

## GULF OF MEXICO AIR EMISSIONS CALCULATIONS INSTRUCTIONS and PRA Statement

### General

This entire document (EP\_AQ.XLS) was prepared through the cooperative efforts of those professionals in the oil industry including the API/OOC Gulf of Mexico Air Quality Subcommittee and the Bureau of Ocean Energy Management (BOEM), who understand calculations of air emissions. This document has been revised throughout the years 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 Exploration Plans (EP) 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 EP\_AQ.XLS workbook.

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### TITLE

The TITLE sheet requires input of the company's name, area, block, OCS-G lease number, platform, a list of all well(s), and contact information in the corresponding lines. This data will automatically be transferred to the EMISSIONS and SUMMARY sheets. Please place any additional data that the air quality reviewer should consider when reviewing your plan in the REMARKS field (such as the drilling rig name and type).

### 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 FACTORS sheet will be automatically changed in the EMISSIONS sheets. A Sulfur Content Source table was added in 1996. A change in this table will automatically revise SO<sub>2</sub> 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.

The basis for the factors is as follows:

1. NG Turbines      Fuel usage scf/hr = HP X 9.524 (10,000 btu/HP-hr / 1050 btu/scf)
2. NG Engines      Fuel usage scf/hr = HP X 7.143 (7,500 btu/HP-hr / 1050 btu/scf)
3. Diesel              Fuel usage gals/hr = HP X 0.0483 (7,000 btu/HP-hr / 145,000 btu/gal)

Emissions Factors:

*Natural Gas Prime Movers*

1. TNMOC refers to total non-methane organic carbon emissions and these can be assumed equivalent to VOC emissions.
2. The sulphur content assumed is 2000 grains /mmscf (3.33 ppm). If your concentration is different, revise the ppm in the Sulphur Content Source table.

*Diesel-Fired Prime Movers*

1. Diesel sulphur level 0.05% by wt. If your sulphur content is different, change % wt. in the Sulphur Content Source table.
2. For vessels, use > 600 HP factors based on AP-42 Vol. II, Table II-3-3.  
Include the emissions from all vessels associated with your activities for their time of operation within a 25 mile radius of your facility.
3. For diesel engines <600 HP, VOC emissions equal total HC emissions; for diesel engines >600 HP, VOC emissions equal non-methane HC emissions.

*Gas Flares*

1. It is assumed that the flare is non-smoking.
2. A heating value of 1050 btu/cu. ft. for NG is assumed.
3. The sulphur content assumed is 2000 grains /mmscf (3.33 ppm). If your concentration is different then revise the ppm in the Sulphur Content Source table, or you may use the following formula:

$$\text{H2S flared (lbs/hr)} = \text{Gas flared (cu ft/hr)} \times \text{ppm H2S} \times 34 / (379 \times 1000000)$$
$$\text{SOx emis (lbs/hr)} = \text{H2S flared (lbs/hr)} \times 64 / 34$$

*Liquid Flares*

1. Assumes 1% by wt sulphur maximum in the crude oil. Revise the percent sulphur in the Sulphur Content Source table if your value is different.
2. VOC equals non-methane HCs

3. Particulate emissions assumes Grade 5 oil.

### *Tanks*

1. Tank emissions assumes uncontrolled fixed roof tank.
2. The EPA TANKS model is an acceptable alternate. If you choose to use TANKS, you must provide BOEM with sufficient information to verify your results.

### **EMISSIONS**

The emissions estimates should be based on and reflect the activity description and schedule required as part of the plan. The emissions from an operation should be presented for a calendar year (2018, 2019, etc.). The operation may include drilling only or drilling in conjunction with other activities such as well testing or caisson installation. For additional years, the Emissions Spreadsheet is renamed EMISSIONS2, EMISSIONS3, etc. The different operating parameters for each year should be entered to calculate revised emissions for that year. The spreadsheet will calculate maximum fuel usage (UNIT/HR) using the known horsepower. It will assume maximum fuel usage is equal to actual fuel (UNIT/DAY) usage unless the actual fuel usage is known. If so, insert actual fuel usage in appropriate column. (Please note that the use of actual fuel might require Mitigation 2.05.) The emissions will be calculated as follows:

Emission rate (lb/hr) = (HP or fuel rate) X Emission Factor (Potential to emit)

Emissions (tpy) = Emission rate (lb/hr) X load factor( Act Fuel/Max Fuel) X hrs X days X ton/2000 lbs  
(Actual emissions)

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 FACTORS tab. If you used alternate emission factors, you should confirm that the calculation methodology is correct for your alternate factors. If you have multiple sequential years with the same equipment, activity, and emissions, you don't have to fill out the following EMISSIONS sheets (only the first year), as the SUMMARY sheet will take the latest populated emissions amounts and auto-populate the following years.

By inputting the first year of the proposed activity in the EMISSIONS1 sheet, all other years should auto-populate on the EMISSIONS and SUMMARY sheets. Also, when you populate the distance from land in miles in the EMISSIONS 1 sheet, the same distance will auto-populate on future EMISSIONS sheets. For purposes of calculating the emissions exemption level, the distance to shore should be expressed in tenths of a statute mile up to 20 miles, and in whole statute miles for distances beyond 20 miles.

### **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 EMISSIONS1 sheet; the second line (Row 8) is linked to the EMISSIONS2 sheet, etc. Once emissions are constant the values are carried to the end of the 10- year period.

The **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 EP 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 250.197. 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 EPs. We estimate that burden to average 600 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, 45600 Woodland Road, Sterling, Virginia 20166.