UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

FACT SHEET and STATEMENT OF BASIS

Outer Continental Shelf Preconstruction and Operating Air Permit
800 MW Offshore Windfarm
Vineyard Wind, LLC

Offshore Renewable Wind Energy Development
Massachusetts Wind Energy Area

EPA Draft Permit Number
OCS-R1-03

Table of Contents

Acronyms and Abbreviations

BOEM	Bureau of Ocean Energy Management
CAA	Clean Air Act
CA SIP	California State Implementation Plan
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
EGRID	Environmental Protection Agency's Emissions & Generation Resource Integrated Database
EPA	United States Environmental Protection Agency
EJ	Environmental Justice
ERC	Emission Reduction Credit
ESA	Endangered Species Act
ESP	Electrical Service Platform
FWS	U.S. Fish and Wildlife Service
g/kw-hr	Grams per kilowatt-hour
H_2SO_4	Sulfuric acid
HAP	Hazardous Air Pollutant
ISO NE	ISO New England
KV	Kilovolt
KW	Kilowatt
MassDEP	Massachusetts Department of Environmental Protection
MW	Megawatt
NHPA	National Historical Preservation Act
NMFS	National Marine Fisheries Service
NMHC	Non-methane hydrocarbons
NNSR	Nonattainment New Source Review
N_2O	Nitrous oxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
OCS	Outer Continental Shelf
OECLA	Offshore Export Cable Laying Activities
Pb	Lead
PM	Particulate matter
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to 10 microns

$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PSD	Prevention of Significant Deterioration
PTE	Potential to emit
SIL	Significant Impact Levels
SO_2	Sulfur dioxide
Title V	The operating permit regulations in 310 CMR 7.00, appendix C
Tpy	Tons per year
VW	Vineyard Wind, LLC
VOC	Volatile organic compounds
WDA	Wind Development Area
WTG	Wind Turbine Generators

I. General Information

Applicant's name and address:	Vineyard Wind, LLC 700 Pleasant Street, Suite 510 New Bedford, Massachusetts 02740
Location of regulated activities:	Wind Development Area (WDA): The northern portion of Outer Continental Shelf (OCS) Lease Area 0501, located in federal waters off the Massachusetts coast. The WDA, at its nearest points, is approximately 23 kilometers (km) from the southeast corner of Martha's Vineyard and a similar distance from the southwest side of Nantucket. Offshore Export Cable Laying Activities (OECLA): The area of federal waters within Nantucket Sound where Vineyard Wind, LLC will install subsea offshore export cable(s) that involve the use of an offshore export cable laying vessel, when that vessel meets the definition of an OCS source.
Draft OCS permit number:	OCS-R1-03
EPA contact:	Donald Dahl Air Permits, Toxics, and Indoor Programs Branch EPA Region 1 5 Post Office Square Suite 100 (05-2) Boston, MA 02109-3912 Telephone: (617) 918-1657 Email: Dahl.Donald@epa.gov

On August 18, 2018, Vineyard Wind, LLC (VW or the applicant) submitted to EPA Region 1 (EPA) an application requesting a Clean Air Act (CAA or the Act) permit under Section 328 of the CAA for the construction and operation of an offshore windfarm, including export cables, on the OCS with the potential to generate 800 megawatts (MW) of electricity (the windfarm). On April 18, 2019, VW submitted an application for a title V operating permit (operating permit) in accordance with 310 CMR 7.00, Appendix C. The EPA is proposing a draft permit that will contain all of the applicable requirements under 40 C.F.R. part 55. Due to the fact that the decommissioning phase of the windfarm will occur well into the future, the EPA is unable to determine best achievable control technology (BACT) and lowest achievable emissions

reductions (LAER) for the decommissioning phase and will not be permitting this phase at this time.

After reviewing the application and additional information, the EPA prepared this Fact Sheet, Statement of Basis, draft OCS permit and draft operating permit for the WDA facility, and draft OCS permit for the OECLA as required by 40 C.F.R. part 124 -Procedures for Decision Making and 310 C.M.R. 7.00, Appendix C. All CAA permits are contained within EPA permit number OCS-R1-03.

The EPA's permit decisions are based on the information and analysis provided by the applicant and the EPA's own technical expertise. This Fact Sheet and Statement of Basis documents the information and analysis the EPA used to support the OCS and operating permit decisions. It includes a description of the proposed windfarm, the applicable regulations, and an analysis demonstrating how the applicant will comply with the requirements.

Based on all submitted information from VW, including information provided by VW's consultants, the EPA has concluded VW's application is complete and provides the necessary information.[1] *See* 40 C.F.R. part 55. The EPA is making VW's submitted information part of the official record for this Fact Sheet, Statement of Basis, and CAA permits. The initial applications and supplemental information for these permits are available on-line at the EPA Region 1 Web Site https://www.epa.gov/caa-permitting/caa-permitting-epas-new-england-region.

II. Equipment, Activity, and/or Facility Subject to CAA Permitting

A. OCS Statutory and Regulatory Requirements

Section 328(a) of the CAA requires that the EPA establish air pollution control requirements that are the same as onshore requirements for equipment, activities or facilities locating on the OCS, which meet the definition of an OCS source, and are located within 25 miles of states'[2] seaward boundary. To comply with this statutory mandate, on September 4, 1992, the EPA promulgated 40 C.F.R. part 55, which established requirements to control air pollution from OCS sources in order to attain and maintain federal and state ambient air quality standards.[3]

The Energy Policy Act of 2005 (s*ee* 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

[1] The EPA deemed the application complete on January 29, 2019
[2] 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.
[3] The reader may 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.

production, transportation, or transmission of energy from sources other than oil and gas." The Bureau of Ocean Energy Management (BOEM) reviews construction and operations plans from wind energy developers and approves, disapproves, or approves those plans with modifications.[4] EPA issues a CAA OCS permit when the definition of OCS source is met, as defined in CAA § 328 and 40 C.F.R. part 55.

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 meet one of the two following criteria:

(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 source, 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 "[o]uter continental shelf" shall have the meaning provided by section 2 of the OCSLA (43 U.S.C. § 1331 et seq.), which in turn 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: (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 miles 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.

[4] A copy of the Construction and Operation Plan may be found at https://www.boem.gov/Vineyard-Wind/ (last visited on May 31, 2019).

B. Procedural Requirements for Permitting [5]

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 receiving a complete permit application, the EPA then follows the applicable procedural requirements for federal permitting contained in 40 C.F.R. part 124 or 40 C.F.R. part 71, and the EPA issues an OCS permit that meets all federal requirements.[6] The EPA is following the applicable procedures in 40 C.F.R. part 124 in issuing this OCS permit.

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. VW submitted to the EPA an NOI for the windfarm on December 11, 2017. The NOI for this windfarm designated Massachusetts as the nearest onshore area (NOA). The EPA did not receive a request from another state to be designated the COA for this windfarm, thus Massachusetts is designated the COA for this windfarm. *See* 40 C.F.R. § 55.5(c)(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 (40 C.F.R. § 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 all of the EPA's state implementation plan (SIP) guidance. 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

[5] The authority granted to the "Administrator" in 40 C.F.R. part 55 has been delegated to the Regional Administrator in Region 1. *See* Docket for Delegation of Authority.
[6] *See* 40 C.F.R. § 55.6(a)(3).

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.

Consistency updates may result in the inclusion of state or local rules or regulations into 40 C.F.R. part 55, even though the EPA may ultimately disapprove the same rules for inclusion as part of the SIP. Inclusion in the OCS rule does not imply that a 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.

On February 12, 2018 (83 FR 5971), 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. On March 9, 2018, the Commonwealth of Massachusetts amended certain regulatory provisions that pertained to the EPA's February 12, 2018 proposed rulemaking. Subsequently, the EPA reopened the comment period for 30 days and provided notice that the EPA modified the proposed regulatory text for incorporation by reference in the consistency update. *See* 83 FR 21254 (May 9, 2018). The EPA published the final rulemaking notice for the consistency update to part 55 on November 13, 2018. *See* 83 FR 56259. 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; (3) 310 CMR 7.00: Air Pollution Control; and (4) 310 CMR 8.00: The Prevention and/or Abatement of Air Pollution Episode and Air Pollution Incident Emergencies, as amended through March 9, 2018.

The OCS permit applicant then follows the procedural requirements to obtain a federal permit as outlined in 40 C.F.R. part 124. The applicant submits an air permit application that provides the information to show that it will comply with all applicable federal requirements, including those requirements found in 40 C.F.R. part 55 (which, because of the consistency update, include certain state and local requirements incorporated by reference into federal law), and any other federal standard that may apply to the source. The EPA reviews the application and proposes either to approve or deny the application. Next, if the EPA decides to propose approval, the EPA drafts a proposed 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 for the draft permit and may also hold a public hearing if there is a significant degree of public interest and/or 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.[7]

C. Wind Development Area (WDA) Facility

The pollutant-emitting activities within the WDA are part of a single plan to construct and operate an offshore windfarm and can be viewed as a single facility that meets the definition of an OCS source in § 55.2. This OCS facility, i.e. the WDA facility, is comprised of the offshore

[7] See Section XIV below for more details regarding the public comment process for this draft permit.

wind turbine generators (WTGs) and their foundations, an electrical service platform (ESP) and its foundation, and inter-array cables. In addition to the windfarm components in the WDA, the WDA facility includes vessels that become part of the OCS source pursuant to the definition of OCS source in § 55.2. Thus, when any equipment or activity that by itself first satisfies the definition of an OCS source within the WDA, including activities performed using a vessel, such as a jack-up vessel, the EPA considers the WDA facility to meet the definition of an OCS source. The EPA finds it appropriate and reasonable to aggregate the estimated 106 WTGs, ESP, and OCS vessels being constructed and/or operating within the WDA as a single source for the purposes of applying prevention of significant deterioration (PSD), nonattainment new source review (NNSR), and Title V permit programs. This "facility-based" approach is supported by both the definition of OCS source and the definition of a source within the context of the NNSR, PSD, and Title V permit programs.[8]

Once the WDA facility meets the definition of an OCS source, emissions from vessels servicing or associated with any part of the WDA facility are included in the potential emissions from the WDA facility while traveling to and from any part of the WDA facility when within 25 miles of the centroid of the WDA facility. Although vessel emissions contributing only to potential emissions within the WDA facility and are not regulated as stationary sources within the draft permit, these emissions are included when making the following determinations:

1. Applicability to other CAA permit programs NNSR, PSD, and CAA title V operating permits);

2. When calculating the number of NO_x and VOC offsets required due to emissions from the WDA facility during the construction and operational phases; and

3. When determining the impact of emissions from the WDA facility on ambient air and Class I areas.

The 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 as direct emissions from the OCS source for the purposes of calculating potential emissions. Similarly, all engines, including vessel engines, that are part of the OCS source and regulated as stationary sources are subject to the applicable requirements of 40 C.F.R. part 55, including control technology requirements.

[8] The EPA determined that the WDA facility is a single source for the purposes of applying the PSD, NNSR, and Title V permit programs. A detailed source determination analysis for the Vineyard Wind windfarm is included in the administrative docket for this action. *See* source determination analysis memo-to-file dated June 26, 2019.

1. Potential Emissions from the WDA Facility

a. Construction Phase

The following tables contain the WDA facility's estimated emissions during the construction phase, as contained in VW's application. As previously explained, construction emissions from the WDA facility will be calculated 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 WDA facility to meet the definition of an OCS source for the purposes of calculating potential emissions, and emissions from vessels servicing or associated with any part of the WDA facility are included in the potential emissions from the WDA facility while traveling to and from any part of the WDA facility when within 25 miles of the centroid of the WDA facility.[9] The potential construction emissions for the WDA facility are shown in Table 1 and Table 2 below.

Table 1. Emissions During the Construction Phase of the WDA Facility

	Total Fuel Use (gal)	WDA Facility Air Emissions (tons) – Construction Phase							
		NO_x	VOC	CO	PM_{10}[a]	$PM_{2.5}$[a]	SO_2	CO_2	CH_4
Year 1	17,103,732	3,168	77	686	104	100	27.3	198,705	1.75
Year 2	3,271,957	546	11	136	18	18	2.1	37,154	0.32
Total	20,375,689	3,713	88	822	123	118	29.5	235,859	2.07

a. On April 22, 2019, VW submitted a supplemental modeling analysis that showed PM_{10} emissions of 102.3 tons per year (tpy) and $PM_{2.5}$ emissions of 98 tpy.

Table 2. Emissions During the Construction Phase of the WDA Facility (cont.)

	Total Fuel Use (gal)	WDA Facility Air Emissions (tons) - Construction Phase (cont.)				
		N_2O	Pb	HAPs	CO_2e	H_2SO_4
Year 1	17,103,732	9.13	0.01	6.7	202,579	1.26
Year 2	3,271,957	1.69	0.00	1.5	39,015	0.10
Total	20,375,689	10.82	0.02	8.2	241,594	1.35

b. Operational Phase

Table 3 and Table 4 contain the estimated emissions for the WDA facility during the operational phase, as contained in VW's application.

[9] For the purposes of determining the potential emissions, the EPA has determined it is appropriate to use the center of the WDA as the point to estimate vessel emissions within 25 miles of the OCS source comprising the WDA. Similarly, emissions from offshore export cable-laying activities will be calculated separately using the center of those activities because it is a separate source. Using the center of the WDA facility and OECLA as the point to estimate emissions is the easiest approach for permitting and enforcement purposes and provides greater certainty for the EPA and the permit applicant.

Table 3. Emissions During the Operational Phase of the WDA Facility

	Total Fuel Use (gal)	WDA Facility Air Emissions (tons) – Operational Phase							
		NO_x	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	CH_4
Annual (tpy)	511,658	76	1.6	21	2.6	2.5	0.32	5,160	0.04

Table 4. Emissions During the Operational Phase of the WDA Facility (cont.)

	Total Fuel Use (gal)	WDA Facility Air Emissions (tons) – Operational Phase (cont.)				
		N_2O	Pb	HAPs	CO_2e	H_2SO_4
Annual (tpy)	511,658	0.23	0.00	0.29	5,223	0.01

Based on emission estimates provided by VW to the EPA, the WDA facility's potential emissions exceed the permit applicability threshold for PSD, NNSR, and title V requirements, including the requirement to offset NO_x and VOC emissions.

D. Offshore Export Cable Laying Activities (OECLA)

The OECLA meets the definition of an OCS source when the cable laying vessel uses an anchoring system in the federal waters area of Nantucket Sound, thereby temporarily attaching to the seabed. Once the cable laying vessel meets the definition of an OCS source, and commences the activity or operations that subject the cable laying vessel to 40 C.F.R. part 55, the EPA considers the OECLA to meet the definition of an OCS source for the purposes of calculating potential emissions. At this point, all emissions from the anchored cable laying vessel and from vessels servicing or associated with any part of the OECLA traveling within 25 miles en route to or from the anchored cable laying vessel are included in the potential emissions from the OECLA. Based on information provided by VW, the anchored cable laying vessel would lay cable over approximately 11 km of the OCS in Nantucket Sound per cable. Possible emission units (i.e. vessels) associated with the OECLA include tug boats, anchor handling tug supply vessels, a pre-lay grapnel run vessel, a crew transfer vessel, a survey vessel, and a cable protection vessel. Based on communications with VW, the EPA does not anticipate emissions from the OECLA during the operational phase of the windfarm. The potential construction phase emissions for the OECLA are shown in Table 5 below.

Table 5. Emissions During the Construction Phase of the OECLA

OECLA Facility Air Emissions (tons) – Construction Phase									
NO_x	VOC	CO	PM_{10}	$PM_{2.5}$	SO_2	CO_2	N_2O	HAPs	CO_2e
96	2.0	23.0	3.0	3.0	0.5	6,417	0.3	0.3	6,501

a. Emissions of CH_4, Pb, and H_2SO_4 are estimated to be 0.0 tons.

III. Location of the WDA Facility and OECLA

A. WDA Facility

The 800 MW offshore windfarm is proposed to be constructed in the northern half of the BOEM Lease Area OCS-A 0501. The lease area is about 16 kilometers (km) (10.3 miles) wide and 50 km (31 miles) long, located in federal waters off the Massachusetts coast. The northern portion of the over 675-square kilometer (km^2) (166,886-acre) lease area to be developed for the windfarm is referred to as the WDA. At its nearest points, the WDA is approximately 23 km (14 miles) from the southeast corner of Martha's Vineyard and a similar distance from the southwest side of Nantucket as shown in Figure 1. The WDA is 306 km^2 (75,614 acres).

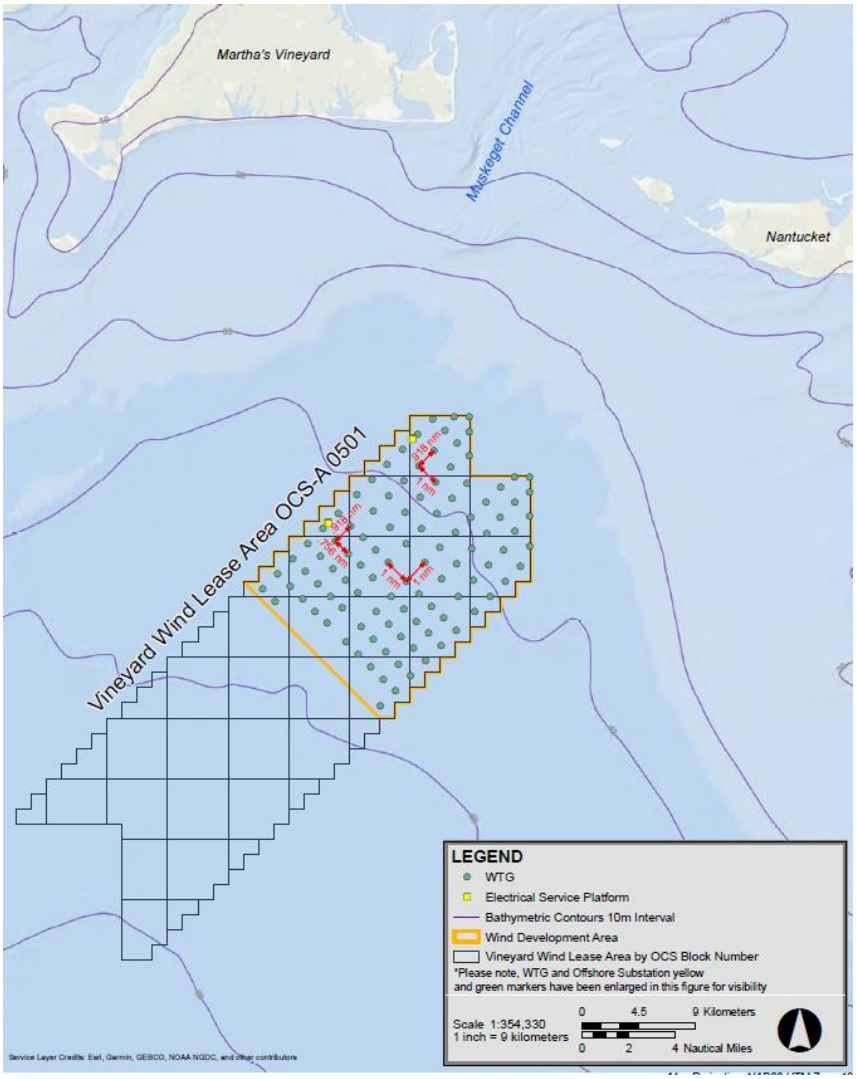

Figure 1. Location on WDA Facility

B. OECLA

The offshore export cables will transmit power from the ESP to the cable landfall site on Cape Cod, Massachusetts. Each offshore export cable spans a distance of approximately 46 miles and connects the ESP to the onshore electrical substation on Cape Cod. According to the permit application, vessels associated with cable laying activities are not anticipated to anchor for the majority of the offshore export cable installation that occurs on the OCS. However, offshore export cable laying activities from the Landfall Site out to approximately 29 miles offshore are expected to use anchors to mechanically pull the vessel forward and install segments of the offshore export cable that passes through an approximately 7 mile portion of federal waters considered part of the OCS in Nantucket Sound. As such, this anchored cable laying vessel meets the definition of an OCS source for the period it is installing the cable on the OCS in Nantucket Sound. The remainder of the installation of the offshore export cable beyond 29 miles from the landfall site will not attach to the seabed and thus not meet the definition of an OCS source. As explained in further detail in the source determination analysis provided in the docket for this permit action, the EPA has determined the OECLA that meet the definition of an OCS source for the offshore export cable in Nantucket Sound are a separate source for the purposes of applying the PSD, NNSR, and Title V permit programs. A map of the OECLA location relative to the WDA and surrounding area is shown in Figure 2.[10]

[10] The map in Figure 2, showing the location of two ESPs and a disconnect between the inter-array cables within the WDA, is included in the Fact Sheet to demonstrate the location of the OECLA is not intended as information regarding the location of the permitted ESP and inter-array cables.

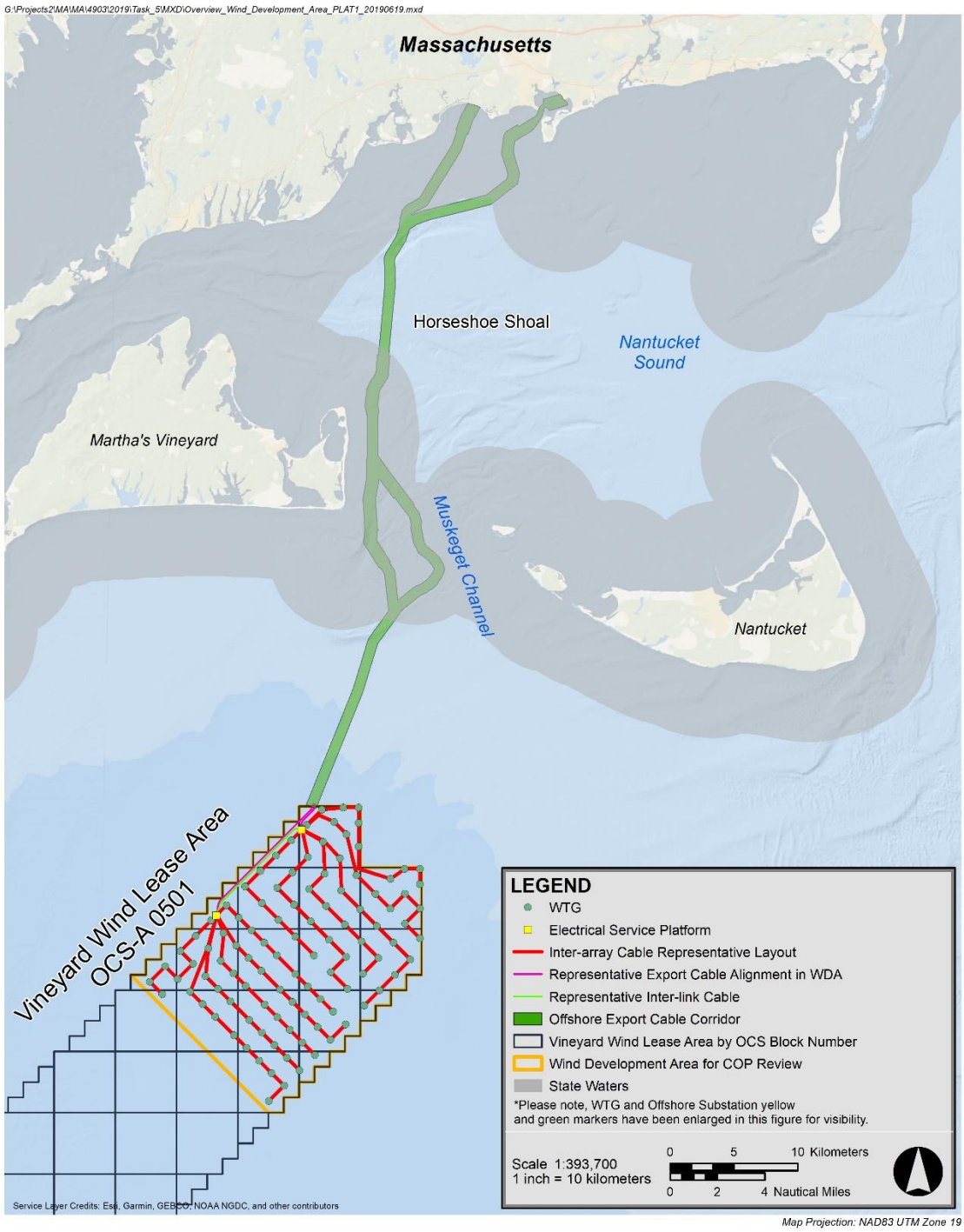

Figure 2. Location of OECLA in Relation to Landfall Site and WDA

IV. Description of the WDA Facility and OECLA

A. WDA Facility

VW plans to construct and operate an 800 MW offshore wind energy facility in the northern half of BOEM Lease Area OCS-A 0501. It is expected that the WTGs will be capable of operating with an annual capacity factor in excess of 45%. According to VW, electricity generated by the WTGs will displace electricity generated by fossil fuel-powered plants, thereby significantly reducing emissions from the New England power grid over the lifespan of the windfarm. VW claims "that based on air emissions data for New England power generation facilities, obtained from the Environmental Protection Agency's Emissions & Generation Resource Integrated Database (eGRID), the windfarm will reduce carbon dioxide ("CO_2") emissions from the ISO NE [ISO New England] power grid by approximately 1,630,000 tons per year ("tpy"). In addition, the windfarm is expected to reduce nitrogen oxide ("NO_x") and sulfur dioxides ("SO_2") emissions by approximately 1,050 tpy and 860 tpy, respectively."

1. Construction Phase

The windfarm is being constructed and permitted using what VW calls an "envelope concept." The envelope concept provides VW with the flexibility[11] a company needs when constructing a windfarm in the ocean while still providing for a permit that meets the CAA requirements. As the windfarm is bidding into a competitive electrical market, the flexible approach allows VW to take advantage of rapidly advancing technology and produce the most cost-effective results for Massachusetts ratepayers.

The key elements of the windfarm construction process occuring within the WDA are as follows:

- Monopile and Jacket Foundations: Foundations will be comprised of monopiles or jackets. A monopile is a long, steel tube that is driven into the seabed to support a WTG. The monopiles will typically be topped by a transition piece although in some cases an extended monopile may be used with no transition piece, subject to detailed design.

  Jacket foundations, if used, are typically located in the deeper water portions of the WDA. The jacket foundation is a large lattice-type steel structure that includes either three or four piles (i.e., legs) connected with welded steel tubular cross bracing. The jacket structures also include a transition piece to connect the WTG to the foundation.

[11] The envelope concept allows VW to properly define and bracket construction and operational characteristics while maintaining a reasonable degree of flexibility with respect to the selection and purchase of key components, such as the WTGs, foundations, submarine cables, offshore substations, etc. As VW is bidding into competitive power procurement processes, this flexible approach is particularly important to ensure that VW has the ability to take advantage of rapidly advancing technology and produce the most cost-effective, environmentally beneficial results for Massachusetts residents.

- Scour Protection: All WTG and ESP foundations will have scour protection. The scour protection is expected to be a layer of stone or rock laid around the foundation.

- Inter-array Cables: 66 kilovolt ("kV") inter-array cables will connect radial "strings" of six to 10 WTGs to a shared offshore substation or ESP.

- Electrical Service Platform (offshore substation): The ESP will include step-up transformers (66 kV to 220 kV) and other electrical equipment. The 800 MW conventional ESP is expected to be located along the northwest edge of the WDA.

- Offshore Cables: 220 kV offshore export cables will connect the offshore ESP to the shore. Two cables will be needed for the ~800 MW windfarm. The Offshore Export Cable Corridor variation and installation techniques have not been determined at this time. The vessels involved in installing the offshore cables while within the WDA are included in the WDA facility. Offshore export cable laying activities occuring in Nantucket Sound constitute a separate OCS source from the WDA facility, and are discussed in greater detail in Section II.D of this Fact Sheet.

- Wind Turbine Generators: WTG technology is changing rapidly, as new engineering designs allow installation of larger WTGs to be installed in a more economical and efficient manner. VW's envelope concept allows for the installation of WTGs from ~8MW to ~10MW WTG. These WTGs are physically large structures, with a ~10MW WTG having a total height of almost 700 feet above sea level.

- Vessels: Third-party-owned vessels will be contracted by VW to perform all of the tasks involved in constructing the windfarm. While it is anticipated that there will be approximately 24 different vessels operating at the same time within the WDA, under certain circumstances VW has stated there could be as many as 46 or more vessels within the WDA at the same time. These third-party vessels range in size from approximately 23 feet up to almost 750 feet in length. Engines on these vessels have a similar range regarding capacity, from as small as 20 kW up to almost 6,000 kW.

2. Operational Phase

Once the windfarm is in operation, there will be activity within the WDA to maintain the WTGs and ESP. The WTGs and ESP are part of the WDA facility, which by definition is an OCS source. Maintenance activities will include vessels that may attach to the seabed or to the WTGs and ESP, thereby becoming part of the OCS source themselves. Additionally, emissions from vessels traveling within 25 miles en route to or from any part of the WDA facility are considered *direct emissions* from the source in potential emissions calculations.

B. OECLA

For the small segment of the OECLA that will cross federal waters in Nantucket Sound, VW plans on employing a cable laying vessel that uses anchors to mechanically pull the vessel

forward (anchored cable laying vessel). Based on VW's preliminary cable alignments, the anchored cable laying vessel would lay cable over approximately 11 km of the OCS in Nantucket Sound per cable. Once the cable laying vessel anchors and is included in the definition of an OCS source, vessels traveling to and from within 25 miles of the anchored cable laying vessel and are servicing or associated with the anchored cable laying vessel, but which do not by themselves meet the definition of an OCS source, are included in the potential emissions from the OECLA. Potential vessels servicing or associated with the cable laying vessel are tug boats, anchor handling tug supply vessels, a pre-lay grapnel run vessel, a crew transfer vessel, a survey vessel, and a cable protection vessel. Emissions from vessels servicing or associated with the OECLA and traveling within 25 miles en route to or from any part of the OECLA are considered *direct emissions* from the source in potential emissions calculations.

V. Applicability of 40 C.F.R. part 55 OCS Air Regulations Requirements

A. Vessels

1. All Jack-up Vessels

A jack-up vessel is a ship or a barge that is equipped with long support legs and a lifting system that enables it to attach to the seafloor and elevate the vessel above the sea surface, essentially converting the vessel into a fixed platform. A picture of a jack-up vessel is provided in Figure 3. The picture is provided for general information only; VW's jack-up units may not be identical to the vessel in the picture.

Figure 3. Example of a Jack-up Vessel (for informational purposes only)

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

1. The diesel-fired electric generating sets 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 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 included as an OCS source and thus be considered part of the OCS source (i.e., the WDA facility). The EPA has determined that a jack-up vessel is included in 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 and is no longer operating as a vessel or a barge. Once that occurs,

the jack-up vessel is considered to be erected on the seabed since the vessel will not be using its engines to maneuver itself at that time. From that point forward (which, for brevity, we refer to as the unit's "attachment"), 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. The EPA expects that for the WDA facility, the first OCS source will be a jack-up vessel.

Therefore, once a jack-up vessel (including the construction equipment on it) becomes part of the OCS source, all emission units on the jack-up vessel 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 operating 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 term and conditions of the permit, until the point in time (which, for brevity, we refer to as the unit's "detachment") when fewer than three jack-up legs are attached to the seafloor. Once the jack-up vessel detachment occurs, it returns to its status as a vessel and is no longer subject to the stationary source requirements of part 55. The jack-up barge and its associated emission units are included in the potential emissions calculations for the WDA facility at all times when within 25 miles of the WDA facility and are subject to the permit's recordkeeping and NNSR offset requirements. However, the jack-up vessel is only subject to the specific emissions limits during the time it is attached to the seabed and regulated as a stationary source under part 55.

2. Support Vessels

In addition to jack-up vessels, dozens of other types of vessels will operate within the WDA and may meet the definition of an OCS source at some point during the construction or operations phase of the WDA facility.

These vessels meet the first part of the definition of an OCS source because the vessels will be performing an activity (i.e., supporting the construction or operations of a WTG or ESP) and will meet all three of the following criteria:

1. The diesel-fired electric generating sets 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, thus demonstrating the windfarm is authorized under the OCSLA (43 U.S.C. § 1331 et seq.); and

3. The vessels will be operating within the WDA, and the WDA is on the OCS or in waters above the OCS.

As stated earlier in this section, the definition of an OCS source has further criteria that must be met before a vessel can be considered an OCS source. Servicing fleet vessels used in the

windfarm may temporally 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. 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., attaches itself to an existing OCS source or to the seabed). Some service fleet vessels will become OCS sources by attaching to part of the OCS facility (including the facility's WTGs or ESP(s) or another vessel like a jack-up vessel operating as an OCS source within the WDA facility) or attaching to the seabed within the WDA. For service fleet vessels attached to an OCS source, only the stationary source activity occurring on the vessel will be regulated by permit conditions.[12] 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 source, 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.[13] 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 thus becomes stationary and is used thereafter for the purpose of exploring, developing, or producing resources from the seabed like constructing a WTG or ESP platform. From that point forward (which, for brevity, we refer to as the unit's "attachment"), 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.

B. Wind Turbine Generators and Electric Service Platform

WTGs and the ESP will be installed on the seabed within the WDA. The EPA has determined that the collection of WTGs and the EPS constitute a "facility," as that term is used in the definition of "OCS source" in 40 C.F.R. § 55.2, and as a "major stationary source" as that term is used in the PSD, NNSR, and Title V permitting programs. Figure 4 provides a picture of an ESP[14] and Figure 5 provides a picture of WTGs with monopile foundations.[15] The EPA has determined that the WTGs and the ESP are OCS sources based on the following:

[12] The emission units on the service fleet vessel are still subject to the permit's NNSR offset requirements once the service fleet vessel is no longer meeting the criteria for an OCS source.
[13] In the case of a safety issue, engine failure, or a storm at sea that requires a vessel to temporarily attach itself to the seabed, the vessel will not be considered an OCS source because the vessel during this time is not considered to be erected on the seabed for the purposes of exploring, developing, or producing resources therefrom.
[14] The picture is provided for general information only; VW's WTG(s) may not be identical to the ESP in the picture.
[15] The picture is provided for general information only; VW's ESP(s) may not be identical to the WTG in the picture.

1. According to the application, WTGs and the ESP will have diesel-fired electric generators during the commissioning stage and some of the generators will remain on the WTGs and ESP during operation as a source of back-up power. These diesel-fired electric generators will have the potential to emit air pollutants.

2. BOEM will approve, disapprove, or approve with modifications a construction and operation plan that allows for the construction and operation of WTGs and ESPs, and equipment on those platforms, thus demonstrating the platforms are authorized under the OCSLA (43 U.S.C. § 1331 et seq.); and

3. The platforms will be located and erected on the seabed within the WDA which itself is located on the OCS.

Figure 4. Example of an Electrical Service Platform (for informational purposes only)

Figure 5. Example of Offshore Wind Turbine Generators with Monopile Foundations (for informational purposes only)

VI. Prevention of Significant Deterioration (PSD) Applicability and Review

A. Applicability of PSD

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 miles 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; therefore, the provisions of 40 C.F.R. § 52.21, except paragraph (a)(1), 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, 40 C.F.R. § 52.21 is in effect in the COA for this windfarm.

Under the PSD regulations, a stationary source is "major" if, among other things, it emits or has the potential to emit (PTE) 100 tpy or more of a "regulated NSR pollutant" as defined in 40 C.F.R. § 52.21(b)(50); is "subject to regulation" as defined in 40 C.F.R. § 52.21(b)(49); and is one of a named list of source categories. Any other stationary source, i.e., one that is not on a list of named source categories, is also considered a major stationary source if it emits or has a PTE of 250 tpy or more of a "regulated NSR pollutant" and is "subject to regulation." See 40 C.F.R. §

52.21(b)(l). The windfarm does not belong to a named source category; therefore, a PTE of 250 tpy of a "regulated NSR pollutant" is the threshold for determining PSD applicability.

"Potential to emit" is defined as the maximum capacity of a source to emit a pollutant under its physical and operational design. See 40 C.F.R. § 52.21(b)(4). In the case of "potential emissions" from the OCS source (i.e. the facility), 40 C.F.R. part 55 defines the term similarly, but also adds that:

> "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 on route 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 40 C.F.R. §§ 55.13 or 55.14 of this part, except that vessel emissions must be included in the "potential to emit" as used in 40 C.F.R. §§ 55.13 or 55.14 of this part. (40 C.F.R. § 55.2)"

Thus, emissions from vessels servicing or associated with an OCS source that are within 25 miles of the OCS source are considered in determining the PTE or "potential emissions" of the OCS source for purposes of applying the PSD regulations.

Once a source locating on the OCS is determined to be subject to PSD, the EPA must then determine the emission units that are part of the major stationary source associated with the project. This principle of using the definition within the specific CAA program is articulated in an Environmental Appeals Board (EAB) Decision *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 the principle articulated in the decision quoted above, the EPA must determine the PSD regulations that apply to the windfarm based on the regulations that define the scope of the Clean Air Act program in question. For this windfarm, the EPA has determined there are two stationary sources, as that term is defined in 40 C.F.R. § 52.21(b)(1), the WDA facility and OECLA.[16] Since all OCS sources are stationary, the EPA has determined that engines on a vessel are considered stationary sources and not nonroad engines when the engines are operating while the vessel meets the definition of an OCS source. The EPA has also determined

[16] *See* memorandum from Eric Wortman entitled "Source Determination Analysis for Vineyard Wind OCS Project" which is located in the Docket.

that all air polluting devices located on a wind turbine generator or the electrical service platform are stationary sources. The OCS source definition in Section 328(a)(4)(C) of the CAA states that the OCS source includes "any equipment, activity, or facility which – emits or has the potential to emit any air pollutant." Furthermore, 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.

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." See 40 C.F.R. § 55.2 (definition of OCS source). There would be no point to considering the "stationary source aspects" of a vessel attached to an OCS source to be part of an OCS source in 40 C.F.R. § 55.2 unless "such stationary source aspects" were considered and regulated in some other way than as emissions from vessels within 25 miles of an OCS source, given that emissions from otherwise nonroad engines on vessels within 25 miles of the OCS source count as direct emissions from the OCS source for purposes of determining potential emissions. Section 328 of the CAA requires that emission units on OCS sources be regulated as stationary sources except with respect to emissions from engines being used for propulsion of vessels while attached to an OCS source.

Consideration of the emission sources on a typical vessel that is determined to be an OCS source makes clear that neither Congress nor EPA could have intended to exclude otherwise nonroad engines from regulation as stationary sources if part of an OCS source. Congress's specific grant of authority to EPA in the 1990 CAA amendments to regulate OCS sources would be rendered meaningless if emissions from engines that would otherwise be considered nonroad engines and that comprise the emission units on the vessels were excluded from regulation as stationary sources.

Given that an engine is a stationary source when located on an OCS source for purposes of Section 111 of the CAA, it is only logical to determine that these same engines are stationary sources for purposes of other CAA programs, including the PSD permit program.

1. WDA Facility

For assessing PSD applicability for the WDA facility, once equipment or an activity that meets the definition of "OCS source" is located in the WDA, then the EPA considers the WDA facility to meet the definition of an OCS source for the purposes of calculating potential emissions. All emissions from vessels servicing or associated with the facility (i.e., OCS source) will be included in the potential emissions calculation. This will include emissions from vessels, whether or not the vessel itself meets the definition of an OCS source, when the vessels are going to and from the facility and are within 25 miles of the center, or centroid, of the facility, after the first time an OCS source is located within the WDA. As the WDA facility, by itself, meets the definition of an OCS source, the EPA has determined that the 25 mile radius shall be calculated from the WDA's centroid. Emissions from vessels within the 25 mile radius are therefore counted in determining whether the WDA facility is required to obtain a PSD and NNSR permit, determining the pollutants for which BACT and LAER is required, and the amount of emission

offsets that must be obtained.

The annual potential emissions for the WDA facility vary greatly between the construction phase and the operational phase. For determining PSD applicability, the EPA is using the potential emissions from the first year of construction, which represents the highest annual emissions expected over the WDA facility's life. Table 6 lists the PTE for each regulated NSR pollutant from the WDA facility, as well as the significant emission rate[17] for each regulated NSR pollutant. Vineyard Wind's permit application materials contain information regarding the emissions factors used to determine PTE for the WDA facility. As discussed above, emissions from vessels servicing the WDA facility are considered direct emissions while within 25 miles of the WDA's centroid once equipment or an activity that meets the definition of OCS source is located in the WDA.

Table 6. Potential to Emit[18] for Regulated NSR Pollutants from the WDA Facility

Pollutant	PTE (tpy)	Significant Emission Rate (tpy)	PSD Review Required
CO	686	100	Yes
NO_x[a]	3,168	40	Yes
VOC[b]	77	40	Yes
PM[c]	103	25	Yes
PM_{10}	103[f]	15	Yes
$PM_{2.5}$	98[f]	10	Yes
SO_2[d]	27.3	40	No
H_2SO_4	1.26	7	No
Pb	.01	0.6	No
GHGs (as CO_2e)	202,579	75,000[e]	Yes

a. NO_x is a measured pollutant for the criteria pollutant NO_2 and a precursor for ozone and $PM_{2.5}$.
b. VOC is a measured pollutant and precursor for the criteria pollutant ozone.
c. Total PM was not provided by the applicant. However, based on PM_{10} emissions being greater than 25 tpy, the EPA has determined the WDA Facility is significant for PM emissions.
d. SO_2 is a criteria pollutant and a precursor for the criteria pollutant $PM_{2.5}$.
e Current BACT threshold and proposed Greenhouse Gas significant emissions rate for sources subject to PSD for another pollutant, i.e. "anyway sources."
f. On April 22, 2019, Vineyard Wind submitted a supplemental analysis to EPA for air modeling. In that document, VW presents slightly lower emissions numbers than previously identified for PM_{10} and $PM_{2.5}$. These revised numbers are included in this Table and differ from the original application. The April 22, 2019 document has been included in the administrative record.

Vineyard Wind's WDA facility is a major PSD source because emissions for at least one "regulated NSR pollutant" (i.e., CO and NO_x) exceeds the major source applicability threshold of 250 tpy. For major PSD sources, "regulated NSR pollutant[s]" that are emitted at levels above the significant emission rate thresholds are subject to review. As shown in Table 6, PSD review is required for CO, NO_x (for NO_2 and as a precursor to ozone and $PM_{2.5}$), PM, PM_{10}, $PM_{2.5}$, and

[17] Significance levels are defined in 40 C.F.R. 52.21(b)(23(i).
[18] The WDA facility's potential emissions include emissions from helicopters which are not required to be part of the potential to emit calculation for the WDA facility. Helicopter emissions are de minimis for the WDA facility, and whether their emissions are included or not will have no impact on determining PSD applicability.

VOC (as a precursor for ozone). Additionally, as with the WDA facility, the EPA applies BACT to GHG emissions in those circumstances where a source emits GHGs in the amount of at least 75,000 tpy on a CO_2e basis where the facility has already triggered PSD review for another regulated NSR pollutant.

2. OECLA

As shown earlier in Table 5, potential emissions from OECLA do not exceed the PSD threshold. Therefore, the EPA has determined that the OCS source referred to as OECLA is not subject to PSD.

B. Best Available Control Technology

As required by the federal PSD program at 40 C.F.R. § 52.21(j)(2) and (3), VW is required to apply BACT[19] to the NO_x, NO_2, PM, PM_{10}, $PM_{2.5}$, CO, and GHG emissions to all WDA facility's emission units. BACT is defined, in relevant part, as, *an emissions limitation ... based on the maximum degree of reduction for each pollutant subject to regulation under [the Clean Air] 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 … for control of such pollutant. See* 40 C.F.R. § 52.21(b)(12); Clean Air Act (CAA) 169(3).

In making its BACT determinations, the EPA follows the following five step "top-down" methodology as outlined in the EPA policy memoranda and supported by the Environmental Appeals Board.[20]

1. **Identify all control technologies.** Identify all possible control options, including inherently lower emitting processes and practices, add-on control equipment, or combination of inherently lower emitting processes and practices and add-on control equipment.

2. **Eliminate technically infeasible options**. Eliminate technically infeasible options based on physical, chemical, and engineering principles.

3. **Rank remaining control technologies by control effectiveness**. Rank the remaining control options by control effectiveness, expected emission reduction, energy impacts, environmental impacts, and economic impacts.

[19] 40 C.F.R. 52.21(b)(12).
[20] *See,* e.g., *In re: Prairie State Generating Company,* 13 E.A.D. 1, 12 (EAB 2006); *See also* EPA Guidance "PSD and Title V Permitting Guidance for Greenhouse Gases," March 2011, beginning at page 17.

4. **Evaluate most effective controls and document results**. Determine the economic, energy, and environmental impacts of the control technology on a case-by-case basis.

5. **Select the BACT**. Select the most effective option not rejected as the BACT.

Although BACT is usually determined for each regulated NSR pollutant at or above the significance level, the type of emission unit operating on an OCS source, i.e. diesel-fired engines, supports a different approach since the actual design of an engine impacts several different regulated NSR pollutants. For example, minimizing NO_x emissions from a diesel-fired engine by reducing high temperature combustion (thermal NO_x) can result in increasing CO emissions. For this reason, the following BACT analysis will group together several regulated NSR pollutants when determining BACT for diesel-fired engines.

1. BACT Analysis for Diesel-Fired Engines on Vessels Meeting the Definition of an OCS Source (Except for the Primary Crew Transfer Vessel and Certain Foreign Flagged Vessels).

At the time of this document, all internal combustion engines operated on OCS vessels will be operated by third parties, i.e., not by VW. Therefore, the size and installation date are unknown at this time. Proposed installation of the WTGs and the ESP change on short notice and require contracts within short timeframes. The EPA is considering these facts in determining BACT for the WDA facility.

NO_2, NO_x, CO, VOC, PM, PM_{10}, and $PM_{2.5}$

Step 1: Identify all control technologies.

Technologies used to reduce the seven regulated NSR pollutants can be separated into two categories: Design and retrofits impacting the operational parameters and add-on controls. VW identified several technologies that are built into the design of newer engines or may be used to retrofit, in certain situations, existing engines. The design and/or retrofit technologies have an impact on:

1. peak cylinder pressure
2. peak cylinder temperature
3. injection pressure
4. compression ratio
5. fuel injection timing
6. air-fuel mixing (related to parameters such as fuel spray configuration)

The technologies that can impact the 6 operational parameters listed above are discussed in Section 6.1.2 of VW's permit application. The EPA has reviewed that list and has not identified any additional control technologies.

Add-on pollution control technologies are listed in Section 6.1.3 of VW's permit application and include but are not limited to selective catalytic reduction for lowering NO_x emissions and diesel oxidation catalyst for lowering CO and PM, PM_{10}, and $PM_{2.5}$ emissions. The EPA has reviewed that list and has not identified any additional technologies.

In addition to add-on controls, the EPA can consider inherently lower-emitting processes/practices/designs within a BACT analysis.[21] Given the unique nature of constructing the WDA facility, the use of the highest tiered engine (this results in the lowest overall emissions of regulated NSR pollutants) available at the "time of deployment" is identified as the option for BACT, as a work practice standard. Time of deployment is impacted by several factors, including but not limited to, construction time table and contractual obligations. In a memorandum dated May 23rd, 2019, VW explained that the process for entering into contracts for an offshore windfarm in the United States is highly complex due to a number of factors. The United States offshore wind industry is in its infancy, it is challenging to secure experienced installation contractors and offshore components, and finding the vessels needed for a windfarm of this size and complexity at the time they are needed to meet established construction schedules is difficult. VW indicated that it must rely heavily upon European vessels and installation equipment, which often have limited availability. In order for the windfarm to be feasible, VW had to choose its contractors with these constraints in mind, and the EPA's draft permit provides that VW must use the cleanest vessels available from the contractors at the "time of deployment" based on the availability of those vessels from the contractors VW has already had to retain. It is also important to note that the use of vessels that emit more NO_x and VOC than other vessels, if necessary, results in a requirement that VW obtain a greater amount of emission offsets. For a more detailed description of the complexity and constraints involved in the contracting process, see VW's May 23rd, 2019 memorandum to EPA Region 1.

VW also identified a requirement in the California State Implementation Plan (CA SIP)[22] that requires certain defined vessels to have engines certified to at least Tier 2 standards. Vessels operating within the WDA facility that are subject to BACT during the construction phase are also subject to LAER for NO_x and VOC emissions. Vessels for OECLA that are subject to BACT during the construction phase[23] are also subject to LAER for NO_x emissions. The EPA has identified within the draft permit that these certain defined vessels, a feeder jack-up vessel and certain crew and supply vessels, even if these vessels were foreign flagged, would be regulated by the CA SIP and would need all engines to meet at least the emission standards for Tier 2 engines in 40 C.F.R. part 94.

Step 2: Eliminate technically infeasible options

[21] *See* EPA Guidance "PSD and Title V Permitting Guidance For Greenhouse Gases," dated March 2011, p. 25.
[22] VW identified California's "Airborne Toxic Control Measure for Commercial Harbor Craft" Title 17, California Code of Regulations, Section 93118.5 as the most stringent SIP limit for vessels. *See* 81 FR 39424 (6/16/2016). EPA Region 1 is not aware of a SIP limit for vessels that is more stringent then California's.

[23] 310 CMR 7.02(8)(a)2. requires sources, like the OECLA, that are subject to a comprehensive plan approval, to meet BACT requirements.

The proposed installation plans can change on short notice and require contracts within short timeframes. The vendors supplying the vessels do not have their entire inventory available within the construction schedule constraints. Also, extensive lead time is necessary for retrofitting an engine. Without knowing which engines will be used during the construction of the WDA facility it is also infeasible to replace engines within the existing fleet. Based on these facts, the EPA finds that the replacement and/or retrofit of the third-party engines is technically infeasible.

The EPA has reviewed Section 6.3.3.2.3 of VW's permit application regarding the technical feasibility of different add-on control technologies and concurs with VW that add-on controls are technically infeasible for reasons articulated in the application and due to space constraints on the vessels.

The remaining technology, work practice standards, or combination of the two, rely on using internal combustion engines that have been certified by the engine manufacturer to meet certain air emission limits. For internal combustion engines used on domestically flagged vessels, the emission limits can be found in 40 C.F.R. §§ 94.8 and 1042.101. The emission limits are divided into different Tier standards, ranging from Tier I, which allows the highest emissions, to Tier IV. The manufacturer of Tier II and higher internal combustion engines will build into the engines' design, air pollution control technologies such as turbocharger, aftercooler, and high injection pressure, with a Tier 4 engine having the most pollution control technologies built into its design.

Step 3: Rank remaining control technologies by control effectiveness

There is only one remaining control technology identified which is the optimal implementation of using the cleanest engine available at the time of deployment.

Step 4: Evaluate most effective controls and document results taking into account economic, energy, and environmental impacts of the control technology.

With only one technology identified in Step 3, further analysis in step 4 is not warranted.

Step 5: Select the BACT

BACT is determined to be the use of the highest tier engine available at the time of deployment.

2. BACT Analysis for Internal Combustion Engines on Wind Turbine Generators and Electrical Service Platform

The internal combustion engines that will be either temporarily or permanently installed on the WTGs are approximately 40 kW or less in size, with each WTG containing 1-3 diesel-fired electric generators during commissioning and up to one diesel-fired electric generator during normal operations. The engines will be used to maintain equipment in the event that electricity is unavailable. The electrical service platform will have two, approximately 400 kW diesel-fired

electric generators, and one diesel fired electric generator of approximately 800 kW. Additional diesel-fired electric generators of similar size may be used during the decommissioning phase.

NO_2, NO_x, CO, VOC, PM, PM_{10}, and $PM_{2.5}$

Step 1: Identify all control technologies

VW identified similar control technologies for the diesel-fired electric generators that will be installed on the WTGs and ESP as the control technologies for internal combustion engines on vessels meeting the definition of an OCS source. These controls are:

1. Selective Catalytic Reduction (SCR)
2. Selective Non-Catalytic Reduction (SNCR)
3. NO_x Absorber/Scrubber Technology
4. Lean NO_x Catalyst
5. 4-Way Catalyst Converter
6. Use of clean fuels

Step 2: Eliminate technically infeasible options

Many of the technologies identified by VW impact the actual design of the diesel-fired electric generator. The EPA has recognized this fact in the new source performance standard (NSPS) for stationary compression ignition internal combustion engines (CI engine) by requiring standards for manufactures to meet.[24] Therefore a manufacturer of a Tier 3 or Tier 4 engine will incorporate technically feasible emission reduction technology into the engine's design. For example, a Tier 4 engine will usually have selective catalytic reduction system to reduce NO_x emissions and a diesel particulate filter in combination with a diesel oxidation catalyst to reduce fine particulates. In other words, the pollution control equipment becomes an integral part of the overall engine.

Although VW's application states that the use of SCR control technology is technologically infeasible for these generators, the EPA disagrees with VW's analysis and is determining not to eliminate any technologies at this step because all of the identified technologies in step 1 are technically feasible for the generators being installed on the WTG and ESP. The EPA has identified at least one manufacturer that produces a Tier 4 marine engine that relies on SCR control to meet the Tier 4 NO_x emission standard.[25]

Step 3: Rank remaining control technologies by control effectiveness

Different internal combustion engine manufacturers use different combinations of emission controls to meet EPA's NSPS standards. The most effective controls consist of a combination of

[24] CI engines are the type of internal combustion engine that will be installed on the platforms.
[25] See https://www.cat.com/en_US/by-industry/marine/tier-four/the-technology-explained.html lasted visited on June 6, 2019.

optimizing the combustion process to minimize emissions, along with after-combustion control technologies for particulates and NO_x/NO_2 emissions,

For the internal combustion engine that is proposed for the ESP or WTGs, the EPA compares the difference between a Tier 3 and Tier 4 engine in 40 C.F.R. part 60, subpart IIII, 40 C.F.R. part 89, part 1039, and part 1042.

Table 7. ~40 kW Diesel-fired Electric Generator

		NO_x (g/kW-hr)	NMHC (g/kW-hr)	NMHC and NO_x (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)
Part 89	Tier 3	N/A	N/A	4.7	5	0.4
Part 1039[a]	Tier 4	N/A	N/A	4.7	5.0	0.03
Part 1042[a] (marine engine)	Tier 3	N/A	N/A	4.7	5.0	0.3

a. The EPA notes that in Parts 1039 and 1042 there are different emission limits for marine engines less than 19 kW in size.

Table 8. ~400 kW Diesel-fired Electric Generator

		NO_x (g/kW-hr)	NMHC (g/kW-hr)	NMHC and NO_x (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)
Part 89	Tier 3	N/A	N/A	4.0	3.5	0.2
Part 1039	Tier 4	0.2	0.19	0.4	3.5	0.02
Part 1042 (marine engine)[a]	Tier 3	N/A	N/A	5.6	5.0	0.10

a. For comparison purposes the EPA is assuming an engine design of ≤ 35 kW/l and each cylinder with a displacement of $1.2 \leq$ disp. < 2.5 liters. The design of the actual engine installed on the ESP may be different and could result in different emission limits since EPA's standards are based on specific engine designs which can result in different emission limits for engines with similar power outputs.

Table 9. ~800 kW Diesel-fired Electric Generator

		NO_x (g/kW-hr)	NMHC (g/kW-hr)	NMHC and NO_x (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)
Part 89[a]	Tier 3	N/A	N/A	N/A	N/A	N/A
	Tier 4	N/A	N/A	N/A	N/A	N/A
Part 1039	Tier 4	0.67	0.19	N/A	3.5	0.03
Part 1042[b]	Tier 3	N/A	N/A	5.8	5.0	0.12
	Tier 4	1.8	0.19	N/A	5.0	0.04

a. There is no Tier 3 standard for a diesel-powered electric generator of this size

b. Assuming an engine design of ≥ 35 kW/l and each cylinder with a displacement of 2.5 liters.

Step 4: Evaluate most effective controls and document results taking into account economic, energy, and environmental impacts of the control technology.

The lowest emitting diesel-fired electric generators are generators certified to the highest Tier standard in 40 C.F.R. part 1039. However, this section of the EPA's regulations did not anticipate that the engines would be operating in a marine environment for 30 years, such as the diesel-fired electric generators located on the WTGs and ESP. EPA has developed Tier standards for engines deployed in a marine environment in 40 C.F.R. part 94 (Tier 1 and 2) and part 1042 (Tier 3 and 4). The EPA recognizes in its Standards for Performance of New Stationary Sources (40 C.F.R. part 60, subpart IIII) that an owner of a stationary source in a marine environment can certify its engine based on the requirements of 40 C.F.R. parts 94 or 1042. *See* 40 C.F.R. § 60.4201(f)(2).

Step 5: Select the BACT

Based on the specific facts articulated above for the installation and operation of diesel-fired electric generators installed on the WTGs and ESP, the EPA has determined BACT to be no less than the Tier 4 standard in 40 C.F.R. part 1042 for the approximately 800 kW diesel-fired electric generator and the Tier 3 standards in 40 C.F.R. part 1042 for the approximately two 400 kW diesel-powered electric generators on the ESP and the 40 kW or less diesel-powered electric generators on the WTGs.

3. Crew Transport Vessel

Unlike most of the vessels used in constructing the WDA facility, at least one crew transport vessel will be needed on a daily basis during both the construction and operational phases. The use of the highest tiered engine at the "time of deployment" identified as the option for BACT for vessel engines other than the primary crew transport vessel does not apply to the primary crew transport vessel which will be used on an almost daily basis for the entire life of the WDA facility. BACT for the primary crew transport vessel, when that vessel is included in the definition of the OCS source (i.e., the WDA facility), is simply the requirement to use engines manufactured in 2017 or later and certified to the Tier 4 standards for marine engines in 40 C.F.R. § 1042.101 if the marine engine(s) are rated at 600 kW or higher. Smaller marine engine(s) are required to meet Tier 3 standards since there are no Tier 4 standards in 40 C.F.R. § 1042.101 for smaller marine engines. Requiring the use of marine engines certified to either Tier 4 or 3 standards cannot be eliminated in Step 2 because it is not technologically infeasible for the primary crew transport vessel to have engines meeting these higher Tier standards. Nor, based on the current record, can the use of marine engines certified to these higher Tier standards be eliminated in step 4 due to adverse economic, energy, and environmental impacts.

The EPA has determined under BACT that for the engines installed on the primary crew transport, the engines must meet, depending on the engine(s)' design, the Tier 3 or Tier 4 certification for marine engines in 40 C.F.R. § 1042.101.[26]

[26] The EPA is also determining that Tier 4 engines represent LAER since these engines are the cleanest engines available at the time of this permit.

4. Other Foreign Flagged Vessels

Foreign flagged vessels pose a unique challenge when applying BACT. Requiring engines on these vessels to be replaced with engines certified to the emission standards in § 60.4204 is infeasible.[27] Instead, the EPA recognizes that engines on foreign flagged vessels operating within the WDA (which is part of the North American emission Control Area) are subject to 40 C.F.R. § 1043 and are not required to operate internal combustion engines certified in accordance with 40 C.F.R. §§ 94.8 or 1042.101, which are regulations for marine engines on US flagged ships. Instead, 40 C.F.R. § 1043.30(c) requires engines over 130 kW on foreign flagged vessels to have a valid Engine International Air Pollution Prevention (EIAPP), certifying that the engine meets the applicable emission standards of International Maritime Organization (IMO) Annex VI, unless the foreign country where the vessel is registered is not part of the IMO. Annex VI, Regulation 13[28] requires all engines on vessels to meet the following NO_x emission limits in Table 10.

Table 10. NO_x Emission Limits for Engines on Foreign Flagged Vessels

Tier	Ship construction date on or after	Total weighted cycle emission limit (g/kWh) n = engine's rated speed (rpm)		
		n < 130	n = 130 - 1999	n ≥ 2000
I	1 January 2000	17.0	$45 \cdot n^{(-0.2)}$ e.g., 720 rpm – 12.1	9.8
II	1 January 2011	14.4	$44 \cdot n^{(-0.23)}$ e.g., 720 rpm – 9.7	7.7
III	1 January 2016	3.4	$9 \cdot n^{(-0.2)}$ e.g., 720 rpm – 2.4	2.0

VW will demonstrate compliance with Regulation 13 by providing a copy of the EIAPP to the EPA along with the vessel's manufacturing date. BACT for foreign flagged vessels that are included in the definition of an OCS source (i.e., the WDA facility or the OECLA) is determined to be the use of the highest tier engine at the "time of deployment."

Without specific emission limits under IMO standards for the remaining regulated air pollutants that require a BACT analysis, the EPA is requiring VW, as a work practice standard, to use good

[27] As explained earlier, foreign flagged vessels that meet the definition of a "crew and supply vessel" in the CA SIP would be required to replace Tier 0 and Tier 1 engines with engines at least meeting the Tier 2 standards in 40 C.F.R. part 94. Therefore, in order to meet LAER, VW is not allowed to use a foreign flagged vessel that meets the definition of a crew and supply vessel with less than Tier 2 certified engines.

[28] *See* http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Nitrogen-oxides-(NOx)-–-Regulation-13.aspx last visited on May 16, 2019.

combustion practices based on the most recent manufacturer's specifications issued for these engines at the time that these engines are operating under this permit.

5. Greenhouse Gases (GHG)

The majority of GHG emissions from the internal combustion engines are in the form of carbon dioxide (CO_2). CO_2 is formed in the combustion chamber as a result of complete combustion of diesel when the carbon in the fuel is converted to CO_2.

Step 1: Identify all control technologies

VW identified the following control technologies:

1. Post-combustion controls (such as carbon capture and sequestration)
2. Use of clean fuels and good combustion practices

As stated earlier, the EPA can consider inherently lower-emitting processes/practices/designs within a BACT analysis. Given the unique nature of the WDA facility, the use of the most efficient engine (resulting in the lowest overall emissions of GHG) available at the time of deployment is identified as an option for BACT. Time of deployment is impacted by several factors, including but not limited to, the construction time table and contractual obligations.

Step 2: Eliminate Technically Infeasible Technologies

Post combustion controls for carbon dioxide are not technically feasible for engines that will be used for the WDA facility.

Step 3: Rank remaining control technologies by control effectiveness

Utilizing good combustion practices will allow the engines at the “time of deployment” to operate more efficiently, thereby reducing fuel usage and GHG emissions

Step 4: Evaluate most effective controls and document results taking into account economic, energy, and environmental impacts of the control technology.

Utilizing good combustion practices will allow the engines at the “time of deployment” to operate more efficiently, thereby reducing fuel usage and GHG emissions.

Step 5: Select the BACT

The EPA has determined that utilizing good combustion practices will allow the engines at the “time of deployment” to operate more efficiently, thereby reducing fuel usage and GHG emissions.

C. Ambient Air Impact Analysis[29]

The regulations at 40 C.F.R. part 51, appendix W (*Guideline on Air Quality Models*; "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 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 WDA facility was conducted to account for two periods: the construction phase and the operational phase. The construction phase emissions account for the highest annual emissions from both the WDA facility and OECLA, and the analysis of ambient air impacts due to construction are described in the first section below. Operational phase emissions for the WDA facility are considerably lower than construction period emissions for the WDA facility on an annual basis, and the analysis of ambient air impacts for the WDA facility during the operational phase are described in the second section below. Modeling for the operational phase for OECLA was not conducted since it is assumed there will be no emissions associated with OECLA during this phase. The modeled emissions rely on a conservative estimate of emissions associated with the WDA facility and OECLA. Therefore, ambient air impacts from the WDA facility and OECLA will be no worse than those shown in this ambient air impact analysis.

1. Construction Phase for the WDA Facility and OECLA

The PSD permitting regulations for proposed major new sources generally require applicants to perform an air quality impact analysis for those pollutants emitted in significant quantities. For temporary emission sources subject to the PSD permitting requirements, the PSD regulations at 40 C.F.R. § 52.21(i)(3) require an assessment of the ambient air impact for Class I areas and areas where the applicable PSD increment is known to be violated. Assessment of the construction emissions was provided by the applicant in a November 2018 report "Air Quality Analysis: Construction Activities," an April 22, 2019 memorandum "Vineyard Wind Project, Supplemental Information Requested by EPA Region 1, Construction and O&M Stage Modeling," and an April 2019 report "Class I Annual NO_2 SIL Evaluation."

The following sections provide the information EPA considered in determining the appropriate ambient air impacts analysis requirements to which the WDA facility and OECLA are each subject for the construction period and whether those requirements have been satisfied. Specifically, the sections below describe, for the construction period, a) the qualification as temporary, b) the assessment of ambient air impacts at areas where PSD increment is known to be violated, c) the assessment of ambient air impacts at Class I areas, d) results of the assessment for the WDA facility, e) results of the assessment for OECLA, and f) EPA's overall conclusion about the ambient air impacts during the construction phase for the WDA facility and OECLA.

[29] Although OECLA is not subject to PSD, an ambient air impact analysis during the construction phase of the OECLA was submitted by VW and reviewed by the EPA. The EPA is relying on the authority in 310 CMR 7.02 to require modeling for sources subject to a comprehensive plan approval. As discussed in Section VII.F.1.a. of this document, the EPA has determined that OECLA is subject to the comprehensive plan approval requirements at 310 CMR 7.02.

a. Qualification as a Temporary Source

The subject emissions associated with the construction of the WDA facility and OECLA each 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. *See* Amended Regulations for Prevention of Significant Deterioration of Air Quality, 45 Fed. Reg. 52676, 52719, 52728 (August 7, 1980). Since the construction source emissions for the WDA facility and OECLA are each anticipated to last no longer than two years, the construction source emissions are considered a temporary source for both the WDA facility and OECLA.

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 WDA facility is located in the OCS at approximately 14 miles (23 km) from the shorelines of Dukes and Nantucket Counties in Massachusetts. Based on a consultation between Vineyard Wind and the Commonwealth,[30] there are no known areas in violation of the PSD increment in Massachusetts. Furthermore, EPA is not aware of any other areas in the vicinity of the WDA facility or OECLA that are violating the PSD increment. Therefore, because of the absence of areas known to be in violation of PSD increment in the vicinity of the WDA facility or OECLA, EPA concludes that construction emissions for the WDA facility and for OECLA 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(e). The Class I areas closest to the WDA facility are Lye Brook Wilderness area, located in southwestern Vermont (within the Green Mountain National Forest), 300 km from the WDA facility; Presidential Range-Dry River Wilderness area, located in Northern New Hampshire, 334 km from the WDA facility; and Brigantine Wilderness area, located in Southeastern New Jersey (within the Edwin B. Forsythe National Wildlife Refuge), 308 km from the WDA facility. For OECLA, the closest Class I area is the Lye Brook Wilderness area at a distance of 274.3 km. A map of the location of these Class I areas with respect to the windfarm is presented in Figure 6.

[30] See email from Glenn Pacheco of the Massachusetts Department of Environmental Protection (MassDEP) dated June 22, 2018, included in the administrative record for this draft permit.

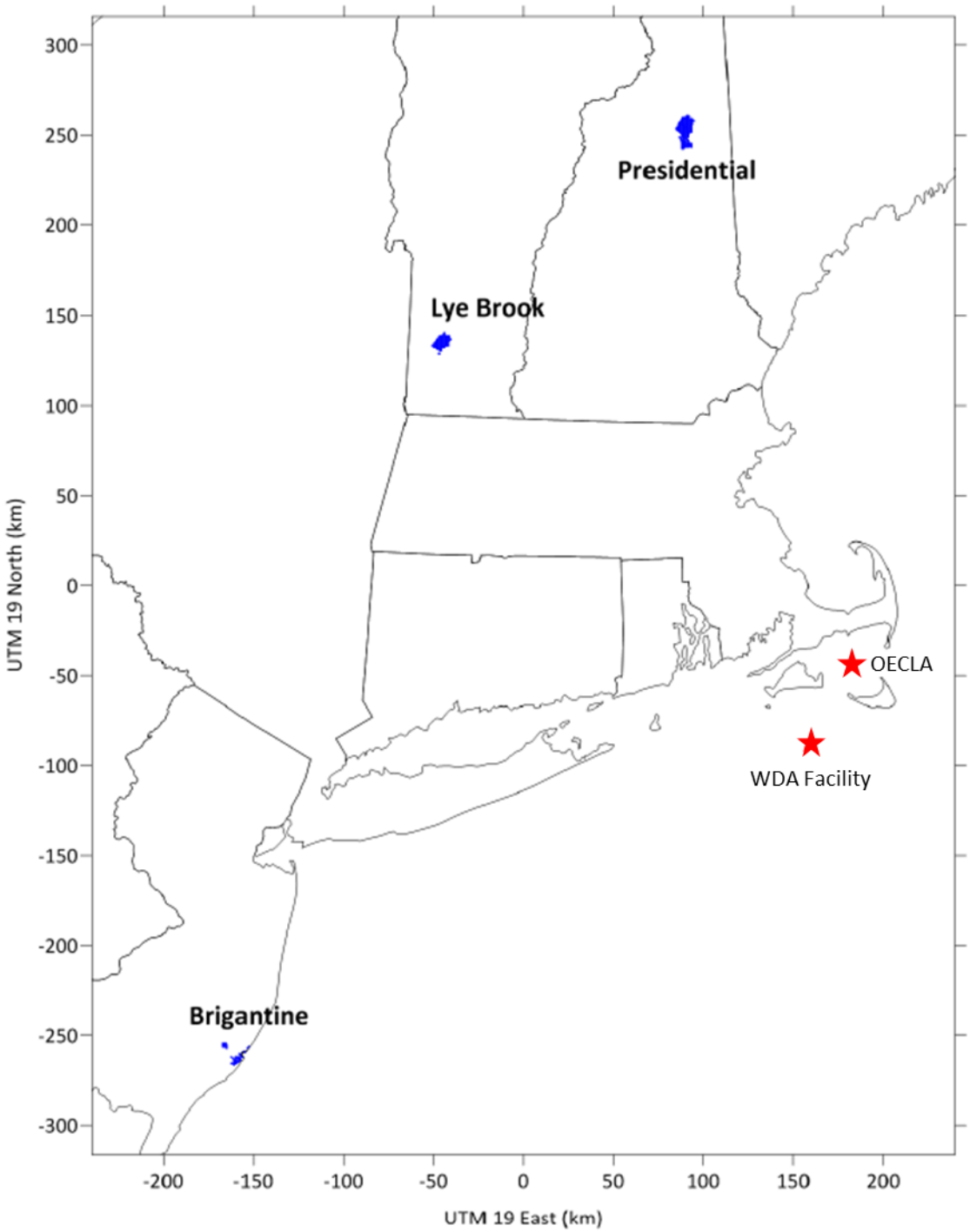

Figure 6. Closest Class I Areas to the WDA Facility and OECLA
Adapted from VW's April 2019 "Class I Annual NO_2 SIL Evaluation," included in the administrative record

Vineyard Wind evaluated the air quality impacts related to construction emissions for the WDA facility and for OECLA at Class I areas using air quality modeling information. The *Guideline* specifies a two-tier screening approach for such long-range transport assessments. Consistent

with section 4.2.c.i of the *Guideline*, Vineyard Wind assessed the significance of ambient impacts at 50 km from the source as a first tier, and if necessary, at further distances representative of the distance to the Class I areas (i.e., around 300 km) as a second tier. For the WDA facility, assessment for some pollutants at the 50 km distance was sufficient to demonstrate impacts below the significance level, while for other pollutants assessment at the further distance was necessary, as further discussed in a subsection below. For OECLA, assessment for all pollutants at the 50 km distance was sufficient to demonstrate impacts were below the significance level, as further discussed in a subsection below. Comparisons of construction period impacts for the WDA facility and the OECLA to significance levels are presented in Table 11 and Table 12, respectively, at the end of this section.

Vineyard Wind compared the modeled impacts at Class I areas with Class I PSD significant impact levels (SILs), for those pollutants for which Class I PSD SILs have been established, to assess whether ambient air quality will be significantly affected.

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, particular $PM_{2.5}$ 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. 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, its use as a concentration considered small enough to qualify for the temporary source exemption (i.e., no impact to Class I areas) appears appropriate.

To assess direct impacts at the 50-km distance, Vineyard Wind selected the Offshore and Coastal Dispersion (OCD) model (version 5) consistent with the *Guideline*. Vineyard Wind prepared hourly representative onshore meteorological data for use with OCD from the National Weather Service (NWS) station at Vineyard Haven (Martha's Vineyard, MA), and supplemental data from Nantucket Memorial Airport, with twice-daily upper air sounding data from Chatham, MA for the five-year period 2013-2017. Missing data was substituted consistent with the EPA recommendations. Vineyard Wind produced a concurrent five-year composite overwater meteorological dataset through processing of data from four nearby meteorological ocean buoy stations.

For secondary impacts of $PM_{2.5}$, Vineyard Wind 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*. Vineyard Wind'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 secondary impacts for $PM_{2.5}$, Vineyard Wind relied on information provided by the EPA related to the EPA modeling of secondary formation of $PM_{2.5}$ constituents due to precursor emissions for hypothetical low-level (i.e., short stack) sources. Information about the EPA hypothetical source modeling is provided in the EPA's April 30, 2019 Guidance. The three hypothetical sources for which Vineyard Wind evaluated secondary formation provide atmospheric chemistry that is suitably representative of the area around the WDA facility. These sources were the Norfolk Co., Massachusetts; Franklin Co., Massachusetts; and Bronx, New York hypothetical sources. Vineyard Wind identified the highest annual and 24-hour nitrate and sulfate impact levels in any direction at or beyond 50 km from each of the hypothetical sources and selected the maximum of the three impacts. By selecting the highest impacts at any direction for any of these three sources for the appropriate distance, the derived value is suitably conservative (i.e., likely to overestimate impacts) for use in this screening assessment. Then, Vineyard Wind scaled the hypothetical impacts based on the ratio of the emissions to the EPA's hypothetical source modeling emissions (i.e., 500 tpy) to derive an expected secondary impact for nitrate and sulfate constituents for 24-hour and annual averaging periods. The sum of these nitrate and sulfate impacts is the total secondary $PM_{2.5}$ impact using this approach at 50 km. For $PM_{2.5}$, the combined primary and secondary were compared to the Class I PSD SIL.

Vineyard Wind applied EPA's ambient ratio method 2 (ARM2) screening method. EPA has evaluated Vineyard Wind's approach in assessing NO_2 impacts and believes it is suitable to identify those impacts resulting from the WDA facility and OECLA in the Class I area.

d. Ambient Air Impacts for the Construction Period of the WDA Facility

For the WDA facility, annual construction period impacts for $PM_{2.5}$ and PM_{10} were shown to be below significance levels at 50 km distance using the first-tier approach. A second-tier assessment was required for annual NO_2 and 24-hr $PM_{2.5}$ and PM_{10}.

For 24-hour construction period impacts for $PM_{2.5}$ and PM_{10}, Vineyard Wind assessed the construction period impacts of the WDA facility at a distance of 300 km based on maximum primary impacts from a subset of the EPA's modeling of hypothetical sources using the Comprehensive Air Quality Model with Extensions (CAMx). Vineyard Wind's approach for estimating 24-hour secondary $PM_{2.5}$ impacts at 300 km was similar to the approach described above for secondary impacts at 50 km.

To assess annual NO_2 impacts from construction of the WDA facility, Vineyard Wind supplied long-range transport modeling of the three Class I areas described in Section VI.C.1.c.—i.e., Lye Brook Wilderness area, Presidential Range Wilderness area, Presidential Range-Dry River Wilderness area, Brigantine Wilderness area—using the Lagrangian CALPUFF model (version 5.8.5) with no chemistry or deposition, consistent with section 4.2.c.ii of the *Guideline*. To

develop a wind field appropriate for use with CALPUFF, Vineyard Wind relied on the Weather Research Forecast (WRF) model for 2015 through 2017 with 4-km grid resolution and provided an evaluation to establish appropriate level of performance. The EPA's assessment of the Vineyard Wind evaluation of the WRF simulation is that it provides a sufficient basis for use in a screening analysis with CALPUFF in estimating annual average NO_2 impacts from the WDA facility at distant Class I areas. EPA notes that while CALPUFF is an appropriate model selection for assessing long-range pollutant transport in this case, there are difficulties in conducting accurate assessments using CALPUFF beyond 300 km.[31] Given that the Interagency Workgroup on Air Quality Modeling (IWAQM) suggested that CALPUFF tends to overestimate at distances beyond 300 km by a factor of 3 to 4, and the generally 300 km or greater distances between the windfarm and the nearest Class I areas, EPA concludes that the assessment for construction period NO_2 impacts from the WDA facility at Class I areas provided by Vineyard Wind is likely to be an overprediction (i.e., conservative).

The total ambient air impacts for pollutants emitted from construction of the WDA facility discussed in this section are presented in Table 11 below. Concentrations in air are given in micrograms per cubic meter ($\mu g/m^3$). 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 distances relevant to the Class I area. The EPA has assessed the ambient air quality demonstration submitted by Vineyard Wind and concludes that it is appropriate for its intended purpose of estimating construction period impacts from the WDA facility. Therefore, the EPA concludes that there will be no significant impacts at Class I areas resulting from construction of the WDA facility. Details of Vineyard Wind's modeling are provided in the applicant's modeling reports included in the administrative record.

Table 11. Assessment of Construction Period Ambient Air Impact for the WDA facility

Pollutant/ Averaging time	Class I PSD SIL ($\mu g/m^3$)	Total Impacts ($\mu g/m^3$)	Assessment Distance (km)	Impact Below SIL?
$PM_{2.5}$				
Annual	0.05[a]	0.018[b,c]	50 km	Yes
24-hr	0.27[a]	0.085[c]	300 km	Yes
PM_{10}				
Annual	0.2[d]	0.005[b]	50 km	Yes
24-hr	0.3[d]	0.020	300 km	Yes
NO_2				
Annual	0.1[e]	0.009	300+ km[f]	Yes

a. The EPA's April 17, 2018 Guidance.
b. OCD reports all results below 0.005 $\mu g/m^3$ as zero. All primary impact results of zero from OCD are reported here as 0.005 $\mu g/m^3$ for conservatism.
c. $PM_{2.5}$ reported as the sum of primary and secondary impacts.
d. 40 C.F.R. § 51.165(b)(2).
e. *See* 61 FR 38250, "Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)."
f. CALPUFF receptor distances ranged from approximately 299 to 334 km from the windfarm.

[31] Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts. EPA-454/R-98-019. Research Triangle Park, NC: December 1998.

e. Ambient Air Impacts for the Construction Period of OECLA

The total ambient air impacts for pollutants emitted from OECLA construction emissions discussed in this section are presented in Table 12 below. 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 distances relevant to the Class I area. The EPA has assessed the ambient air quality demonstration submitted by Vineyard Wind and concludes that it is appropriate for its intended purpose of estimating construction period impacts from OECLA. Therefore, the EPA concludes that there will be no significant impacts at Class I areas resulting from OECLA construction. Details of Vineyard Wind's modeling are provided in the applicant's modeling reports included in the administrative record.

Table 12. Assessment of Construction Period Ambient Air Impact for OECLA

Pollutant/ Averaging time	Class I PSD SIL ($\mu g/m^3$)	Total Impacts ($\mu g/m^3$)	Assessment Distance (km)	Impact Below SIL?
$PM_{2.5}$				
Annual	0.05[a]	0.019[b,c]	50 km	Yes
24-hr	0.27[a]	0.21[b,c]	50 km	Yes
PM_{10}				
Annual	0.2[d]	0.005[b]	50 km	Yes
24-hr	0.3[d]	0.18	50 km	Yes
NO_2				
Annual	0.1[e]	0.018	50 km	Yes

a. The EPA's April 17, 2018 Guidance.
b. OCD reports all results below 0.005 $\mu g/m^3$ as zero. All primary impact results of zero from OCD are reported here as 0.005 $\mu g/m^3$ for conservatism.
c. $PM_{2.5}$ reported as the sum of primary and secondary impacts.
d. 40 C.F.R. § 51.165(b)(2).
e. *See* 61 FR 38250, "Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)."

f. The EPA Conclusion About Ambient Air Impacts During Construction Period for the WDA Facility and for OECLA

Based on the reasoning presented above, the EPA concludes that the construction period emissions for the WDA facility are temporary and that ambient air impacts from these emissions will be below significance levels at Class I areas and areas where the PSD increment is known to be violated. Similarly, based on the reasoning presented above, the EPA concludes that the construction period emissions for OECLA are temporary and that ambient air impacts from these emissions will be below significance levels at Class I areas and areas where the PSD increment is known to be violated. Therefore, the ambient air impact requirements for the construction period of the WDA facility and OECLA have been satisfied.

2. Operational Phase of the WDA Facility[32]

The PSD permitting regulations for proposed major new sources generally require applicants to perform an air quality impact analysis for those pollutants with significant emissions. Though most emissions for the operational phase are below these thresholds, all emissions during both the construction and operational phases must be appropriately assessed to ensure that emissions from the WDA facility do not cause or contribute to a violation of the NAAQS or PSD Increment. Assessment of the operational emissions was provided by the applicant mainly in a November 2018 report "Air Quality Analysis: Operation & Maintenance Emissions," and modified by an April 22, 2019 memorandum "Vineyard Wind Project, Supplemental Information Requested by EPA Region 1, Construction and O&M Stage Modeling."

The following sections provide the EPA's assessment of information provided by Vineyard Wind in determining whether ambient air impacts from the WDA facility are protective of air quality standards. Table 13 provides the applicable NAAQS, PSD Increment, and SILs. Specifically, the sections below describe a) an overview of the air modeling conducted by Vineyard Wind, b) comparison of operational phase impacts against the SILs, c) comparison of operational phase impacts against the NAAQS, d) comparison of operational phase impacts against the PSD Increment, e) assessment of operational phase impairment to visibility, soils, and vegetation, and f) EPA's conclusion about the ambient air impacts during the operational phase of the WDA facility.

To assess direct impacts within a 50-km distance, Vineyard Wind selected the OCD model, consistent with the *Guideline*. Vineyard Wind relied on the same meteorological dataset as used with the OCD modeling analysis for construction period impacts, described in Section VI.C.1 above. Emissions included in the analysis are appropriately representative of the Envelope approach, described earlier in this Fact Sheet, in that they represent the highest emitting activities anticipated for the operational period of the WDA facility. Impacts from multiple emission scenarios (representing different activities) are assessed separately or combined as appropriate depending on the averaging time period for the relevant air quality standard.

The WDA facility must also account for secondary formation of $PM_{2.5}$ resulting from precursor emissions of SO_2 and NO_x. To do so, Vineyard Wind 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, Vineyard Wind relied on the most conservative MERPs value for the US east coast (i.e., likely to overestimate impacts). Vineyard Wind combined secondary $PM_{2.5}$ impacts from operational WDA facility impacts with modeled primary $PM_{2.5}$ impacts to calculate total $PM_{2.5}$ impacts for all comparison with the SIL, NAAQS, and Class II PSD Increment.

[32] Neither EPA nor VW anticipates operational phase emissions from the OECLA, and thus no ambient impact analysis was conducted on operational scenarios for the OECLA.

Table 13. NAAQS, PSD Increment, and SILs, in µg/m³

Pollutant/ Averaging time	NAAQS[a]		PSD Class II Increment[b]	Class II SIL
	Primary	Secondary		
$PM_{2.5}$				
Annual	12	15	4	0.2[c]
24-hr	35	35	9	1.2[c]
PM_{10}				
Annual	NA	NA	17	1[e]
24-hr	150	150	30	5[e]
NO_2				
Annual	100	100	25	1[d]
1-hr	188	NA	NA	7.5[f]
CO				
8-hr	40,000	40,000	NA	500[e]
1-hr	10,000	10,000	NA	2,000[e]

Note: NA = Not applicable. Concentrations are presented in µg/m³, though for some pollutants (NO_2, CO) pollutants are typically reported for non-modeling applications in other units (e.g., parts per billion).
a. *See* 40 C.F.R. Part 50.
b. *See* 40 C.F.R. § 52.21(c).
c. EPA's April 17, 2018 Guidance and associated legal memorandum and technical support documents, included as part of the permit record.
d. *See* 61 FR 38250, "Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)."
e. *See* 40 C.F.R. § 51.165(b)(2).
f. 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/m³) was used.

Modeling methodologies, inputs, and techniques were consistent with the *Guideline* and the EPA guidance. Receptors were included in a dense grid nearer to the WDA and more sparsely farther from the WDA area out to 50 km. No receptors were excluded from analysis. Vineyard Wind justified treatment of certain emissions as intermittent with regard 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, Vineyard Wind applied a ratio of the number of operating hours per year by 8,760 hours to the 1-hour NO_2 emissions because anticipated emissions. The EPA agrees that Vineyard Wind has appropriately represented the intermittent sources and accounted for their expected operation with respect to the 1-hour NO_2 standard. The EPA has evaluated the methods and techniques included in the air quality impact analyses for the operational period provided by Vineyard Wind and determined that they are appropriate for assessing compliance with the NAAQS, SILs, and PSD Increment.

Vineyard Wind has significant impacts no greater than 1.0 km from the edge of the WDA Facility in areas well covered by model receptors.

a. Assessment of Significant Impacts

Vineyard Wind appropriately justified the use of SILs in its ambient air quality impact assessment by comparing difference between the NAAQS and background air quality levels

against the SILs. Therefore, the EPA concludes that demonstration of insignificant impacts using the SILs for the WDA facility will ensure no violation of the NAAQS and to identify pollutants for which further refined air quality assessments are required. Furthermore, the EPA notes that 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 WDA facility.

Vineyard Wind's screening model results for CO, NO_2, PM_{10}, and $PM_{2.5}$ are presented in Table 14. This screening modeling indicates that impacts for annual NO_2, 1-hour and 8-hour CO, and annual $PM_{2.5}$ and PM_{10} were below the significance threshold and no further analysis is warranted. Further 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 analyses. Because the modeling assessment was representative of the broad area of the WDA facility, the EPA considers the significant impact area radius to extend from the entire perimeter around the WDA facility rather than only at the individual receptors used in this modeling assessment.

Table 14. Comparison of WDA Facility Operational Period Impacts Against SILs

Pollutant	Averaging Time	Class II SIL ($\mu g/m^3$)	Impact ($\mu g/m^3$)	Significant Impacts?	Significant Impact Area Radius (km)
NO_2	1-hour[a]	7.5[d]	23.84	**Yes**	1.0
	Annual[b]	1[e]	0.23	No	NA
PM_{10}	24-hour[c]	5[f]	22.13	**Yes**	0.50
	Annual[b]	1[f]	0.01	No	NA
$PM_{2.5}$	24-hour[c]	1.2[g]	21.44	**Yes**	3.5[h]
	Annual[b]	0.2[g]	0.01	No	NA
CO	1-hour[c]	2,000[f]	411.4	No	NA
	8-hour[c]	500[f]	279.27	No	NA

Note: NA = Not applicable. Concentrations are presented in $\mu g/m^3$, though for some pollutants (NO_2, CO) pollutants are typically reported for non-modeling applications in other units (e.g., parts per billion).
a. Highest expected short-term impact from cable and ESP inspection and repair activities.
b. Included expected emissions from activities related to scour protection repair, ESP operation and maintenance, WTG maintenance and replacement, cable and ESP inspection and repair, and typical daily operation and maintenance.
c. Highest expected short-term impact from typical daily operation and maintenance.
d. EPA, June 28, 2010, "General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level." The interim SIL value of 4 ppb (or 7.5 $\mu g/m^3$) was used.
e. *See* 61 FR 38250, "Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)."
f. *See* 40 C.F.R. § 51.165(b)(2).
g. EPA's April 17, 2018 Guidance and associated legal memorandum and technical support documents, included as part of the permit record.
h. Modeling for $PM_{2.5}$ 24-hour PSD Increment indicates that the significant impacts outside the WDA only extend 0.75 km. Those receptors shown to be above significance levels beyond 0.75 km from the WTG are entirely within the WDA.

b. Compliance with the NAAQS

Vineyard Wind completed a refined modeling analysis for 1-hour NO_2, 24-hour PM_{10}, and 24-hour $PM_{2.5}$.

When using results from refined modeling for NAAQS compliance, background concentrations including impacts from nearby sources must be combined with impacts to identify total ambient concentrations for comparison with the NAAQS. There are no ambient air monitoring stations from which to derive background levels for the area. Therefore, Vineyard Wind selected nearby onshore monitoring data as appropriately representative of air quality in the area. The EPA finds that this assumption is protective of air quality because it likely overestimates concentrations near the WDA facility. The nearest major source (Nantucket Electric) to the significant impact area is over 20 km from the significant impact area for any pollutant, so the EPA concludes that monitored background values account for all nearby sources.

All refined 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. Assessment of impacts for NO_2 impacts were post-processed with the ARM2 equation tier 2 screening method in a manner consistent with the *Guideline*. Vineyard Wind applied this as a post-processing step because OCD does not have capabilities to implement this approach directly or include more refined techniques for NO_2 impact screening. The EPA concludes that Vineyard Wind's modeling was appropriate to assess impacts for these pollutants. A summary of the refined modeling, which demonstrates compliance with the NAAQS for all pollutants, is presented in Table 15 below.

Table 15. NAAQS Assessment Results

Pollutant/ Averaging Time[a]	Impact ($\mu g/m^3$)	Background Level ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)[a]	Exceeds NAAQS?
1-hour NO_2	25.0	83.4	108.4	188	No
24-hour PM_{10}	11.3	33.0	44.3	150	No
24-hour $PM_{2.5}$	5.5	14.2	19.7	35	No

Note: Concentrations are presented in $\mu g/m^3$, though for some pollutants (NO_2) pollutants are typically reported for non-modeling applications in other units (e.g., parts per billion).
a. *See* 40 C.F.R. Part 50.

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

c. Compliance with Class II PSD Increment

Vineyard Wind supplied a PSD Increment analysis for both pollutants and averaging periods for which impacts were determined to be significant, i.e., for 24-hour $PM_{2.5}$ and 24-hour PM_{10}, and for which PSD Increment levels have been established. Table 16 presents the maximum PSD Increment consumed for $PM_{2.5}$ and PM_{10} within the significant impact area for each pollutant, as described in Section VI.C.2.a and presented in Table 14. The maximum PSD Increment

consumption occurs within 130 m of the WTG, and no more than half is consumed beyond 0.5 km from the WTG outside the WDA. There is no PSD Increment for 1-hour NO_2. This major source application for Vineyard Wind was deemed complete on January 29, 2019, which serves as the minor source baseline date for these pollutants.[33] No other sources have consumed PSD Increment in or around the area. Therefore, no additional sources are included in the modeling analysis for PSD Increment. The EPA has reviewed the modeling assessment for PSD Increment and concludes that the analysis was performed appropriately.

Table 16. Class II PSD Increment Assessment Results for the WDA Facility

Pollutant/ Averaging Time[a]	Impact ($\mu g/m^3$)	Class II PSD Increment ($\mu g/m^3$)[a]	Percent of Increment Consumed
24-hour PM_{10}	18.45	30	61.5%
24-hour $PM_{2.5}$	8.97[b]	9	99.7%

a. *See* 40 C.F.R. § 52.21(c).
b. This value includes both primary and secondary $PM_{2.5}$ impacts.

d. Impairment to Visibility, Soils, and Vegetation

Vineyard Wind 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 WDA facility and general commercial, residential, industrial and other growth associated with the operational period of the WDA facility. The EPA has evaluated the analyses provided by Vineyard Wind to address these requirements.

Regarding visibility, Vineyard Wind submitted analyses using the VISCREEN model and "emissions divided by distance" screening technique for the operational period of the WDA facility. The results of both analyses provided results well below screening thresholds. The EPA notes that the approaches used by Vineyard are likely to overestimate impacts on visibility at Class I areas because they assume coherence of the emission plume despite (1) the 300-km distance from the WDA to the nearest such area and (2) the wide area over which emissions will occur in the WDA. On March 29, 2019 the Forest Service determination that analyses of air quality related value (AQRV) would not be required, and their determination considered the level of emissions associated with the operational period. See Section VI.D (Consultation with Federal Land Managers) below.

Vineyard Wind provided conservative assessments of impacts on vegetation based on maximum operational period air quality impacts in any location, even if the impacts occurred over water (i.e., where there is no terrestrial vegetation). The WDA facility is located 23 km from the nearest land area. The EPA finds that the Vineyard Wind analysis is appropriate to identify impacts to vegetation and that impacts are well below the screening thresholds and/or secondary

[33] 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_{10} is August 7, 1977 and for $PM_{2.5}$ is October 20, 2011.

NAAQS, as shown in Table 17 below. Therefore, the EPA concludes that the operational period emissions from the WDA facility will not impair nearby vegetation.

Table 17. Vegetation Impacts from Operational Phase Emissions of the WDA Facility

Pollutant	Averaging Period	Impact (μg/m^3)	NAAQS Secondary Standard (μg/m^3)	Screening Threshold (μg/m3)
NO_2	4-hour[a]	23.84	NA	3760
	1-month[a]	23.84	NA	564
	Annual	12.74	100	94
CO	1-week[b]	279.27	NA	1,800,000
PM_{10}	24-hour	22.13	150	NA
$PM_{2.5}$	24-hour	21.44	35	NA
	Annual	0.49	15	NA

Note: NA = Not Applicable
a. Based on modeled 1-hour averaging period predicted concentration.
b. Based on modeled 8-hour averaging period predicted concentration.

Vineyard Wind's assessment of impacts to soil notes the low emission levels of trace elements from the windfarm (0.03 tpy) and the large distances between the windfarm and nearby land areas. The EPA's considers the assessment to be sufficient to address potential impacts from operational emissions, and the EPA concludes that the operational emissions will not cause impairment to soils.

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.

e. The EPA Conclusion About Ambient Air Impacts During Operational Period of the WDA Facility

The EPA has assessed the analyses submitted by Vineyard Wind 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 WDA facility have been satisfied.

D. 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 submitted a Request for Determination to the Forest Service on February 4, 2019 regarding the windfarm. The Forest Service operates Lye Brook Wilderness area, which is the Class I area closest to the WDA. Subsequently on March 27, 2019, Vineyard Wind submitted a supplemental visibility assessment for consideration in the Forest Service determination. On March 29, 2019, the Forest Service determined that it would not request AQRV analyses for the windfarm. The Forest Service based its determination on several factors, specifically: the distance of the WDA from the Class I area, the emission profiles (i.e., the temporary nature of the construction period emissions), the 1-km spacing of the WTGs, the conservative treatment of emissions in the analysis, and the long-term emission reduction that will occur once the WDA facility is complete. (*See* email from Ralph Perron included in the administrative record.)

VII. COA Requirements Applicable to the WDA Facility and OECLA

As stated in Section II.B. of this document, the COA for the WDA facility and OECLA is the Commonwealth of Massachusetts. An explanation of how these two sources will meet the applicable Massachusetts rules that have been incorporated into 40 C.F.R. part 55 is provided below.

A. Applicability of Nonattainment New Source Review

Dukes County, Massachusetts is currently designated as a marginal nonattainment area for the 2008 ozone NAAQS. *See* 40 C.F.R. § 81.322. However, this is not the only factor to consider when analyzing the applicability of Nonattainment New Source Review in Massachusetts.

In the CAA amendments of 1990, Congress created the Ozone Transport Region (OTR), located in the northeast portion of the country, to address ozone formation due to transport. Congress included all of Massachusetts as one of the states or commonwealths within the OTR. As such, even though parts of the WDA facility are closer to Nantucket County, a county designated unclassifiable/attainment for the 2008 and 2015 ozone standards, since Massachusetts is part of the OTR, unclassifiable/attainment areas are treated as moderate nonattainment areas for ozone. *See* CAA § 184(b)(2). The same rationale is applied to the area containing the OECLA where some of the area is closer to Barnstable County (a county designated unclassifiable/attainment for the 2008 and 2015 ozone standards) than it is to Dukes County.

Massachusetts regulations for NNSR are mostly found in 310 C.M.R. 7.00, Appendix A. Prior to construction, any source with potential emissions equal to or greater than 50 tpy of NO_x or VOC is subject to Appendix A and is required to obtain a comprehensive plan approval under 310 C.M.R. 7.02.

Although there are several other permit conditions, such as requirements for monitoring, record keeping, and reporting, there are two main elements to an NNSR permit. Sources like the WDA facility and OECLA are required to offset their NNSR pollutant emissions prior to actually emitting the NNSR pollutant(s) and must comply with LAER for all stationary emission units.

1. WDA Facility

As shown in Table 1 and Table 3, the WDA facility's potential emissions of NO_x and VOC are above 50 tpy, the threshold for NNSR, during the construction phase. While only NO_x emissions continue to be above 50 tpy during the operational phase, both NO_x and VOC emissions continue to be subject to NNSR permitting since the potential emissions of the WDA facility exceeded the NNSR thresholds for at least one year.

2. OECLA

OECLA's emissions in any one year only exceed the NNSR threshold for NO_x emissions during the construction phase. Neither the EPA nor VW anticipates air emissions from the OECLA once the cable is buried and functional. See Section II.D for further discussion about OECLA emissions activities.

B. Offsets

1. Offsets Required for the WDA Facility and OECLA

The WDA facility involves two distinct phases, each phase requiring a different offset type (i.e., emission reduction credit or "ERC"). Only the construction phase for the OECLA will require offsets. Emissions during the construction phase for the WDA facility and OECLA will end when construction and commissioning (for the WDA facility) is completed and thus these emissions are considered "one-time" emissions, meaning they will not continue out into the future. The type of emission credits used for offsetting one-time emissions are usually referred to as a discrete emission reduction credit.[34] Under 310 CMR 7.00, Appendix B, these credits are referred to as mass-based ERCs. The unit used to define a DERC or mass-based ERC is simply *tons*, to recognize that the emission credit can only be used one-time to offset emissions occuring in just one year.

The second phase of the WDA facility will involve emissions that are anticipated to occur every year the WDA facility operates. To offset these types of emissions, a different type of emission credit is required, one that ensures that the annual emissions will be offset for each and every future operating year in which the emissions will occur. This type of emission credit, sometimes referred to as a NNSR offset, a continuous ERC (CERC), or simply an ERC, is referred to as a rate-based ERC in 310 CMR 7.00, Appendix B. The unit used to define a rate-based ERC is tons per year, to recognize that the emission credit can offset yearly emissions that will occur each and every operating year of the source.

Offsets for both the construction and operational phases are subject to the adjustment factor of 1.2:1 required in 310 CMR 7.00, Appendix A, Section 6. e.1. Additionally, 310 CMR 7.00, Appendix B, Section 3.e.2 requires that persons seeking to use ERCs from the Massachusetts

[34] *See* EPA Guidance "Improving Air Quality with Economic Incentive Programs" dated January 2001, at https://www.epa.gov/sites/production/files/2015-07/documents/eipfin.pdf, last visited on June 18, 2019 and included as part of the permit record.

ERC bank must obtain an amount of credit equal to five percent more than the amount needed for the offset calculation.

Based on the potential emissions of the WDA facility and the OECLA, the maximum offsets anticipated for the construction phase are contained in the Tables 18 and 19. The actual number of offsets VW will need for the operational phase is in Table 20.

Table 18. Construction Phase Potential Emissions Offsets for the WDA Facility

Emissions (tons)	Potential Offsets Required (mass-based ERCs)
3,713 of NO_x	4,679 tons of NO_x
88 of VOC	111 tons of VOC

Table 19. Construction Phase Potential Emissions Offsets for the OECLA

Emissions (tons)	Potential Offsets Required (mass-based ERCs)
96 of NO_x	121 tons of NO_x

Table 20. Operational Phase Emissions Offsets for the WDA Facility

Emissions (tons per year)	Offsets Required (rate-based ERCs)
76 of NO_x	96 tons per year of NO_x
1.6 of VOC	2 tons per year of VOC

VW can obtain offsets, both mass-based and rate-based, in the following manners:

- 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 FR 41355, and 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 VW using the ERC; 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 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.

When calculating the number of offsets required for NNSR, the EPA will make no distinction based on the offset's origin. This results in applying the requirement in 310 CMR 7.00, Appendix B, Section 3.e.2 to all offsets obtained using any of the three above mechanisms. As shown in Tables 18-20, VW is required to obtain offsets at a 1:26 to 1 ratio for both VOC and NO_x emissions from both the WDA facility and OECLA.

2. Obtaining Offsets from Sources Outside of Dukes County

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 and VOC emissions in Dukes County were 1,034 and 1,428 tons, respectively. Due to the lack of availability of potential VOC and NO_x offsets (i.e., ERCs) within the Dukes County 2008 ozone nonattainment area, the EPA anticipates that VW 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 located 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.

Areas within the OTR are required to meet the requirements of a moderate nonattainment area, regardless of whether the area is classified as marginal nonattainment or unclassifiable/attainment. Even though all areas within Massachusetts, outside of Dukes County, were designated unclassifiable/attainment for the 2008 ozone standard,[35] NNSR offsets from sources within Massachusetts meet the first criterion since all of the Commonwealth is required to meet the nonattainment requirements of a moderate nonattainment area.[36]

The second criterion requires a demonstration that emissions from the other area contributes to a violation of the ozone standard within Dukes County.[37] Based on recent air dispersion modeling that EPA conducted to assist states with their ozone transport analysis for the 2015 ozone

[35] All of Massachusetts is designated attainment/unclassifiable for the 2015 ozone standard, a standard that is more stringent than the 2008 ozone standard. *See* 40 C.F.R. § 81.322.
[36] 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 located in a serious nonattainment area.
[37] The EPA determined that Dukes County attained the 2008 ozone standard by the July 20, 2015 attainment date (See 81 FR 26697, May 4, 2016).

NAAQS, sources within Massachusetts are projected to contribute 10.54 ppb ozone in Dukes County in 2023.[38]

Therefore, with both criteria met, the EPA is determining that VW can obtain offsets from anywhere within Massachusetts. If VW were to obtain offsets from another state, an analysis similar to the one contained within this document for areas within Massachusetts would need to be performed and submitted to the EPA and concurred upon prior to relying on those offsets for compliance with offset obligations.

3. Methodology Used to Determine Daily NOx and VOC Emissions

Almost all NO_x and VOC emissions from the WDA facility and OECLA for purposes of determining the required NNSR are generated from third-party vessels. At the time of the draft permit, VW and the EPA are not aware of the exact engines that are installed and will be operating on these third-party vessels. Without specific engine information, the methodology for determining daily NO_x and VOC emissions is challenging.

The EPA is soliciting comment on the proposed methodology in the draft permit for calculating daily NO_x and VOC emissions; any alternative methodology proposed by a commenter must still be enforceable as a practical matter. The EPA acknowledges that the methodology in the draft permit for calculating daily NO_x and VOC emissions is conservative and potentially overestimates daily emissions of each pollutant.

The draft permit's proposed methodology for determining daily NO_x and VOC emissions involves the following records and measurements:

1. Requiring VW to document the Tier standard the engine's manufacturer certified each engine to meet. Knowing the Tier standard the engine is certified to meet allows the Permittee and the EPA to determine the emission factor of a given pollutant in g/kW-hr that the engine will emit while operating;

2. Nameplate information for each engine. This data at a minimum should include the engine's manufacturing date, rated maximum power, the number of cylinders, and the overall engine displacement;

3. Record whether the engines are on a foreign or domestically flagged vessel;

4. Hours of operation when operating within 25 miles of the WDA facility or OECLA; and

5. When using the alternative method for an engine's load factor that relies on actual fuel used while operating within 25 miles of the WDA facility or OECLA, VW must obtain and keep a record of the manufacturer's performance specification data for each engine

[38] *See* https://www.epa.gov/airmarkets/memo-and-supplemental-information-regarding-interstate-transport-sips-2015-ozone-naaqs, lasted visited on May 14, 2019. The 2015 NAAQS Interstate Transport Assessment Design Values and Contributions spreadsheet can be found in the docket.

that is used to calculate engine load based on fuel usage.

Even with the above information, further assumptions must be made when determining daily NO_x and VOC emissions. These assumptions are:

1. Emission factors for some Tier certified engines combine NO_x and VOC into one emission limit. When this is presented, the EPA has calculated a NO_x/VOC ratio based on the total potential NO_x and VOC emissions for the entire WDA facility to determine g/kW-hr for NO_x and VOC, respectively.

2. IMO certification for engines on foreign flagged vessels do not contain an emission limit for VOCs. For these engines, the EPA has provided specific VOC emission factors depending on vessel type.

3. Some engines on vessels may not be certified to either an IMO or EPA standard. In this case, the EPA is relying on emission data from EPA's Draft Regulatory Impact Analysis: Control of Emissions from Compression-Ignition Marine Engines, dated November 1998, for determining NO_x and VOC emission factors.[39]

4. If fuel usage data and manufacturer's performance specification data is unavailable, VW will use a default value of 0.69 as the engine's load factor. This number is based on the weighted average engine load when a manufacturer certified an engine meets EPA's Tier emission limits. *See* 40 C.F.R. §94.105(b), Table B and 40 C.F.R. part 1042, Appendix II, section (a)(1).

C. Lowest Achievable Emission Rate

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 in excess of the amount allowable pursuant to applicable new source standards of performance.

See 310 CMR 7.00 Appendix A, § 2; *see also* CAA § 171(3). The LAER requirement does not consider economic, energy, or other environmental factors. *See In re Three Mountain Power, LLC*, 10 E.A.D. 39, 48 n.9 (2001) (quoting *New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Area Permitting* (draft Oct. 1990) (hereafter "Draft NSR Manual"), at G.4.

[39] See https://nepis.epa.gov/Exe/ZyPDF.cgi/P1004N1J.PDF?Dockey=P1004N1J.PDF, last visited on June 10, 2019 and included in the docket.

Although the definitions for LAER and BACT are different, they share many common traits. For example, 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.[40] Step 2 of the BACT analysis requires the permitting authority, in this case the EPA, to document why, if true, a particular control technology is infeasible and thus not achievable, for that source category.

Paragraph (b) of the definition for LAER is addressed in Step 3 of a BACT analysis, where the different control technologies are ranked by control effectiveness; thereby the technology required for LAER will be ranked at the top. Where LAER and BACT determinations diverge is in Step 4 of a BACT analysis, where based on an evaluation of energy, environmental and economic impacts, the EPA can remove a technology from consideration. 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 will not take into account the energy, environmental, or economic impacts associated with that technology.

1. LAER Analysis for Internal Combustion Engines on Vessels Within the Definition of an OCS Source.

As demonstrated in Section VI.B.1, the EPA determined that all technologies or work practices, except for use of the highest tiered engine at the "time of deployment," are technologically infeasible for vessels meeting the definition of an OCS source. Based on this determination, the EPA finds that emission limits that could be achieved by technologies other than use of the highest tiered engine at the "time of deployment" to be unachievable. Thus, LAER is determined to be the use of the highest tier internal combustion engine at the time of deployment.

2. LAER Analysis for Engines Installed on the Wind Turbine Generator Platforms and Electrical Service Platform.

Based on the same analysis and facts contained in Section VI.B.2. of this document for BACT, the EPA has determined LAER to be the Tier 4 standard in 40 C.F.R. part 1042 for the approximately 800 kW diesel-fired electric generator and the Tier 3 standard in 40 C.F.R. part 1042 for the approximately two 400 kW diesel-fired electric generators on the ESP and the 40 kW or less diesel-fired electric generators on the WTGs.

D. Alternative Site Analysis

The EPA has reviewed the information contained in Section 8.5 of VW's application and concurs with VW's analysis. VW analyzed four distinct alternatives: 1) a "no build" alternative; 2) alternative sites; 3) a smaller sized buildout; and 4) alternative production processes and environmental control techniques. EPA finds that VW sufficiently satisfied the requirements of 310 CMR 7.00, Appendix A, Section (8)(b) by demonstrating that the environmental and social

[40] As stated earlier the CA SIP requires defined vessel categories to meet 40 C.F.R. part 94 Tier 2 standards.

benefits of the windfarm, as proposed, substantial and significantly outweigh logical alternatives such as not constructing at all, altering the proposed WDA, reducing the windfarm size, or selecting different production processes and environmental controls.

E. Compliance at other Facilities

VW meets this requirement; VW's application states that VW does not own or operate any other major stationary sources in Massachusetts.

F. Other Applicable Requirements from the COA

As previously stated, the COA for the WDA facility and OECLA is the Commonwealth of Massachusetts. On December 11, 2017, VW submitted to the EPA a Notice of Intent (NOI) for the both of these OCS sources. Under 40 C.F.R. § 55.12(c), the NOI triggered a consistency review of EPA's previous incorporation of Massachusetts rules. The EPA completed its consistency review on November 13, 2018 and updated the incorporation of Massachusetts regulations into 40 C.F.R. part 55, appendix A. *See* 83 FR 56259 (November 13, 2018).

Thus, the WDA facility and OECLA are 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 WDA facility and OECLA, including the vessels that meet the definition of an OCS vessel and which regulations result in terms and condition(s) specified in permit number OCS-R1-03.

1. 310 CMR 7.02: Plan Approval and Emission Limitations

The WDA facility and OECLA 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 best available control technology (BACT) analysis, using a top-down approach, is the preferred approach or one of a number of other enumerated approaches that may be proposed by an applicant. *See* 310 CMR 7.02(8)(a)(2).

a. WDA Facility

As stated in Section VI.B. of this document, the EPA has determined BACT for all of the WDA facility's air pollutants except for SO_2. That is because BACT for SO_2 is not triggered under 40 C.F.R. § 52.21, but is triggered by Massachusetts' regulations. Accordingly, the following is a top-down BACT analysis for the WDA facility's SO_2 emissions.

SO_2

Step 1: Identify all control technologies.

To control SO_2 emissions, VW identified several different types of fuel that could theoretically be used in some or all of the internal combustion engines located on OCS sources. These fuel types are

1. Ultra-low sulfur diesel (ULSD)
2. Marine Distillate Fuel
3. Marine Residual Fuel
4. Natural Gas
5. Liquefied Petroleum Gas (LPG)/Propane
6. Biodiesel
7. Methanol
8. Diesel Fuel with Hydrogen

Neither the applicant nor the EPA has identified add-on control technology for reducing SO_2 emissions from the internal combustion engines that will be operated on the OCS sources.

Step 2: Eliminate technically infeasible options.

VW demonstrated in section 6.3.3.1.3 of its application that several fuel types are technically infeasible for the internal combustion engines operating on the OCS sources. These fuels are:

1. Natural Gas
2. Liquefied Petroleum Gas (LPG)/Propane
3. Biodiesel
4. Methanol
5. Diesel fuel with Hydrogen

The EPA has reviewed VW's rationale and concurs with VW that the five fuels listed above are technically infeasible for the internal combustion engines operating on the OCS sources.

Step 3: Rank remaining control technologies by control effectiveness.

1. ULSD: This fuel has a sulfur content by weight of 15 ppm or less.
2. Marine Distillate Fuel or Marine Residual Fuel: This fuel has a sulfur content by weight of 1,000 ppm or less. *See* 40 C.F.R. § 80.510(k)

Step 4: Evaluate most effective controls and document results taking into account economic, energy, and environmental impacts of the control technology.

ULSD may not always be available or allowed to be used in certain marine vessels due to the lower flash point, which raises a safety concern, when compared to marine fuels.[41] Therefore, the use of ULSD on vessels that become OCS sources is eliminated.

The use of ULSD for the engines on the WTG and ESP is still viable because these installations are not governed by the International Convention on the Safety of Life at Sea.

Step 5: Select the BACT

BACT for vessels that become OCS sources are required to burn Marine Distillate Fuel oil unless the vessel is designed to burn only Marine Residual Fuel. Both types of fuels have the same limit on the amount of sulfur; however, the EPA understands that marine distillate fuel tends to have a lower sulfur content than residual fuel oil in Massachusetts harbors.

b. OECLA

As stated earlier, emissions from OECLA are below PSD thresholds. Therefore, the EPA did not perform a BACT analysis for emissions from OECLA in Section VI.B of this document. Instead, EPA conducted a BACT analysis for OECLA pursuant to the authorities in 310 CMR 7.02 for sources required to obtain a Comprehensive Plan Approval.

The vessels involved in constructing OECLA are a subset of similar type vessels involved in constructing the WDA facility. Therefore, the EPA is relying on the same facts and analysis contained in Section VI.B.1. for major source PSD BACT and Section VII.F.1.a for 310 CMR 7.02 BACT for SO_2 emissions to determine BACT for the vessels included in the definition of an OCS source for OECLA. As shown in draft permit condition VI.D.4. and 5, the EPA has included the Anchored Cable Laying Vessel and all other vessels associated with the OECLA that are included in the definition of an OCS source, in the same requirements for similar vessels associated with the WDA facility. Therefore, although the vessels associated with the OECLA are not governed by PSD BACT, the EPA has determined that BACT under 310 CMR 7.02 for OECLA is the same as for the WDA facility.

2. 310 CMR 7.05 U Fuels All Districts

310 CMR 7.05(1)(a)(1) limits the amount of sulfur content by weight in fuel. Since BACT for SO_2 was based on the lowest available sulfur content fuel and has been incorporated into the draft permit, this provision of the Commonwealth's regulations is considered subsumed by the regulation that requires SO_2 BACT.

3. 310 C.M.R. 7.06 U Visible Emissions

[41]According to the International Convention on the Safety of Life at Sea the use of fuels with a flashpoint lower than 60°C is not allowed.

This section of the Commonwealth's regulations limits the opacity and smoke density from the engines. These requirements have been incorporated into the draft permit.

4. 310 CMR 7.11 U Transportation Media

This section of the Commonwealth's regulations prohibit tube blowing or other soot removal activities from vessels within the WDA and within 25 miles of OECLA.

5. 310 CMR 7.12 U Source Registration

This section of the Commonwealth's regulations requires owners/operators of facilities to submit an annual source registration to Massachusetts. The annual source registration includes detailed emission estimates for air pollutants.

6. 310 CMR 7.18: U Volatile and Halogenated Organic Compounds

Subsection 30 of this regulation (Adhesives and Sealants) limits the amount of VOCs in adhesive, sealant, adhesive primer, or sealant primer that will be used for the WDA facility.

VIII. Other Federal Requirements

A. Federal New Source Performance Standards

1. Internal Combustion Engines Located on a WTG or ESP

Forty C.F.R. § 55.13(c) states:

> "40 C.F.R. Part 60 (NSPS) shall apply to OCS sources in the same manner as in the COA, except that any source determined to be an existing source pursuant to § 55.3(e) of this part shall not be considered a "new source" for the purpose of NSPS adopted before December 5, 1991."

All internal combustion engines (i.e., generating set) located on a WTG or ESP are required to meet 40 C.F.R. part 60, subpart IIII. For the purposes of determining which emission limit is applicable to these internal combustion engines, the date that construction commences is the date the engine is ordered by the original owner or operator. Based on the information provided by VW, up to three, approximately 40 kW or less diesel-fired electrical generator may operate at the same time on each WTG during commissioning. At least two, and possibly all three generators will be removed once the commissioning period is over and the WTG is normally operating.

According to VW's application, larger diesel-fired electrical generators will be located on the ESP. The ESP will have one approximately 800 kW diesel-fired electric generator and two approximately 400 kW diesel-fired electrical generator that will be used during both the commissioning phase and during normal operations.

Forty C.F.R. §60.4201(f)(2) allows the owner or operator to use engines certified to the marine standards in 40 C.F.R. parts 94 and 1042. As shown in Section VI for BACT and VII for LAER, the EPA is requiring all engines at the WTGs and ESP to meet the standards for marine engines in 40 C.F.R. 1042.

2. Internal Combustion Engines on Vessels while the Vessels are Operating as an OCS Source

As stated above, 40 C.F.R. §60.4201(f)(2) allows the owner or operator to use engines certified to the marine standards in 40 C.F.R. parts 94 and 1042. As shown in Section VI for BACT and VII for LAER, the EPA is requiring all engines on most vessels when those vessels are operating within the definition of an OCS source to meet the standards for marine engines in either 40 C.F.R. part 94 or part 1042. Foreign flagged vessels are exempt from having to meet the marine standards within 40 C.F.R. parts 94 and 1042 and instead are required to meet the emission standards in 40 C.F.R. § 1043. However, as demonstrated in Section VII of this document, certain foreign flagged vessels are required to meet the emission standards for Tier 2 engines in 40 C.F.R. § 94.8 due to LAER requirements.

B. National Emission Standards for Hazardous Air Pollutants

As discussed above, all internal combustion engines located on a vessel, while the vessel meets the definition of an OCS, or located on WTGs and an ESP that meet the definition of an OCS source, are considered stationary sources. Forty C.F.R. § 55.13(e) states:

> "40 C.F.R. part 61, together with any other provisions promulgated pursuant to section 112 of the Act, shall apply if rationally related to the attainment and maintenance of Federal or State ambient air quality standards or the requirements of part C of title I of the Act."

In promulgating 40 C.F.R. part 63, subpart ZZZZ, the EPA established that hazardous air pollutant emissions from engines (i.e., internal combustion engines) are rationally related to the attainment and maintenance of Federal or State ambient air quality standards. *See* 78 FR 6674 (January 30, 2013)

The EPA is determining that all internal combustion engines operating on OCS sources are subject to 40 C.F.R. part 63, subpart ZZZZ. The draft permit associated with this document contains the requirements from 40 C.F.R. part 63, subpart ZZZZ applicable to the WDA facility and OECLA.

IX. Monitoring, Recordkeeping, and Testing Requirements

The flexibility VW requested for the WDA facility requires robust monitoring and recordkeeping of activities on a daily basis. The monitoring, recordkeeping, and testing requirements can be grouped into several categories. These categories are:

- Tracking, on a daily basis, of the actual NO_x and VOC emissions from all OCS sources and vessels going to and from an OCS source while within 25 miles. This tracking is necessary to ensure VW will have offsets equal to or greater than the amount required by 310 CMR 7.00, Appendix A prior to when the actual emissions occur from the WDA facility or OECLA.

- Documenting key design parameters and manufacturers' certifications for every internal combustion engine and any other air emitting unit on an OCS source. This information is necessary to demonstrate compliance with the BACT and LAER emission limits.

- Work practice standards for 40 C.F.R. part 63, subpart ZZZZ.

- 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 contractor/VW.

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

- Demonstrating compliance with the opacity standards for internal combustion engines for jack-up vessels when those jack-up vessels are operating as OCS sources.

X. Reporting Requirements

There are three types of reports required by the associated draft permit. These are:

- Self-reporting (i.e., prompt reporting) of deviations from permit terms and conditions. The EPA is requiring the prompt reporting of permit deviations: 1) as a condition of the preconstruction permitting requirements of the draft permit; and 2) to ensure that the requirements of 310 CMR 7.00, Appendix C (operating permits) are met. In the future, if it is determined that the WDA facility is no longer required to have an operating permit under 310 CMR 7.00, Appendix C, the requirement to promptly report permit deviations will remain because this requirement is not limited to 310 CMR 7.00, Appendix C.

- Quarterly reports will be submitted to the EPA. The draft permit associated with this document contains the exact information that must be submitted.

- By January 31st of each year, VW must submit an annual certification that provides for the status of compliance with the terms and conditions of the permit for the previous calendar year. The EPA is requiring the annual certification: 1) as a condition of the preconstruction permitting requirements of the draft permit; and 2) to ensure that the requirements of 310 CMR 7.00, Appendix C (operating permit) are met. In the future, if it is determined that the WDA facility is no longer required to have an operating permit under 310 CMR 7.00, Appendix C, the requirement to submit an annual certification will remain since the origin of this requirement is not limited to 310 CMR 7.00, Appendix C.

XI. 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. The BOEM is the lead federal agency for authorizing renewable energy activities on the OCS and the Vineyard Wind windfarm is also a federal action for the BOEM.[42] The BOEM's regulations at 30 C.F.R. part 585 require Vineyard Wind to obtain a Construction and Operation Plan (COP) approval before commencing construction on the windfarm. In conjunction with the COP approval, the BOEM is also responsible for issuing the Record of Decision on the Environmental Impact Statement conducted under the National Environmental Policy Review Act (NEPA).[43] The EPA assesses its own permitting action (i.e., to issue an OCS air permit for the WDA facility and OECLA) as interrelated to, or interdependent with, the BOEM's COP approval and issuance of the NEPA Record of Decision (ROD) for the Vineyard Wind windfarm. Accordingly, the EPA has designated the BOEM as the lead Federal agency for purposes of fulfilling statutory obligations under the aforementioned statutes.[44] The BOEM has accepted the designation as lead Federal agency.[45]

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

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, 16 U.S.C. 470f, 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

[42] More information on the BOEM's Renewable Energy Program can be found at https://www.boem.gov/Renewable-Energy/.
[43] More information on the NEPA process can be found at https://www.epa.gov/nepa/national-environmental-policy-act-review-process.
[44] A copy of the July 25, 2018 letter from EPA R1 to the BOEM regarding lead agency designation is included in the administrative record for this action
[45] 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.

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, the BOEM is the designated lead agency for the purposes of fulfilling EPA's obligations under Section 7 of the ESA, Section 305(b) MSFCMA, and Section 106 of the NHPA for offshore wind development projects on the Atlantic OCS, including the Vineyard Wind windfarm. As a result of this designation, the 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, the BOEM has commenced but not completed its consultation requirements for ESA, MSFCMA, and NHPA for the COP approval and NEPA ROD on the Vineyard Wind windfarm. The EPA understands that the 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 Vineyard Wind 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 provide an additional opportunity for public comment regarding any such new conditions or restrictions as necessary and appropriate.

B. Coastal Zone Management Act

Section 307 of the CZMA, 16 U.S.C. § 1456, and the implementing regulations at 15 C.F.R. 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. Generally, federal consistency requires that federal actions, within and outside the coastal zone, which have reasonably 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. 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 within 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.[46] 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.[47]

C. Clean Air Act General Conformity

Under CAA § 176, federal agencies cannot permit or approve any activity that does not conform to an approved state implementation plan. At the time of this fact sheet, it is the EPA's understanding that BOEM is undertaking an analysis to determine whether general conformity applies to the windfarm project and, if so, what requirements must be met.

XII. Environmental Justice

Executive Order (EO) 12898 entitled "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 FR 7629 (Feb. 16, 1994). Consistent with EO 12898 and the EPA's "Plan EJ 2014: Considering Environmental Justice in Permitting,"[48] 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.

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 polices.[49] The EPA's goal with respect to Environmental Justice in permitting is to enable

---

[46] State federal consistency lists can be accessed online at https://www.coast.noaa.gov/czm/consistency/states/. (last visited on April 3, 2019).

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

[48] For additional information on addressing environmental justice in permitting, *see, e.g.*, the EPA's "Plan EJ 2014: Considering Environmental Justice in Permitting," available at https://www.epa.gov/environmentaljustice/plan-ej-2014-considering-environmental-justice-permitting. (last visited on April 3, 2019).

[49] EPA provides of glossary of EJ terminology at https://www.epa.gov/environmentaljustice/ej-2020-glossary. More information on the EPA's Environmental Justice program can be accessed at https://www.epa.gov/environmentaljustice. Last accessed on May 16, 2019.

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, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks as a result of greater vulnerability to environmental hazards.

In light of Executive Order 12898, the White House Council on Environmental Quality (CEQ) issued Environmental Justice; Guidance Under the National Environmental Policy Act.[50] This 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 has evaluated these principles as part of the environmental justice analysis for the Vineyard Wind windfarm. 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.

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."[51] 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. The EPA has determined that issuance of this OCS permit will not contribute to NAAQS violations or have

[50] *See Environmental Justice: Guidance Under the National Environmental Policy Act* can be accessed at: https://www.epa.gov/environmentaljustice/ceq-environmental-justice-guidance-under-national-environmental-policy-act. December, 1997. Last accessed on May 16, 2019.
[51] 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.

potentially adverse effects on ambient air quality. See Section VI.C. of this of this document for a detailed analysis of the ambient impact analysis of the WDA Facility and OECLA.

B. Environmental Impacts to Potentially Overburdened Communities

EPA's EJ Screen tool 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,[52] EPA identifies the 80th percentile for the purpose of identifying 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 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: 25 percent of households within the census block group have a median annual household income at or below 65 percent of the statewide median income for Massachusetts; or 25 percent or more of the residents are minority; or 25 percent or more of the residents have English Isolation.[53]

The EPA evaluated the WDA facility and OECLA for potentially affected environmental justice communities using a conservative 50-mile buffer around the approximate WDA area in EPA's EJ Screen tool.[54] This 50-mile buffer includes potentially affected areas of tribal communities, all of Martha's Vineyard and Nantucket, the WDA facility's port of New Bedford, and the onshore construction locations on Cape Cod. In the EJ Screen standard report, there were no demographic indicators identified above EPA's threshold of the 80th percentile. In addition, there are no low-income or minority populations in the communities affected by the WDA facility and OECLA that exceed 50%, and the percentage of minorities and people with income below the poverty level is not significantly higher than the state-wide levels. However, the EJ Screen report does contain environmental indicators for "Superfund Proximity" and "Wastewater Discharge Indicator" that were above the 80th percentile. Additionally, EJ populations, as defined by the more stringent income and minority criteria established under the Commonwealth of Massachusetts' Environmental Justice Policy do exist in the area affected by the WDA facility and OECLA.

---

[52] 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. Last accessed May 16, 2019.

[53] See Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs. Available at: https://www.mass.gov/files/documents/2017/11/29/2017-environmental-justice-policy_0.pdf. Last accessed May 16, 2019.

[54] A copy of the standard report generated from EPA's EJ Screen analysis is included in the administrative docket for this action.

Individual fishing communities that use the Vineyard Wind WDA facility and OECLA areas for recreational or commercial fishing purposes could be minority or low-income populations. The application indicates that the vast majority of the WDA facility and OECLA emissions would occur during installation and maintenance, which involve the use of workboat and support vessels. According to BOEM's Draft Environmental Impact Statement (DEIS),[55] construction and installation would have impacts on recreational boating and commercial fishing, both of which contribute to employment and income. The DEIS also states there may be impacts on marine navigation in the WDA and harbors that support offshore construction. According to BOEM, the temporary impacts on commercial or recreational boating would impact all local boaters, and would not have disproportionate impacts on residents or businesses within the areas identified as environmental justice communities; however, the impact may be of greater magnitude for individuals who fish for subsistence, including members of Native American tribes or members of environmental justice communities who depend on commercial fishing jobs (including seafood processing and packing industries) for their livelihood. Ultimately, BOEM's analysis concluded that construction, operations, and decommissioning activity would have a negligible impact on environmental justice communities, except for commercial and subsistence fishing. However, these impacts are temporary in nature and will last less than 2 years.

Regarding air impacts to environmental justice communities, Vineyard Wind's OCS air permit application indicates that the vast majority of the WDA facility and OECLA emissions would occur during installation and maintenance, which involve the use of workboat and support vessels. The construction emissions are temporary and anticipated to last less than 2 years. The WDA facility and OECLA are subject to BACT and LAER under the PSD and NNSR permitting programs and the emissions generating activities at the source will be controlled to the greatest extent possible. The emissions generated during the operation phase of the windfarm engines would be very low, since the operation of the wind turbine diesel engines is anticipated to be less than 100 hr/yr, 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 WDA facility and the construction of OECLA include minimizing the idling of the engines of the vessels; and the use ultra-low sulfur diesel whenever possible to minimize sulfur and particulate emissions. The EPA notes that some of the emissions generated by the engines associated with the vessels' engines, which will depart from and return to the port of New Bedford would occur near shore (within State water or near the State/Federal waters boundary). However, EPA notes that 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 minor (if any) human health or environmental effects on the overall population, including any minority or low-income population.

The EPA has concluded that the WDA facility and OECLA's air emissions would not have disproportionately high or adverse human health or environmental effects on minority or low-income populations. The draft OCS air permit for the Vineyard Wind windfarm is part of a

[55] A copy of BOEM's December 2018 DEIS can be found in the administrative record for this action.

federal permitting action, as discussed in this Fact Sheet and Statement of Basis, and is a major source as defined under CAA regulations. The WDA facility's potential to emit for NO_x, CO, and VOCs exceed major source thresholds. However, the overall benefits of the windfarm are expected to result in decrease of 31,385 tons of NO_x and 25,641 tons of SO_2 from the New England power grid over the life of the windfarm.

The WDA facility will be located on the OCS approximately 14 miles southwest from the nearest shoreline of Martha's Vineyard, Massachusetts. Consequently, the majority (if not all) of the emissions associated with the WDA facility would be generated at the OCS location and localized near that location, remaining well away from the shore (i.e., populated areas). Further, the impact of those emissions would be dispersed over a wide area of the OCS.

C. Tribal Consultation and Enhanced Public Participation

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 September 26, 2018, the EPA notified the tribes in Massachusetts, Rhode Island, and Connecticut and provided the opportunity to conduct government-to-government consultation prior to issuing the OCS air permit.[56] To date the EPA has not received a request from any tribe requesting consultation on this permit action. However, the tribes may request consultation at any time.

In order to comply with the Section 5-5(c) ("Public Participation and Access to Information") of EO 12898, which 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, the EPA has prepared a Public Notice, available on the EPA website at https://www.epa.gov/caa-permitting/caa-permitting-epas-new-england-region. Interested parties can also subscribe to an EPA email list that notifies them of public comment opportunities in Region 1 for proposed air pollution control permits via email at https://www.epa.gov/caa-permitting/caa-permitting-epas-new-england-region. These procedures, along with this Fact Sheet and Statement of Basis, will ensure an opportunity for meaningful involvement for all communities. In addition, the EPA will hold a public hearing for this permit action in areas with potentially impacted environmental justice communities.

XIII. Operating Permit under Title V of the Clean Air Act

On April 18, 2019, VW submitted an application for a title V operating permit (operating permit) in accordance with 310 CMR 7.00, Appendix C. As demonstrated in Table 3, yearly NO_x emissions during the WDA facility's operational phase are projected to be over 50 tons per year. 310 C.M.R. 7.00, Appendix C, section (2)(a) requires any facility with the potential to emit 50

[56] A copy of the EPA's August 10, 2018 letter offering government-to-government consultation to each of the tribes is included in the administrative record for this action.

tons per year or greater of NO_x to obtain an operating permit. Appendix C of Massachusetts regulations were adopted by the Commonwealth to meet the requirements of a Title V operating permit program. *See* 66 FR 49451 (September 28, 2001). The draft OCS permit includes, independent of the requirements in 310 CMR, 7.00, Appendix C, conditions that are equivalent to requirements of the title V operating permit program. For example, the draft OCS permit will include requirements for submittal of annual compliance certifications, monitoring, recordkeeping, and reporting requirements. The annual fee payment (based on actual emissions) applies solely because the WDA facility's operational phase is subject to title V. If in the future, the WDA facility's potential emissions during the operational phase drop below the applicability threshold of 310 CMR. 7.00, Appendix C, section (2)(a), VW may request in writing to have the EPA revoke the OCS permit conditions solely related to title V, which for this OCS permit, is only the requirement to pay the annual fee.

XIV. 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, to Donald Dahl (OEP 05-2) U.S. Environmental Protection Agency 5 Post Office Square - Suite 100 Boston MA 02109 - 3912.

A public hearing will be held during the public comment period. See the public notice for details. 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 to the public at the EPA' s Boston Office.

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 interested 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.

XV. EPA Contacts

Additional information concerning the draft permit may be obtained between the hours of 8:00 a.m. and 4:00 p.m., Monday through Thursday, excluding holidays from:

Donald Dahl (Mailcode 05-2)
U.S. Environmental Protection Agency
5 Post Office Square - Suite 100
Boston MA 02109 - 3912
Telephone: (617) 918-1657

Email: Dahl.Donald@epa.gov

All supporting information regarding this permitting action can also be found at www.regulations.gov Docket ID. EPA-R01-OAR-2019-0355.