

Environmental Studies Program: Studies Development Plan | FY 2020–2022

Title	Updating the Emissions Exemption Thresholds (EETs) Using Classification and Regression Tree (CART) Analysis
Administered by	Headquarters
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Procurement Type(s)	Contract
Performance Period	FY 2020–2023
Date Revised	April 4, 2019
PICOC Summary	Write one or two sentences for each of the following elements, as appropriate.
<i>Problem</i>	BOEM’s exemption thresholds in 30 Code of Federal Regulations (CFR) 550.303 are outdated and erroneously triggering air modeling requirements. Initial evaluations in the Gulf of Mexico Outer Continental Shelf (OCS) Region have indicated that CART analysis may be a suitable alternative approach to reduce the errors seen using the exemption thresholds.
<i>Intervention</i>	Replace exemption thresholds with CART decision trees, either national level or region specific (based on the analysis) to reduce errors.
<i>Comparison</i>	Compare the performance between exemption thresholds and CART approach to test the hypothesis that CART analysis will reduce errors.
<i>Outcome</i>	Evaluate whether CART decision trees would perform better than exemption thresholds to determine the most appropriate triggers for air modeling requirements. Provide decision trees to use in regulations, either one national set or region-specific sets depending on the best fit, to decide whether an operator should be exempt from air modeling for an Outer Continental Shelf (OCS) plan.
<i>Context</i>	Central Gulf of Mexico (GOM), Western GOM, Beaufort Sea and Chukchi Sea

BOEM Information Need(s): BOEM’s current regulatory air emissions exemption thresholds (30 CFR 550.303) developed in the 1980’s, are outdated and may be unreliable triggers when used to determine if more rigorous impact evaluation, air dispersion modeling, is needed. Therefore, BOEM needs to explore other methods such as the CART approach for use in evaluating proposed air emissions. The *Air Quality Modeling in the Gulf of Mexico Region* study included a preliminary examination of the current exemption thresholds and recommended a CART approach. This effort is a follow up to the information provided by the *Air Quality Modeling in the Gulf of Mexico Region* and the *Arctic Air Quality Impact Assessment Modeling* studies.

Background: BOEM has air jurisdiction over the Central and Western GOM and the Beaufort and Chukchi Sea in Alaska. When an operator proposed emission amount submitted in an OCS plan exceeds the exemption threshold at 30 CFR 550.303 the operator is required to perform air dispersion modeling. The modeled concentration is compared to the significant impact levels to demonstrate whether a proposed source will or will not contribute to a violation of a National Ambient Air Quality Standards (NAAQS) and if emissions must be reduced. These exemption thresholds were

developed in the 1980's to help protect the NAAQS as required by the Outer Continental Shelf Lands Act (OCSLA) Section 5(a)(8). The NAAQS cover six common criteria air pollutants that are harmful to the public health and environment. It is also important to examine precursor pollutants like volatile organic compounds (VOCs) and oxides of nitrogen (NOx) as they contribute to criteria air pollutant levels. Since the 1980's, the NAAQS were updated and BOEM's exemption thresholds were not. In addition, BOEM's exemption thresholds do not address NAAQS with short-term averaging times such as 1-hour, 3-hours, 8-hours, and 24-hours. Both modeling studies' results showed that, under the current exemption thresholds, BOEM is not requiring modeling on sources that do impact short-term standards, but requiring more modeling than necessary in terms of the annual standards. BOEM needs a more balanced approach that protects the environment and also does not put unnecessary burden on industry.

Objectives:

- Evaluate the efficacy of a CART analysis as a replacement for the EET analysis currently codified in 30 CFR 550.303 for the GOM and Alaska OCS Regions.
- If appropriate, develop a CART analysis framework that BOEM can adopt as a replacement for the current exemption threshold(s).

Methods: The development of CART decision trees and performance evaluation of the developed CART decision trees and exemption thresholds would use data from the modeling studies.

Specific Research Question(s):

1. Does CART perform better than other alternatives (linear/exponential/*etc.*) for both GOM and Alaska OCS Regions?
2. Does the statistical analysis suggest that one national dataset or two regional specific datasets eliminates the most errors?
3. What CART if/then statements should BOEM use per pollutant per averaging time to have better performance than the EETs?

References:

Fields Simms, P., B. Do, B. Brashers, T. Stoeckenius, and R. Morris. 2018. Arctic Air Quality Impact Assessment Modeling Study: Final Project Report. Prepared by Eastern Research Group, Inc., Sacramento, CA for U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Alaska OCS Region, Anchorage, AK. OCS Study BOEM 2018-020. 58 pp.