GULF OF MEXICO AIR EMISSIONS CALCULATIONS INSTRUCTIONS and PRA Statement

General

This entire document (DOCD_AQ.XLS) was prepared through the cooperative efforts of those professionals in the oil industry including the API/OOC Gulf of Mexico Air Quality Task Force, and the Bureau of Ocean Energy Management (BOEM), who deal with air emission issues. This document was revised extensively in 2011 to update emission factors and to estimate emissions for additional equipment types. This document is intended to standardize the way we estimate our potential air emissions for Development Operations Coordination Documents (DOCD) approved by the BOEM. It is intended to be thorough but flexible to meet the needs of different operators. This instructions document gives the basis for the emission factors used in the emission spreadsheet as well as general instructions for using the spreadsheet.

The following sections describe the spreadsheets in the DOCD_AQ.XLS workbook.

TITLE

The TITLE sheet requires input of the company's name, area, block, OCS-G number, platform and/or well(s), drilling rig name and type, and contact information in the corresponding lines. This data will automatically be transferred to the EMISSIONS and SUMMARY sheets.

STATIONARY FACTORS

The emission factors were compiled from the latest AP-42 references or from industry studies if no AP-42 reference was available. Factors may be revised as more data becomes available. A change to the STATIONARY FACTORS sheet will be automatically changed in the EMISSIONS sheets. A Sulfur Content table was added in 1996. A change in this table will automatically revise SO_2 emission factors and the corresponding emission estimates. If your sulfur content is different than the default values in the table, you should change the values in the table to match your actual fuel sulfur content. Tables for Fugitive THC Emission Factors, Default Sales Gas Composition, Mud Degassing THC Emission Factors, THC Emission Speciation for Mud Degassing, and fuel conversion factors were added in 2011. Changes to these tables will automatically be reflected in the associated emission factors and emission estimates.

Turbines, Engines, Boilers/Heaters/Burners, and Liquid Flaring

1. Particulate Matter (PM) emission factors for natural gas combustion are for filterable PM only.
2. It is assumed that PM = PM_{10} = $PM_{2.5}$ unless individual species are provided in AP-42.
3. If an emission factor for VOC is not provided in AP-42, it is assumed that TOC or Nonmethane TOC = VOC.
4. In order to estimate the worst-case emissions, the dual-fuel emission factors for **dual-fuel turbines** are the highest of either the natural gas emission factor or distillate emission factor for each pollutant.
5. The emission factors provided in AP-42 for **dual-fuel-fired engines** assume 95 percent natural gas combustion and 5 percent diesel fuel combustion.

Natural Gas Flares

The emission factors are from AP-42, Chapter 13.5. The emission factors are in units of lbs/MMBtu. These factors are multiplied by a heat value of 1050 MMBtu/MMscf to convert units to lbs/MMscf. The VOC factor is based on the hydrocarbon emission factor in table 13.5-1 and the average non-methane components in table 13.5-2.

Storage Tanks, Glycol Dehydrators, Gas Venting, Amine Gas Sweetening Units, and Loading Operations

Average emission values were estimated from the BOEM 2005 or 2008 Gulfwide Emission Inventory Studies as indicated in the Ref. column. Total emissions from each equipment type are estimated according to the counts provided on the EMISSIONS sheets.

Fugitives

The worst-case THC emission factor is selected from the Fugitive THC Emission Factors table according to the stream type selected on each EMISSIONS sheet. VOC emissions are estimated from the THC emissions based on the Default Sales Gas Composition table. The VOC component of the sales gas includes C_3, through C_{8+}.

Mud Degassing

VOC emission factors for mud degassing are derived from the Mud Degassing THC Emission Factors table and the THC Emission Speciation for Mud Degassing table. Methane and Ethane are not considered to be VOCs.

Pneumatic Pumps and Pressure Level Controllers

VOC emissions are estimated based on the throughput reported on the EMISSIONS sheets and the Default Sales Gas Composition table. The VOC component of the sales gas includes C_3, through C_{8+}.

VESSEL FACTORS

The VESSEL FACTORS sheet was added in 2011 to accommodate revised emission factors for vessels and drilling rigs. The emission factors are disaggregated by vessel type and category, and kW rating. The original emission factors were obtained from the following sources: e-mail communications with EPA regarding data from EPA's regulatory program; U.S. Environmental Protection Agency's Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, Final Report, April 2009, Prepared by ICF International; and the European Environmental Agency, EMEP/EEA Air Pollutant Emission Inventory Guidebook—2009, Technical report No. 9. 2009. The typical load factors and adjusted power (based on the average power in each class) were applied to the emission factors to acquire the final emission rates. One additional piece of information necessary to calculate the SO_2 emission factors for vessels is the sulfur content in the fuel. The fuel sulfur content needs to be entered in a separate table in the VESSEL FACTORS sheet. The recommended default for vessel fuel sulfur content for projects implemented prior to 2012 is 500 ppm. For projects implemented after 2012, the default value should be changed to 15 ppm.

METHODOLOGY

The METHODOLOGY sheet was added in 2011 to show the formulas used to estimate emissions on the EMISSIONS sheets.

EMISSIONS

The emissions from an operation should be presented for a calendar year (2011, 2012, etc.). The operation may include production only or production in conjunction with other activities such as drilling or construction operations. For additional years, the Emissions Spreadsheet is renamed EMISSIONS_2, EMISSIONS_3, etc. The different operating parameters for each year should be entered to calculate revised emissions for that year. The emissions will be calculated as shown on the METHODOLOGY sheet for each equipment type.

To customize the spreadsheet for your application, it is possible to delete lines for non-applicable equipment/activities or copy/insert an entire line if more than one similar type of equipment is present. If you add or delete rows, you should confirm that the correct cells are being referenced from the STATIONARY FACTORS and VESSEL FACTORS tabs. If you used alternate emission factors, you should confirm that the calculation methodology is correct for your alternate factors.

The production equipment can be customized further by adding the use of the equipment behind the equipment type name. For example, “TURBINE nat gas” could be changed to “TURBINE nat gas – Gas Compressor”; or “BURNER” could be changed to “BURNER - Line Heater”.

SUMMARY

The SUMMARY sheet is designed to show a proposed estimate of emissions from an activity over a ten year period. The first line (Row 7) of the summary sheet is linked to the yearly totals in the EMISSIONS_1 sheet; the second line (Row 8) is linked to the EMISSIONS_2 sheet, etc. If additional years of calculations are necessary to reach a constant, then a spreadsheet can be copied and linked to the summary sheet for future years. Once emissions are constant the values are carried to the end of the 10-year period.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq*.) requires us to inform you that BOEM collects this information as part of an applicant's DOCD submitted for our approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 550.197. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget (OMB) control number. Responses are mandatory (43 U.S.C. 1334). The reporting burden for this form is included in the burden for preparing DOCDs. We estimate that burden to average 700 hours per response, including the time for reviewing instructions, gathering and maintaining the data, and completing and reviewing the forms associated with subpart B. Direct comments on the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Bureau of Ocean Energy Management, 381 Elden Street, Herndon, VA 20170.