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MICHIGAN AIR EMISSIONS REPORTING SYSTEM (MAERS)

E-101 EMISSIONS FORM INSTRUCTIONS AND EXAMPLE

An E-101 form must be completed for each emission unit or reporting group. **Emissions must be reported in pounds.** Criteria pollutant emissions greater than 20 pounds at the Source Classification Code (SCC) level must be reported. Criteria pollutants less than 20 pounds may be reported as zero.

A copy of the previous year's summary report may be helpful in completing the MAERS emissions data.

While MAERS does not require the reporting of non-criteria pollutants, sources should review their source hazardous emissions predicted by the emissions calculator (refer to The MAERS Emission Estimator on page 5). If the calculated values appear to be inaccurate, sources are encouraged to report emission estimates on the E-101 Emissions form.

Reporting of T-Butyl Acetate

In the November 29, 2004 Federal Register, EPA modified the federal definition of VOC by excluding tertiary butyl acetate (TBAC) from the definition of VOC, because of its negligible level of reactivity with respect to ozone formation.

EPA requires that TBAC remain subject to all federal recordkeeping, emissions reporting, and inventory requirements which apply to VOCs. EPA believes that the use of TBAC as a substitute for other solvents could increase sharply, and that even "negligibly reactive" materials, when used in sufficient quantities, can contribute significantly to ozone formation. Industry will now be required to track and report TBAC emissions as a distinct class of emissions, separate from non-exempt VOCs. The same de minimus and thresholds used for VOCs should be used for TBAC.

At this time, if T-Butyl Acetate is used in any of the activities listed on the A-101 form, it should be reported as a separate pollutant on the Emissions form. In the pollutant code dropdown field choose "Tert-Butyl Acetate" then enter the annual emissions in the annual emissions field.

INVENTORY YEAR

1. **Inventory Year – (Required)** the year in which the emission activities took place. (Example: 2011 is the inventory year for the 2011 MAERS report, which is due March 15, 2012.)

FORM REFERENCE SECTION:

2. **Form Type** - DEQ Air Quality reference identification for the form.
3. **AQD Source ID (SRN) - (Required)** - Enter the source's SRN. This number is also called a State Registration Number (SRN).
4. **EU or RG ID - (Required)** Use the EU or RG ID's that you created on the EU-101 Emission Unit form, Field 4 or the Reporting Group ID on RG-101, Field 4.
5. **SCC - (Required)** Enter the SCC from the A-101 Emission Unit Activity form Field 4. Complete one E-101 form for each SCC under an emission unit identified on the A-101 form.

The emission factors and pollutants associated with the SCC will be listed in the summary report. If none are listed, the SCC has no emission factors. To estimate particulate emissions, weigh the collected pollutants and subtract from the raw material throughput; or, refer to the calculations used in the NSR permit to determine how to estimate particulate emissions. For VOC emissions, mass balance should be used to determine the estimated emissions.

6. **Material Code - (Required)** Enter the throughput material name as specified by the SCC code.

EMISSION INFORMATION SECTION:

Complete this section for each pollutant associated with the SCC. An annual emission for each criteria pollutant for which a MAERS emission factor exists **MUST** be reported. Please note, the required criteria pollutants may have changed from the previous year's submittal. In the MAERS web-based application, fields 7-11 were not carried forward from the previous year's submittal. All required pollutants will need to be reselected and annual emissions entered.

- 7A.-7B. **Pollutant Code (Required) & Annual Emissions in Pounds** - Enter the pollutant code. The Pollutant/Material Codes list is available on our website or a copy may be requested from our district office (Submittal Instructions, Map and Table I guide). Report annual emissions in **pounds**. If no MAERS emission factor exists, then an estimate for at least one criteria pollutant must be provided. Annual emissions should include the emissions that occur during malfunctions.

- 8. Emission Basis** - Select the basis on which emissions are estimated. Emissions should be estimated using the best available site-specific data according to the following hierarchy.
- A. CEM - Continuous Emissions Monitoring
 - B. Site Specific Stack Test - Stack test protocol approved by AQD. Results from the most recent stack test should be used. Stack tests must have been conducted in accordance with U.S. EPA protocol under conditions which represent current operations.
 - C. PEM - Parametric Emissions Monitoring
 - D. Mass Balance - The method that allows estimation of emissions by analyzing inputs of a material to a process minus consumption, accumulation, and loss of that material during a process.
 - E. Tank Model - The TANKS model is an EPA computer software program that computes estimates of volatile organic compound (VOC) emissions from fixed and floating-roof storage tanks. TANKS is based on the emission estimation procedures from Chapter 7 of EPA's Compilation of Air Pollutant Emission Factors (AP-42), plus recent updates from the American Petroleum Institute.
 - F. Landfill Model - This EPA model was developed by the Control Technology Center (CTC). The Landfill Air Emissions Estimation Model can be used to estimate emission rates for methane, carbon dioxide, non-methane organic compounds, and individual toxic air pollutants from landfills.
 - G. MAERS Emission Factor - SCC/emission factors that are in the MAERS reference table. These are either EPA or DEQ-AQD emission factors. (Emissions estimator instructions located on page 5.)
 - H. Other - If not previously identified, select 'Other', and attach supporting documentation. Use of EPA AP-42 or EPA Fire Emission Factors that are not listed in the MAERS reference table should be referenced here.

Supporting Documentation:

Copies of emission test reports and detailed calculations must be filed with each E-101 form when the Emission Basis is not MAERS Emission Factor.

9A.-9C. List Emission Factor, Exponent, and Emission Factor Unit Code - List the proper emission factor, using **scientific notation** and the corresponding unit code. Please note, certain emission factors may have changed from the previous year. The emission factor unit code is the unit code pounds, divided by the unit code for the material unit code in Field 15C, Form A-101 (Prefilled on electronic forms). This information is required if an emission factor is used.

Scientific Notation: The emission factors are expressed in scientific notation, which means that the decimal point has been moved. If the exponent is negative, move the decimal point to the left. If the exponent is positive, move the decimal point to the right. If the exponent is zero, the decimal point does not move. For example, if a number is expressed as 2.0E-1, move the decimal point one place to the left to get 0.20. If a number is expressed as 2.0E2, move the decimal point 2 places to the right to get 200. If a number is expressed as 2.0E0, the decimal point does not move – the number is 2.0.

10. **Control Efficiency (in weight percent)** - Enter the control efficiency for the control device(s). (This could be a combination of capture and destruction efficiencies.) If no control efficiency is being used, leave this field blank. Do not enter a zero. See Control Efficiency Discussion, page 6.
11. **Comment** - Use comment field if further explanation is needed.

THE MAERS EMISSIONS ESTIMATOR

When using MAERS Emission Factors as the Emission Basis in Field 8-G, the MAERS application will estimate facility emissions by emission unit in one easy step.

- **How it works:** The Estimator reads the SCC, Material Code, and the Material Unit Code. It matches these identifiers with the Pollutant Codes which have **uncontrolled emission factors**. Once a match is found the Estimator multiplies the Material Throughput (amount) times the **uncontrolled** emission factor, adjusts the value using the user supplied control efficiency, and then stores the generated data, internally, to be displayed later in the Emissions Reports.

- **Identifiers must be unique.** In order for MAERS to be able to estimate emissions for the virtually unlimited number of different processes encountered, each identifier must be unique. There are tens of thousands of unique values within the MAERS application. The user **must** ensure that the correct identifiers are entered or the application will not function correctly. For emissions estimating, ALL of the following fields are unique: SCC, Material Code, Unit Code, Pollutant Code, and Emission Factors (are unique to combinations of codes).

- **How to use the Emissions Estimator to calculate emissions:** Once the A-101 ACTIVITY form has been completed, the MAERS Emission Estimator has enough information to calculate **uncontrolled** emissions. Go to the MAERS Menu Bar and click on Tasks, on the drop down, click on Calculate Emissions. The Emissions Estimator will then attempt to calculate uncontrolled emissions for every SCC/Material Code/Pollutant Code/Emission Factor matching combination for the entire source. It will make these calculations at the Emission Unit level. If a Material Throughput value has been entered, emissions will be calculated. (NOTE: In some cases, WT % Sulfur, WT % Ash, or WT % VOC are also required to be entered.)

- **How to view the calculated uncontrolled emissions:** Go to the MAERS Menu Bar and click on Reports, on the drop down, put the cursor on Audit Reports, follow the arrow to Emission Comparison, follow the arrow to SCC Detail and then click. This will bring up a report; **EMISSION COMPARISON – SCC DETAIL REPORT**. On the right hand side of this report, for each SCC, will be a box; AQD CALCULATED EMISSIONS. Below this box are listed the Amount, Unit Code and Pollutant Code for every pollutant having an uncontrolled emission factor in the MAERS Emission Factor table. **YOU MUST REPORT, AS A MINIMUM, EACH OF THE CRITERIA POLLUTANTS LISTED FOR EACH EMISSION UNIT.** The Pollutant Code and the Unit Code from this report may be entered on the E-101 form in the appropriate fields. **DO NOT ENTER THE POLLUTANT AMOUNTS FROM THIS STEP, THESE EMISSIONS ARE UNCONTROLLED.** (After the Control Efficiencies have been added to the E-101 form and the emissions have been re-calculated, the amounts may be entered as the source emissions.)

CONTROL EFFICIENCY DISCUSSION

The MAERS Emissions Estimator only uses uncontrolled emission factors in its calculations. When using the MAERS Emissions Estimator to estimate source emissions, it is necessary to enter the process control efficiency if the emission unit is controlled. Otherwise, emissions for that process will be over-estimated. The best place to find the proper control efficiency for a specific piece of control equipment is from the specifications list issued by the equipment manufacturer. A second common source of control efficiency data is from stack tests performed on the process at the facility. A caution about control efficiencies; they are pollutant specific. For example, a control efficiency used for PM,FLTRBLE may **NOT** be used for VOC. A control efficiency for NOX may **NOT** be used for CO.

What if I Don't Know the Control Efficiency for a Pollutant?

If you cannot get the control efficiency for a particular pollutant from the equipment manufacturer or test data, then calculate a "default control efficiency." A default control efficiency is calculated using the controlled and uncontrolled emission factors provided in the emission factor table on the E-101 form. The steps and example below explain how this is done:

Divide the "controlled" emission factor by the "uncontrolled " emission factor; subtract that number from 1 and carry four decimal places; and multiply the final net number by 100. Enter this number as the Weight Percent Control Efficiency.

Default Control Efficiency =	1 -	$\frac{\text{Controlled EF}}{\text{Uncontrolled EF}}$	X 100
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EXAMPLE:

SCC = 1-02-002-04 Pollutant = PM10,FLTRBLE,

Emission Factor (CONTROLLED) = 7.200 E -2 with BAGHOUSE
Emission Factor (UNCONTROLLED) = 1.320 E 1 UNCONTROLLED

Default Control Efficiency = 1.0 – (0.072/13.2) x 100 = 99.45%

*Note: The SCC and the Pollutant **MUST** be identical for the two Emission Factors used to calculate the Weight Percent Control Efficiency.*



Michigan Department of Environmental Quality - Air Quality Division
Michigan Air Emissions Reporting System (MAERS)
E-101 EMISSIONS

1. INVENTORY YEAR
2011

Authorized under 1994 P.A. 451, as amended. Completion of information is required. Civil and/or criminal penalties possible for providing false information.

GENERAL INSTRUCTIONS: Refer to last year's MAERS forms or summary report for information previously submitted, and complete this form as applicable with additions or corrections as necessary. For more detailed instructions refer to the MAERS General Instructions Booklet. This MAERS form is used to report each activity's emissions for a specific inventory year. Enter the specific inventory year in field 1.

FORM REFERENCE			
2. Form Type E-101	3. AQD Source ID (SRN) A1234	4. Emission Unit (EU) OR Reporting Group (RG) ID EUBOILERS	
5. Source Classification Code (SCC) 1-03-006-02		6. Material Code Natural Gas	

EMISSION INFORMATION				<input type="checkbox"/> Change	<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Delete
7A. Pollutant Code CO		7B. Annual Emissions 25,200 Pounds				
8. Emission Basis <input type="checkbox"/> CEM <input type="checkbox"/> Stack Test <input type="checkbox"/> PEM <input type="checkbox"/> Mass Balance <input type="checkbox"/> Tank Model <input type="checkbox"/> Landfill Model (Please check one) <input checked="" type="checkbox"/> MAERS Emission Factor <input type="checkbox"/> Other (Attach Description)						
9A. List Emission Factor 8 . 4	9B. Exponent 1	9C. Emission Factor Unit Code LB		10. Control Efficiency _____ Weight Percent		
11. Comment						

EMISSION INFORMATION				<input type="checkbox"/> Change	<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Delete
7A. Pollutant Code NOX		7B. Annual Emissions 30,000 Pounds				
8. Emission Basis <input type="checkbox"/> CEM <input type="checkbox"/> Stack Test <input type="checkbox"/> PEM <input type="checkbox"/> Mass Balance <input type="checkbox"/> Tank Model <input type="checkbox"/> Landfill Model (Please check one) <input checked="" type="checkbox"/> MAERS Emission Factor <input type="checkbox"/> Other (Attach Description)						
9A. List Emission Factor 1 . 0	9B. Exponent 0	9C. Emission Factor Unit Code LB		10. Control Efficiency _____ Weight Percent		
11. Comment						

EMISSION INFORMATION				<input type="checkbox"/> Change	<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Delete
7A. Pollutant Code PM10,PRIMARY		7B. Annual Emissions 2,280 Pounds				
8. Emission Basis <input type="checkbox"/> CEM <input type="checkbox"/> Stack Test <input type="checkbox"/> PEM <input type="checkbox"/> Mass Balance <input type="checkbox"/> Tank Model <input type="checkbox"/> Landfill Model (Please check one) <input checked="" type="checkbox"/> MAERS Emission Factor <input type="checkbox"/> Other (Attach Description)						
9A. List Emission Factor 7 . 6 0	9B. Exponent 0	9C. Emission Factor Unit Code LB		10. Control Efficiency _____ Weight Percent		
11. Comment						

EMISSION INFORMATION				<input type="checkbox"/> Change	<input checked="" type="checkbox"/> Add	<input type="checkbox"/> Delete
7A. Pollutant Code SO2		7B. Annual Emissions 180 Pounds				
8. Emission Basis <input type="checkbox"/> CEM <input type="checkbox"/> Stack Test <input type="checkbox"/> PEM <input type="checkbox"/> Mass Balance <input type="checkbox"/> Tank Model <input type="checkbox"/> Landfill Model (Please check one) <input checked="" type="checkbox"/> MAERS Emission Factor <input type="checkbox"/> Other (Attach Description)						
9A. List Emission Factor 6 . 0	9B. Exponent - 1	9C. Emission Factor Unit Code		10. Control Efficiency _____ Weight Percent		
11. Comment						