

Environmental Studies Program: Ongoing Study

Study Area(s): Western GOM, Central GOM

Administered By: GOM OCS Region

Title: Fugitive Emissions Update in the OCS:
Component Amounts and Counts (GM-15-05)

BOEM Information Need(s) to be Addressed: Fugitive emissions are the second largest platform emitter of volatile organic compounds (VOCs) and methane (CH₄). VOCs are primary reactants in the photochemical reactions which contribute to ozone formation. Since some state coastal areas have been designated non-attainment for ozone, the OCS emissions inventory for VOCs needs to be as accurate as possible. Additionally, the Government Accountability Office (GAO) published a report seeking to reduce methane losses by requiring installation of control technology on platforms to simultaneously improve royalty revenue streams and reduce greenhouse gas (GHG) emissions. Before control technology is required (with a significant cost to industry), the OCS emissions inventory for CH₄ also needs to be as accurate as possible. This study will update the way fugitive emissions are calculated in the OCS emissions inventories to assure GAO and BOEM have the best and most accurate emissions to use for economic and environmental analysis.

Total BOEM Cost: \$581,923

Period of Performance: FY 2016–2018

Conducting Organization(s): Contractor – Eastern Research Group, Inc

BOEM Contact(s): Stacie Merritt, stacie.merritt@boem.gov

Description:

Background: The Clean Air Act (CAA) requires states to submit State Implementation Plans (SIPs) detailing how they will reduce pollution to meet the National Ambient Air Quality Standards (NAAQS), set by USEPA, for criteria pollutants. As part of the SIP, photochemical grid modeling is conducted by the state to demonstrate compliance with the ozone NAAQS. The photochemical grid model is dependent upon the quality and accuracy of the emissions inventory which serves as inputs for the model. Therefore, accurate accounting of fugitive VOC emissions is needed to ensure certainty in the ozone modeling results. The collection and compilation of an air emissions inventory is one of the tasks that BOEM conducts to assure coordination of air pollution control regulations between Outer Continental Shelf (OCS) offshore sources and state's sources onshore (as per Section 328(b) of the 1990 CAAA).

Fugitive emissions are leaks from sealed surfaces associated with process equipment, and are comprised of VOCs and CH₄. Specific fugitive source types include equipment components such as valves, flanges, and connectors. In the past, offshore platform fugitive emissions were calculated using total hydrocarbon (THC) emission factors by stream type (i.e., gas, heavy oil, light oil, water/oil, or oil/water/gas), average VOC and methane weight percent, and component counts. Component counts of fugitive

emission sources are based on data submitted by operators in response to previous surveys. However, in some cases, component counts are based on default component counts, which are derived from data published by American Petroleum Institute (API) in 1993. This study counted components on smaller, shallow water platforms. With the increase in larger, deep-water platforms, the default component count needs to be updated. Also, the THC emissions factors for oil and gas production operations for specific component type were last studied by API in 1996. These emissions factors need to be updated. Lastly, average VOC weight percent by stream type need to be updated. This fugitive emissions calculation is detailed in the BOEM study (2014-666).

The importance of this study is twofold. One, an infrared camera was obtained by BSEE and has been used on platform inspections. The results of this camera show the platforms have little to no leaks, meaning the OCS emissions inventories could possibly be overestimating VOC and CH₄ emissions. Second, GAO is looking at reducing methane emissions possibly by requiring controls on industry (GAO-11-34). However, if the OCS emissions inventories are overestimating VOC and methane emissions, then possibly control technologies would not be required.

Objectives: To update the calculation of fugitive emissions in the OCS emissions inventories by: updating the default component count; revising the emissions factors; updating the default speciation weight fractions for THC emissions by stream type; and quantifying the expected methane emissions reduction and impacts from replacement of high bleed pneumatic controllers with low bleed pneumatic controllers. All this methodology is detailed in the BOEM study (2014-666) “Year 2011 Gulfwide Emissions Inventory Study”.

Methods: The Contractor has to visit shallow water and deep-water offshore production platforms to identify and conduct testing of fugitive equipment leaks in order to develop updated VOC, select hazardous air pollutant (HAP), and methane emission factors. The approach to obtaining the data needed to develop the updated emission factors involves the use of Optical Gas Imaging cameras, Hi Flow Samplers, USEPA Method 21, and USEPA analytical Methods 18 and TO-14A. The Contractor will follow all USEPA approved protocols for each monitoring and measurement method used in this study.

Current Status: The Contractor held external advice meetings with: 1) Industry to solicit input on emission factors, component counts, the testing plan, and platform access and logistics; and 2) USEPA to ensure the emission factor determination methodology proposed is consistent with USEPA’s format and methodologies for methane/VOC and GHG emission inventories. Both and industry and USEPA were able to review the draft Quality Assurance Project Plan (QAPP) and Testing Plan. The Contractor is addressing comments made on the QAPP and Testing Plan and preparing a final version reflecting the comments received.

Final Report Due: December 3, 2018

Publications Completed:

API. 1993. Fugitive hydrocarbon emissions from oil and gas production operations. Health and Environmental Sciences Department, American Petroleum Institute (API) Publication Number 4589.

API. 1996. Calculation workbook for oil and gas production equipment fugitive emissions. Health and Environmental Sciences Department, American Petroleum Institute (API) Publication Number 4638.

Affiliated WWW Sites: None.

Revised Date: February 2, 2017