with the permit requirements require monitoring and recordkeeping of activities. The monitoring, recordkeeping, and testing requirements can be grouped into several categories. These categories are:

- Tracking actual facility-wide emissions of NO_X and VOC, on a daily rolling, 365-day total upon commencement of the operational phase start date. This includes emissions from all OCS sources including support vessels servicing or associated with the OCS source while at or going to or from an OCS source while within 25 nautical miles of the source's centroid.

- Documenting key design parameters and manufacturers certifications for every internal combustion engine and any other emission unit classified as an OCS source. This information is necessary to demonstrate compliance with the BACT and LAER emission limits. Certifying that at the time a vessel will become an OCS source, the vessel in question has the least polluting internal combustion engines on it available to the permittee or its contractors.

- Demonstrating compliance with the sulfur fuel limits by obtaining the fuel supplier's certificate that contains information regarding the fuel's sulfur content.

- All applicable requirements under NSPS IIII and NESHAP ZZZZ.

IX. Consultations

For the purposes of the Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), and the National Historic Preservation Act (NHPA), the issuance of an OCS air permit is a federal action undertaken by the EPA. BOEM is the lead federal agency for authorizing renewable energy activities on the OCS and authorizing the NEW1 windfarm is also a federal action for BOEM. BOEM's regulations at 30 C.F.R. part 585 require the NEW1 windfarm to obtain a COP approval before commencing construction. In conjunction with the COP approval, BOEM is also responsible for issuing the Record of Decision (ROD) on the Environmental Impact Statement conducted under the National Environmental Policy Review Act (NEPA).

The applicant requests a lease, easement, right-of-way, and any other related approvals from BOEM necessary to authorize construction, operation, and eventual decommissioning of the proposed action. BOEM's authority to approve, deny, or modify the project derives from the Energy Policy Act of 2005. Section 388 of the Act amended the OCSLA by adding subsection 8(p), which authorizes the Department of the Interior to grant leases, easements, or rights-of-way on OCS lands for activities that produce or support production, transportation, or transmission of energy from sources other than oil and gas, such as wind power.

The EPA assesses its own permitting action (i.e., to issue an OCS air permit for the windfarm) as interrelated to, or interdependent with, the BOEM's COP approval and issuance of the NEPA ROD for the NEW1 windfarm. Accordingly, the EPA has designated BOEM as the lead Federal agency for purposes of fulfilling statutory obligations under the statutes mentioned previously.[125] BOEM has accepted the designation as lead Federal agency.[126]

A. Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, and National Historic Preservation Act

[125] A copy of the July 25, 2018, letter from EPA R1 to the BOEM requesting lead agency designation from BOEM is included in the administrative record for this action.

[126] A copy of the September 24, 2018, letter from the BOEM to EPA R1 accepting lead agency designation is included in the administrative record for this action.

Under Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2), the EPA must ensure that any action authorized, funded, or carried out by the EPA is not likely to jeopardize the continued existence of any federally listed endangered species or threatened species or result in the destruction or adverse modification of such species' designated critical habitat. If the EPA's action (i.e., OCS air permit issuance) may affect a federally listed species or designated critical habitat, Section 7(a)(2) of the ESA and relevant implementing regulations at 50 C.F.R. part 402 require consultation between the EPA and the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS), depending on the species and/or habitat at issue.

In accordance with Section 305(b)(2) of the MSFCMA, 16 U.S.C. § 1855(b)(2), Federal agencies are also required to consult with the NMFS on any action that may result in adverse effects to essential fish habitat (EFH).

Section 106 of the NHPA, 54 U.S.C. § 306108, and the implementing regulations at 36 C.F.R. part 800 require federal agencies to consider the effect of their actions on historic properties and afford the opportunity for the Advisory Council on Historic Preservation (ACHP) and consulting parties to consult on the federal undertaking.

The ESA regulations at 50 C.F.R. § 402.07, the MSFCMA regulations at 50 C.F.R. § 600.920(b), and the NHPA regulations at 36 C.F.R. § 800.2(a)(2) provide that where more than one federal agency is involved in an action, the consultation requirements may be fulfilled by a designated lead agency on behalf of itself and the other involved agencies. As previously discussed, BOEM is the designated lead agency for the purposes of fulfilling EPA's obligations under Section 7 of the ESA, Section 305(b) of the MSFCMA, and Section 106 of the NHPA for offshore wind development projects on the Atlantic OCS, including the project. As a result of this designation, BOEM will consider the effects of the EPA's OCS permitting action in fulfilling its consultation obligations under each of these statutes for the NEPA ROD and COP approval process.

At the time of writing this Fact Sheet and the EPA's associated proposal of the draft permit, BOEM has commenced but not completed its consultation requirements for ESA, MSFCMA, and NHPA for the COP approval and NEPA ROD for the project. The EPA understands that BOEM will satisfy its statutory obligations as lead federal agency under each of these statutes prior to EPA issuance of a final OCS air permit for the NEW1 windfarm. Should the result of BOEM's consultation under one or more of these statutes identify any conditions or restrictions on air emissions for inclusion in the OCS air permit, the EPA will include those conditions or restrictions in the final permit as necessary. The EPA will also provide an additional opportunity for public comment regarding any such new conditions or restrictions as necessary and appropriate.

B. Coastal Zone Management Act (CZMA)

Section 307 of the CZMA, 16 U.S.C. § 1456, and the implementing regulations at 15 C.F.R. part 930 provide a federal consistency process for state programs to use to manage coastal activities and resources and to facilitate cooperation and coordination with federal agencies. Federal consistency requires that federal actions, within and outside the coastal zone, which have foreseeable effects on any coastal use (land or water), or natural resource of the coastal zone be consistent with the

enforceable policies of a state's federally approved coastal management program. Federal actions include federal agency activities, federal license or permit activities, and federal financial assistance activities. Federal agency activities must be consistent to the maximum extent practicable with the enforceable policies of a state coastal management program, and license and permit and financial assistance activities must be fully consistent.

Under 15 C.F.R. part 930, subpart D, a non-federal applicant for a federal license or permit is required to provide a state with a consistency certification if the state has identified the federal license or permit on a list of activities subject to federal consistency review in its federally approved coastal management program. State federal consistency lists identify the federal agency, federal license or permit, and federal financial assistance activities that are subject to federal consistency review if the activities occur and have effects on a state's coastal zone pursuant to the applicable subparts of the regulations at 15 C.F.R. part 930. The EPA has reviewed the listed federal actions for federal license or permit activities for Massachusetts and Rhode Island. The EPA's action to issue an OCS air permit under the regulations at 40 C.F.R. part 55 is not included on the current list of federal actions for federal consistency review. Thus, issuance of this OCS air permit is not required to be preceded by a federal consistency review.[127]

C. Clean Air Act General Conformity

Pursuant to 40 C.F.R. § 93.153(d)(1), a conformity determination is not required for the portion of an action that includes major or minor new or modified stationary sources that require a permit under the NSR program.

X. Environmental Justice

Executive Order (EO) 12898 titled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires that federal agencies identify and address, as appropriate and to the extent practicable and permitted by existing law, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. *See* Executive Order 12898, Section 1-101; 59 Fed. Reg. 7629 (Feb. 16, 1994). The EPA defines "Environmental Justice" (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The EPA's goal with respect to Environmental Justice in permitting is to enable overburdened communities to have full and meaningful access to the permitting process and to develop permits that address environmental justice issues to the greatest extent practicable under existing environmental laws. Overburdened is used to describe the minority, low-income, and tribal nations and indigenous peoples or communities in the United States that potentially experience disproportionate environmental harms and risks because of greater vulnerability to environmental hazards.

[127] The EPA confirmed with the State of Rhode Island and the Commonwealth of Massachusetts that the states do not seek a consistency review for OCS air permits. A copy of the email confirmation from Rhode Island and Massachusetts is included in the administrative record for this action.

Consistent with EO 12898 and the EPA's "Plan EJ 2014: Considering Environmental Justice in Permitting," the EPA must (1) consider the environmental justice issues, on a case-by-case basis, connected with the issuance of federal permits (particularly when permitting projects for major sources that may involve activities with significant public health or environmental impacts on already overburdened communities); and (2) focus on whether the federal permitting action would have disproportionately high and adverse human health or environmental effects on minority or low income populations.

Considering Executive Order 12898, the White House Council on Environmental Quality (CEQ) issued Environmental Justice: Guidance Under the National Environmental Policy Act (NEPA). As part of the NEPA process, BOEM conducted an environmental justice analysis in accordance with this guidance. The guidance includes six principles for environmental justice analyses to determine any disproportionately high and adverse human health or environmental effects to low-income, minority, and tribal populations. The EPA evaluated BOEM's analysis of these principles about environmental justice for the project. The principles are:

1. Consider the composition of the affected area to determine whether low-income, minority or tribal populations are present and whether there may be disproportionately high and adverse human health or environmental effects on these populations;

2. Consider relevant public health and industry data concerning the potential for multiple exposures or cumulative exposure to human health or environmental hazards in the affected population, as well as historical patterns of exposure to environmental hazards;

3. Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action;

4. Develop effective public participation strategies;

5. Assure meaningful community representation in the process, beginning at the earliest possible time; and

6. Seek tribal representation in the process.

Additionally, EPA has published eight principles to assist each Region to promote environmental justice in air permitting programs.[128] The following principles were also evaluated or implemented regarding environmental justice for the project:

1. Identify communities with potential environmental justice concerns.
2. Engage early in the permitting process to promote meaningful participation and fair treatment.
3. Enhance public involvement throughout the permitting process.
4. Conduct a "fit for purpose" environmental justice analysis.

[128] *See* EPA's December 22, 2022, EJ in Air Permitting - Principles for Addressing Environmental Justice Concerns in Air Permitting. https://www.epa.gov/caa-permitting/ej-air-permitting-principles-addressing-enviroNMental-justice-concerns-air.

5. Minimize and mitigate disproportionately high and adverse effects associated with the permit action to promote fair treatment.
6. Provide federal support throughout the air permitting process.
7. Enhance transparency throughout the air permitting process.
8. Build capacity to enhance the consideration of environmental justice in the air permitting process.

A. Air Quality Review

For purposes of Executive Order 12898 on environmental justice, the Environmental Appeals Board has recognized that compliance with the National Ambient Air Quality Standards (NAAQS) is "emblematic of achieving a level of public health protection that, based on the level of protection afforded by a primary NAAQS, demonstrates that minority or low-income populations will not experience disproportionately high and adverse human health or environmental effects due to the exposure to relevant criteria pollutants."[129] This is because the NAAQS are health-based standards, designed to protect public health with an adequate margin of safety, including sensitive populations such as children, the elderly, and asthmatics. Based on PSD-required modeling for this project, the EPA has determined that issuance of this OCS permit will not contribute to NAAQS or increment violations nor have potentially adverse effects on ambient air quality. See Section IV.D. which contains the ambient air impact analysis for the project.

B. Environmental Impacts to Potentially Overburdened Communities

EPA's EJ Screen tool[130] is an environmental justice screening and mapping tool that utilizes standard and nationally consistent data to highlight places that may have higher environmental burdens and vulnerable populations. In EJ Screen, EPA uses the 80th percentile as a threshold to identify geographic areas that may warrant further consideration, analysis, or outreach for environmental justice. CEQ's 1997 guidance document identifies minority populations in an affected environment if (a) the minority population of the affected area exceeds 50 percent of the affected area's total population or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. The Commonwealth of Massachusetts has more stringent criteria and defines an environmental justice community as one or more U.S. Census block groups that meet one or more of the following criteria: the annual median household income is not more than 65 per cent of the statewide annual median household income; minorities comprise 40 per cent or more of the population; 25 per cent or more of households lack English language proficiency; or minorities comprise 25 per cent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 per cent of the statewide annual median household income.[131]

[129] See Environmental Appeals Board Order In re Shell Gulf of Mexico, Inc. & In re Shell Offshore, Inc., 15 E.A.D. 103, 156 (December 30, 2010). A copy of the order can be found in the administrative record for this action.
[130] EJSCREEN is an environmental justice mapping and screening tool that provides the EPA with a nationally consistent dataset and approach for combining environmental and demographic indicators. More information on EPA's EJ Screen tool is available at https://www.epa.gov/ejscreen.
[131] *See* Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs. Available at: https://www.mass.gov/doc/enviroNMental-justice-policy6242021-update/download. Last accessed November 30, 2022.

In the Draft Environmental Impact Statement (DEIS) for New England Wind, which is comprised of NEW1 and NEW2, BOEM analyzed potential air quality impacts because of the construction and operation of the project.[132] EPA finds BOEM's analysis helpful in identifying potential environmental justice areas of concern. Indirect air quality impacts[133] to environmental justice communities were evaluated for the Geographic Analysis Area (GAA). The GAA includes all counties adjacent to the Lease Area and any areas where Project offshore infrastructure may be visible. Counties adjacent to onshore Project infrastructure or ports used to support Project construction, O&M, and decommissioning activities in the WDA and along the export cable route are also included in the GAA. In addition, the GAA includes counties adjacent to major ports that support commercial fisheries potentially affected by the Project. The percentage of minority and low-income populations in each block group, county, and city/town were determined using EPA's EJ Screen tool in BOEM's DEIS for New England Wind. Potential environmental justice areas of concern were identified if 1) the minority population exceeds 50% or 2) the minority or low-income population percentage is meaningfully greater than the minority or low-income population percentage of a reference population. Of the estimated block groups, several were identified as EJ areas of concern.[134] The analysis area also includes tribal lands and communities that the Project may affect, and port areas indirectly affected by the project.

Many of the air emitting activities analyzed by BOEM's DEIS are not regulated under EPA's OCS air permit program. Vessel emissions, such as transit vessels and vessel activity at port communities beyond 25 miles from the OCS source's centroid are not subject to EPA's OCS air permit. In addition, only vessels within the OCS Facility that meet the definition of an OCS source are subject to BACT and LAER. However, these vessels are potentially subject to EPA and IMO standards for marine engines found at 40 C.F.R. part 1042, 40 C.F.R. part 1043, and IMO Annex VI. These standards also require the use of ULSD for certain engine categories. These standards apply to the marine engines on all vessels independent of this OCS air permit.

According to the Permittee's application for the NEW1 windfarm, the potential port facilities to be used to support construction of the project include ports in New York, Rhode Island, Connecticut, Massachusetts, or New Jersey. During O&M the potential ports to be used to support the project include ports in New York, Massachusetts, Connecticut, New Jersey, and Rhode Island. EPA and the states operate an extensive network of air quality monitoring locations to ensure ambient air quality meets the NAAQS. Many of these air monitoring locations coincide with port communities such as New Bedford, MA; Fall River, MA; Providence, RI; New London, CT; and Bridgeport, CT, as well as other northeast and mid-Atlantic states.[135] See Figure 5 Map of Ozone and PM Air Monitoring Stations in states with potential port facilities.

[132] A copy of BOEM's DEIS for the project can be found in the administrative record for this action.

[133] For the purposes of this discussion, indirect air quality impacts are those that are caused by activities such as onshore construction, staging of materials, and emissions from vessels associated with the construction and operation of NEW1. These emissions are not directly regulated by EPA's CAA OCS permit and are outside the regulatory authority of EPA within the context of CAA OCS permitting.

[134] BOEM (December 2022). NEW1 Draft EIS

[135] An interactive map of air quality monitoring locations is available at https://www.epa.gov/outdoor-air-quality-data.

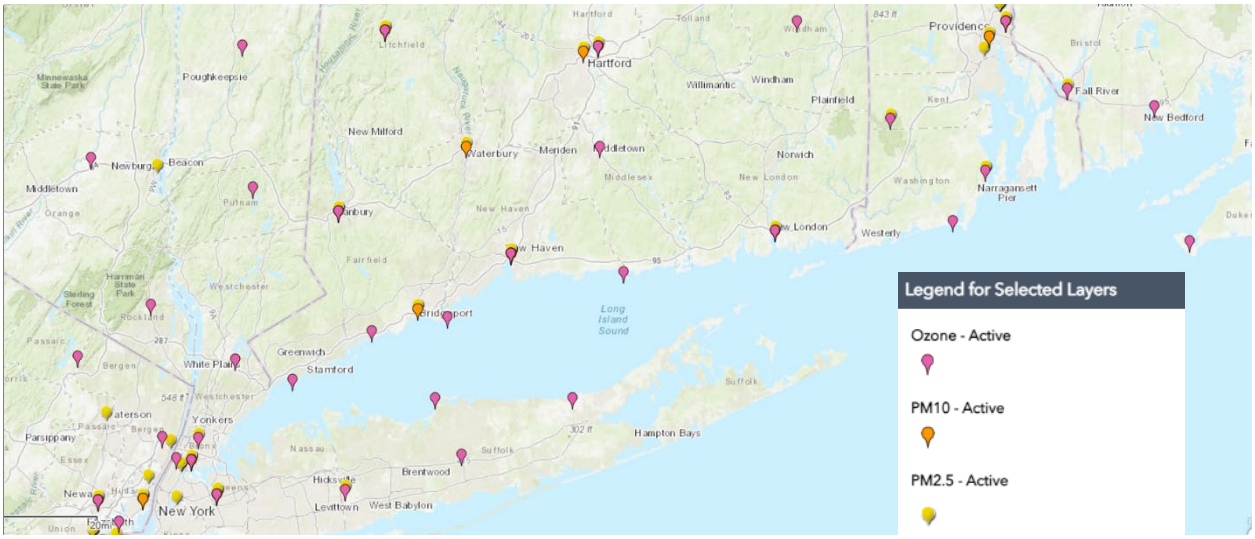

Figure 5 Map of Ozone and PM Air Monitoring Stations

Over time, the development of offshore wind, a renewable and non-emitting energy source, on the Atlantic Coast is expected to displace fossil-fuel fired generation of electricity and improve air quality in the region, in turn significantly reducing adverse health impacts to EJ communities in the area.

The Permittee estimates that avoided emissions of offshore wind displacing fossil-fuel generators for the project are 848 NO_X per year,450 tons SO_X per year and 1,585,878 tons CO_{2e} per year.[136] EPA expects substantial, long-term air quality improvements will have a beneficial impact on the health and safety of EJ populations as a result of this project. Furthermore, BOEM analyzed the employment and economic activity impacts associated with offshore wind development and found there to be minor beneficial impacts from new job formation.

Any direct air quality impacts[137] during the construction phase of the project are temporary, occurring over less than two years. Direct air quality impacts from ongoing project activities regulated by this permit are localized around the OCS Facility and insignificant in all onshore areas.

Furthermore, direct air emissions from the project are subject to BACT and LAER emission limits as well as the requirement to obtain emissions offsets (for the operational phase of the project) in advance under the NNSR permitting programs. Thus, the emissions generating activities at the source will be controlled by compliance with the OCS air permit. In other words, emissions control and NNSR offset requirements in the air permit will minimize air pollutant emissions. The emissions generated during the operation phase of the windfarm engines would be very low and the engines are certified to meet EPA emissions standards. In addition, work practice standards that will be employed during the construction and operation of the project include minimizing the idling of the engines of the vessels; and the use of ultra-low sulfur diesel whenever possible to minimize sulfur and particulate emissions. The EPA notes that some of the emissions generated by the vessel's engine, which will depart from and return to the ports, would occur near shore. These emissions would add a small amount to the current vessel traffic emissions in the area, and given their very low-level and very short duration, would have

[136] Section 6.4.3, NEW1 Permit Application (01/13/2023).

[137] For the purposes of this discussion, direct air quality impacts are those that are regulated under 40 C.F.R. part 55.

minor (if any) human health or environmental effects on the overall population, including any minority or low-income population.[138]

C. Tribal Consultation

Per the EPA Policy on Consultation and Coordination with Indian Tribes, the EPA Region 1 offers tribal government leaders an opportunity to consult on all OCS air permit actions. On March 2, 2023, the EPA notified federally-recognized tribes in Massachusetts, Rhode Island, and Connecticut of the opportunity to conduct government-to-government consultation with EPA prior to issuing the OCS air permit.[139] To date the EPA has not received a request from any tribe requesting consultation on this permit action. However, tribes may request consultation at any time.

D. Public Participation

Section 5-5(c) (Public Participation and Access to Information) of EO 12898 requires that each federal agency work to ensure that public documents, notices, and hearings relating to human health, or the environment are concise, understandable, and readily accessible to the public to provide opportunity for meaningful involvement for all communities, including potentially impacted environmental justice communities. The EPA is taking or will take the following actions to provide public participation and access to information in accordance with EO 12898:

- Prepared a Public Notice, along with this Fact Sheet, which are available on the EPA website https://www.epa.gov/caa-permitting/caa-public-comment-opportunities-region-1.
- Will hold a virtual public hearing for this permit action during the public comment period. Please refer to the public notice on EPA's website for details on how to register.
- Providing Email notification of future Region 1 CAA permit public comment opportunities. Interested parties can sign up at: https://www.epa.gov/caa-permitting/caa-permitting-epas-new-england-region.

XI. Comment Period, Hearings and Procedures for Final Decisions

All persons, including applicants, who believe any condition of the Draft Permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, in writing. EPA prefers that all comments be submitted by electronic means to:
Morgan M. McGrath, P.E.
Email: mcgrath.morgan@epa.gov

Comments may also be submitted electronically through https://www.regulations.gov (Docket ID # **EPA-R01-OAR-2023-0526).**

[138] BOEM (12/2022). NEW1 Draft EIS, 3-12.
[139] Letters offering government-to-government consultation to each of the affected federally-recognized tribes are included in the administrative record for this air permit action.

If electronic submittal of comments is not feasible, hard copy comments may be submitted via mail to the address below:

U.S. EPA Region 1
Air and Radiation Division
Air Permits, Toxics, and Indoor Programs Branch
Attn. Morgan M. McGrath, P.E.
Mailing Address: 5 Post Office Square, Suite 100, 5-MD, Boston, Massachusetts 02109

A public hearing will be held during the public comment period. Please refer to the public notice for details on how to register. The EPA will consider requests for extending the public comment period for good cause. In reaching a final decision on the Draft Permit, the EPA will respond to all significant comments and make these responses available upon request.

Following the close of the public comment period, and after the public hearing, the EPA will issue a Final Permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Within 30 days following the notice of issuance of the final permit decision, any eligible parties may submit a petition for review of the final permit decision to the EPA's Environmental Appeals Board consistent with 40 C.F.R. § 124.19.

XII. EPA Contacts

Additional information concerning the OCS permit may be obtained from:

Morgan M. McGrath, P.E.
Telephone: (617) 918-1541
Email: mcgrath.morgan@epa.gov

All supporting information regarding this permitting action can also be found on EPA's website at https://www.epa.gov/caa-permitting/epa-issued-caa-permits-region-1, or at www.regulations.gov Docket ID #**EPA-R01-OAR-2023-0526).**