STUDY TITLE: Emission Inventories of OCS Production and Development Activities in the Gulf of Mexico

REPORT TITLE: User's Guide for the Breton Offshore Activities Data System (BOADS) for Air Quality, Interim Report, User's Guide for the Breton Offshore Activities Data System (BOADS) for Air Quality, Final Report, and Emission Inventories of OCS Production and Development Activities in the Gulf of Mexico, Final Report

CONTRACT NUMBER: 1435-01-98-CT-30856

SPONSORING OCS REGION: Gulf of Mexico

APPLICABLE PLANNING AREA(S): Western, Central, Eastern

FISCAL YEAR(S) OF PROJECT FUNDING: 1998, 1999, 2000, 2001, 2002

COMPLETION DATE OF REPORT: February 2003

COST(S): FY 2002: $23,248

CUMULATIVE PROJECT COST: $522,308

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KEY WORDS: Breton National Wildlife Area; outer continental shelf; emission inventories; Gulf of Mexico

BACKGROUND: The region east of the Mississippi Delta contains the Breton National Wildlife Area (BNWA), which is protected under the Clean Air Act as a Class I air quality area. Air pollutant emissions from sources within 100 km of all Class I areas are regulated to prevent significant deterioration of air quality (through the prevention of significant deterioration [PSD] permitting process). For regulatory purposes, significant air quality deterioration is defined as an increase in an air pollutant's concentration (determined through air quality modeling) that exceeds an increment defined for each pollutant (sulfur dioxide [SO_2], nitrogen dioxide [NO_2]). A large number of oil and gas producing platforms, numerous onshore industrial sources, and several urbanized areas are located within 100 km of the BNWA.

OBJECTIVES: (1) To provide technical support for the development of the BNWA current year OCS emission inventory; (2) to estimate historical OCS gulf-wide emissions

for 1977 and 1988 for primary air pollutants (carbon monoxide [CO], oxides of nitrogen [NO_x], sulfur oxides [SO_x], total suspended particulates [TSP], particulate matter less than 10 microns [PM_{10}], particulate matter less than 2.5 microns [$PM_{2.5}$], total hydrocarbons [THC], and volatile organic compounds [VOC]); (3) to spatially resolve area and mobile sources to the grid-cell level, and point sources to specific coordinates; and (4) to develop computer software tools to assist the MMS in collecting and managing the OCS emission inventory in the future.

DESCRIPTION: Historical inventories for the entire Gulf of Mexico were prepared for 1977 and 1988 for oil and gas platform sources (e.g., flares and storage tanks), platform-associated sources (e.g., crew and supply boats), pipeline construction equipment, and exploration and drilling equipment. A current-year (2000) emission inventory was compiled from monthly surveys of platform operators for approximately 510 facilities within 100 km of the BNWA. The inventory covered platform equipment and processes for surveyed facilities. Specialized data collection software was developed (the Breton Offshore Activities Data System for Air Quality [BOADS]) for use by MMS to collect and perform end-user QA/QC of the current-year emissions activity data. The BOADS software incorporated automated QA/QC including checks of (1) parameter ranges and magnitudes by source categories and (2) data formats and units to ensure data integrity. A relational Oracle-based DBMS was developed and delivered to the MMS that facilitates data input, rapid data access, automated data reports, and efficient data queries. The DBMS also computes and provides error warnings, range checks, and outlier flags.

SIGNIFICANT CONCLUSIONS: No single source category is responsible for most of the emissions in the OCS. Overall, platform source emissions are greater than platform-related mobile source emissions. Among platform sources, platform equipment (e.g., engines, turbines, and boilers) are the predominant source of combustion-related emissions (e.g., NO_x, CO, and PM); venting is the predominant source of THC and VOC, followed closely by glycol dehydrator units. Flares are the predominant source of SO_x. Among mobile sources, crew and supply boats are the single largest source category of all pollutants. There are no consistent trends among pollutants in the historical emissions estimates.

STUDY RESULTS: Oil and gas development and production are subject to economic cycles and technological limitations. Historical activity data compiled in this study reveals several observable trends: (1) within 100 km of the BNWA the number of platforms approximately doubled from 1990 to 2000; (2) the average platform depth was relatively unchanged at approximately 100 feet during the period from 1977 to 1990, but the average depth more than doubled after 1998 through the current year (since more energy is needed to construct and drill in deeper waters, more emissions are generated); and (3) while the number of wells drilled per year is decreasing due to better detection equipment and past exploration, the depth of wells drilled is increasing over time.

Thus, from 1977 to 1990, the amount of gas released to vent or flare equipment declined, but the amount released after 1990 increased in concert with increasing production levels (gulf-wide oil production has almost doubled since 1990). Emissions from diesel engines also reflect a doubling of diesel engine use from 1990 to 2000. A reduction in flaring activity from 1977 to 1990 was also noted. As the amount of flaring decreases, the emissions from other platform equipment contribute a greater share of the inventory.

STUDY PRODUCTS: Coe, D.L., C.A. Gorin, L.R. Chinkin, M. Yocke, and D. Scalfano. 2002. Emission Inventories of OCS Production and Development Activities in the Gulf of Mexico. Prepared by Sonoma Technology, Inc., ENVIRON International, Inc., and Northlake Engineers and Surveyors, Inc. OCS Study MMS 2002-073. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS region, New Orleans, LA. 190 pp.

Coe, D.L., D.J. Ladner, J.D. Prouty, L.R. Chinkin, M. Yocke, and D. Scalfano. 2000. User's Guide for the Breton Offshore Activities Data System (BOADS) for Air Quality. Prepared for Minerals Management Service under MMS Contract 1435-01-98-CT-30856 by Sonoma Technology, Inc., Petaluma, CA, ENVIRON International, Inc., Novato, CA, and Northlake Engineers and Surveyors, Inc., Mandeville, LA, OCS Study MMS 2000-081 78 pp.

SOFTWARE PRODUCTS:

BOADS: Breton Offshore Activities Data System for Air Quality [BOADS]) for use by MMS to collect and perform end-user QA/QC of the current-year emissions activity data.

DBMS: Relational Oracle-based data base management system developed to facilitate data input, rapid data access, automated data reports, and efficient data queries.