CHAPTER 12
The Emissions Form: E-101

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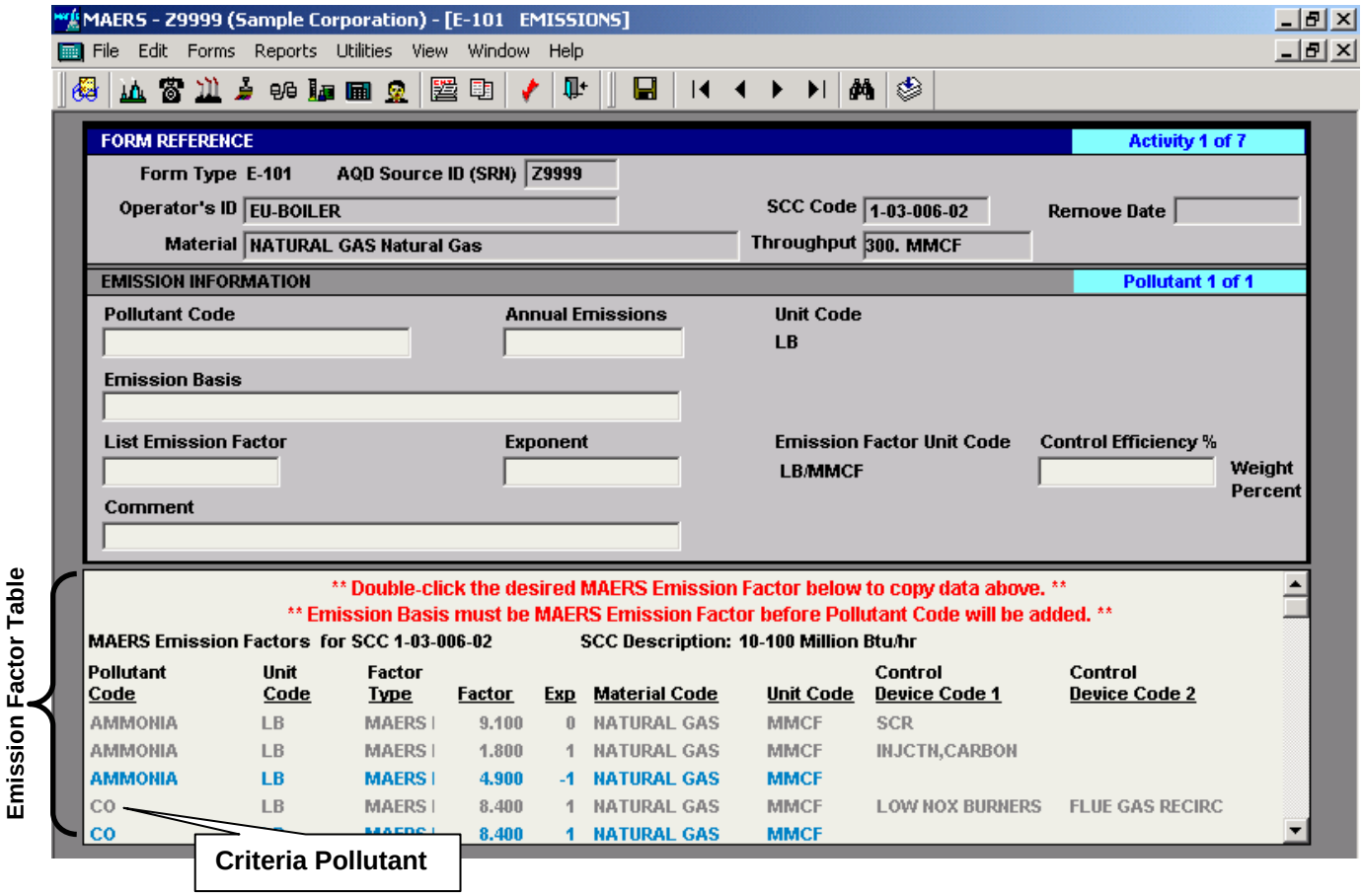
CHAPTER 12: The Emissions Form

(Complete after the A-101 form)



FORM OVERVIEW

The Emissions Form, E-101, is used to report all emissions of criteria pollutants greater than 20 pounds per year at the SCC level. Criteria pollutant emissions of less than 20 pounds per year may be reported as zero. An emissions record must be completed for each emission unit or reporting group identified on the EU-101 and RG-101 forms where the emission unit/reporting group is not one of the specified Rule 201 exempt groups with a throughput/physical capacity less than the thresholds noted in Table 8-2.

THE EMISSION FACTOR TABLE

Emission factors are an easy, although not necessarily the most accurate, way of determining the annual emissions for a given pollutant. By simply multiplying the factor by the annual throughput of the material, you can estimate the annual emission of that pollutant. The emission factor table that appears at the bottom of the screen is provided as a tool to help you identify the pollutants and emission factors associated with the SCC currently displayed in the Form Reference Section. If any emission factors or pollutants are associated with the SCC, they will be listed in the emission factor table. If no emission factors or pollutants are listed in the emission factor table, it means the SCC has no emission factors. Even though there may not be any emission factors listed in the table, you still must report emissions for at least one criteria pollutant using another method.

WHAT EMISSIONS MUST BE REPORTED?

In the emission factor table, those pollutants that appear blue are criteria pollutants. Each of the criteria pollutants that appear here must be reported under the pollutant code field (see Step 1 of the Form Completion Instructions). Those pollutants that do not appear in blue are non-criteria pollutants associated with the SCC, and reporting these pollutants is optional. Note that some of the criteria pollutants have additional emission factors that appear gray. These are "controlled" emission factors, which can be used to calculate a default control efficiency (see page 12-7). The software will not allow you to select a "controlled" emission factor.

If no pollutants appear in the Emission Factor table, at least one criteria pollutant estimate must be provided for each emission unit with a reported activity and material. To do this you must manually select a pollutant code from the drop-down list under the "Pollutant Code" field (see Step 1).

Copies of test results, if available, and detailed calculations must be provided if the "Emission Basis" (entered in Step 2) is not a MAERS emission factor. For more information about calculating emissions refer to the *Calculating Air Emissions for MAERS Guidebook*, which explains the various methods you can use to calculate annual emissions. You can access this guidebook via the Internet at **www.michigan.gov/deqair** (select "Clean Air Assistance," then "Michigan Air Emissions Reporting System (MAERS)") or by contacting the Clean Air Assistance Program at (800) 662-9278.

FORM RELATIONSHIP

An E-101 form was automatically generated for each SCC entered on the A-101 form. If an existing activity record is removed from MAERS on the A-101 form, the removal date will automatically be entered on the E-101 form (see the Form Reference section).

FORM COMPLETION INSTRUCTIONS

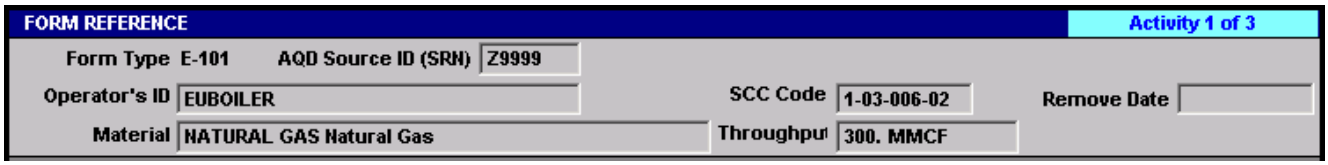
The E-101 form consists of two sections: the Form Reference section and the Emission Information section. **No fields on this form have been carried over from the previous year's submittal. All required pollutants must be reselected and annual emissions values completed.** Following is an explanation of each section of the E-101 form as well as step-by-step instructions on how to complete the required fields.

Note: *You may want to refer to last years summary report to find a listing of pollutants that were reported and the method used to calculate emissions (e.g., MAERS Emission Factor, Mass Balance, Stack Test).*

IMPORTANT!

No fields on this form have been carried over from the previous year's submittal. All required pollutants must be reselected and annual emissions values completed.

Form Reference Section (There are no editable fields in this section)



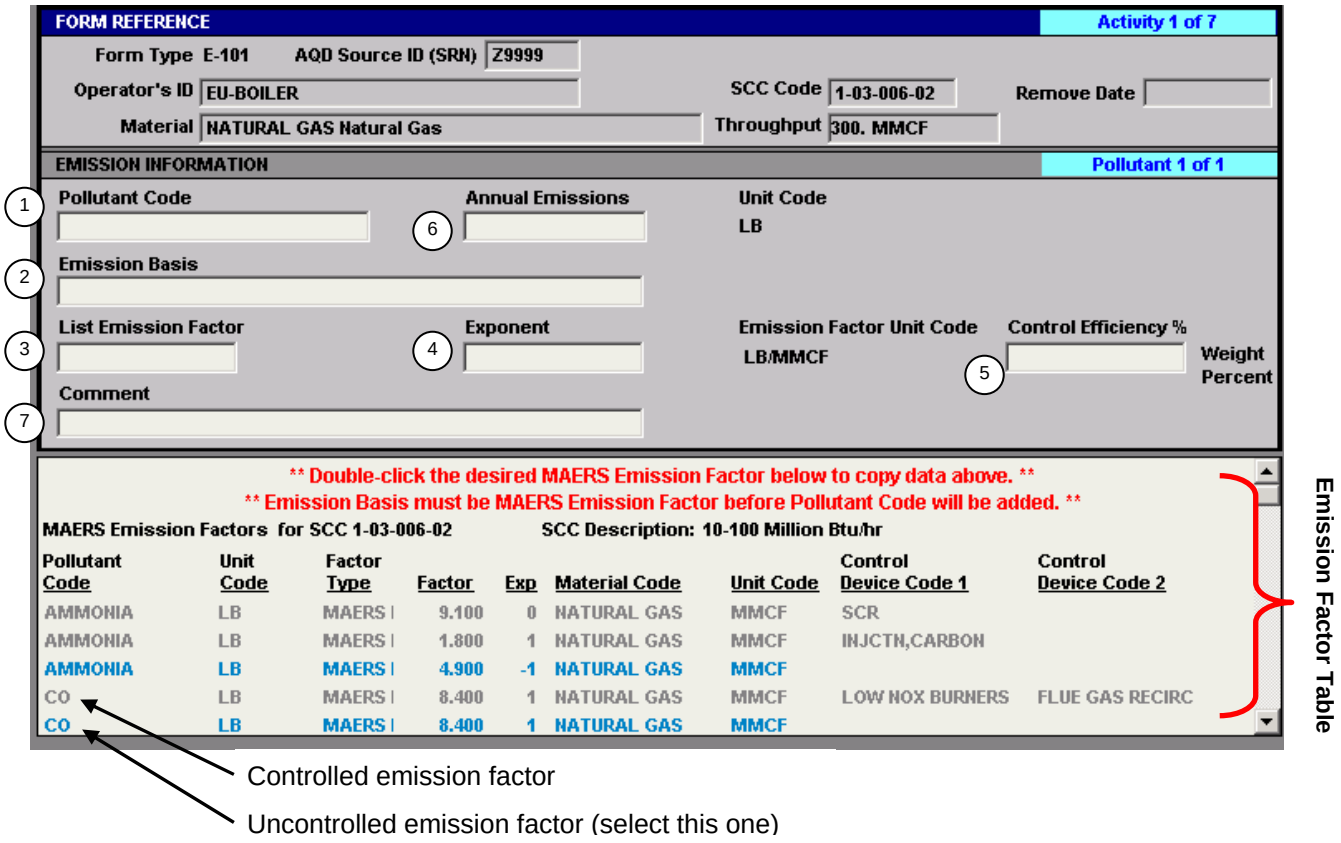
The Form Reference section on the E-101 form brings together information collected on the EU-101, A-101, and RG-101 forms. This information is pre-filled and cannot be edited. The following information is provided in this section:

- **Form Type**: Identifies the form type that is open (E-101).
- **AQD Source ID**: The facility's AQD Source ID or Source Registration Number (SRN).
- **Operator's ID**: The emission unit ID or reporting group ID that was created on the EU-101 or RG-101 forms.
- **SCC code**: The Source Classification Code entered on the A-101 form for the emission unit or reporting group currently displayed in this section.
- **Remove Date**: A date will only be displayed here if the SCC identified in this section was removed from MAERS on the A-101 form.
- **Material**: The throughput material and any material description identified on the A-101 form for the SCC currently displayed in this section.
- **Throughput**: The material throughput entered on the A-101 form for the material currently displayed in this section.

The numbers in the top, right corner of this section identify the emission record that is currently displayed. On this form, "Activity 1 of 3" indicates that the emissions record for activity 1 of 3 is currently displayed on the screen. There should be an emissions form for every activity identified on the A-101 form. To move to a different record, click anywhere in the Form Reference section (the title bar should be blue) and use the arrow buttons on the tool bar or click on the browse button and select the activity of interest.

Emission Information Section

Complete this section for **each** criteria pollutant that is emitted from the material identified in the Form Reference section.



1. **Pollutant Code:** First, check to see if a list of pollutants and emission factors are displayed in the emission factor table at the bottom of the screen. If so, those that appear in blue are criteria pollutants and must be reported. If you would like to estimate the emissions from these pollutants using the emission factors provided, double-click on the first blue criteria pollutant on the list. This field, along with the "Emission Basis", "Emission Factor", and "Exponent" fields, will be automatically pre-filled. After you have selected the first pollutant, choose **Edit** on the menu bar and select **Add Emission**. Now you can select the next criteria pollutant from the emission factor table. Continue adding pollutant records until all the criteria pollutants listed have been entered.

   Note: *More than one emission factor may be provided for a particular pollutant (see emission factor table above). This is because some emission factors have control devices associated with them (controlled). These factors appear gray. You cannot choose the* ***controlled*** *emission factor. Controlled emission factors are only provided to help calculate a default control efficiency when needed (see page 12-7).*

   If there are no emission factors associated with the SCC, or you do not want to use the emission factors provided to calculate your annual emissions, click on the "Pollutant Code" field and a drop-down list of pollutants will be displayed (Figure 12-1). The first set of pollutants are criteria pollutants, and they will appear blue. You must report at least one of these criteria pollutants. If more than one criteria pollutant is emitted, you must report these as well. After you have selected the first pollutant, choose **Edit** on the menu bar and select **Add Emission**. Select the next pollutant that is emitted. Continue adding pollutant records until all the criteria pollutants that are emitted have been entered.

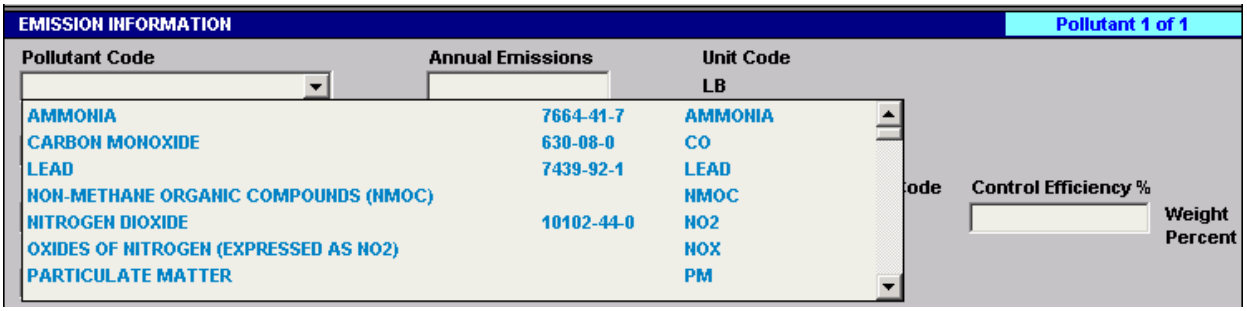


Figure 12-1: Pollutant Code Drop-Down List

2. Emission Basis: *(If this field has been pre-filled with "MAERS Emission Factor" and you would like to use the factors provided, skip this field)*. After you have identified the pollutants that need to be reported in the pollutant code field, you will need to enter the basis on which you will calculate your annual emissions for that pollutant. Click on the field and a drop-down list with your options will appear (Figure 12-2). Select the basis on which you will estimate emissions for this pollutant. Emissions should be estimated using the best available site-specific data according to the hierarchy below.

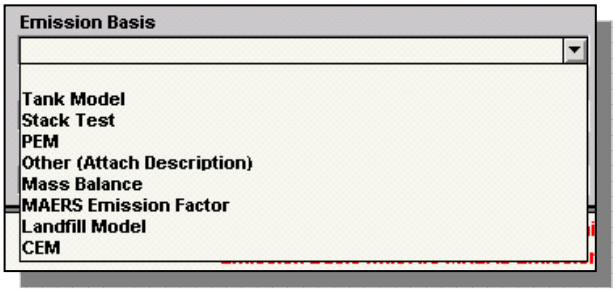


Figure 12-2: Emission Basis Drop-Down List

A. **CEM** - Continuous Emissions Monitoring

B. **Site Specific Stack Test** - Stack test protocol approved by AQD. Results from the most recent stack test (generally conducted less than five years previous) should be used. Stack tests must have been conducted in accordance with U.S. EPA protocol under conditions that 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. The TANK software can be accessed via the Internet at **www.epa.gov/ttn/chief**.

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. The Landfill software can be accessed via the Internet at **www.epa.gov/ttn/chief**.

G. **MAERS Emission Factor** - SCC code/emission factors that are in the MAERS reference table. These are either EPA or State emission factors. *If you are using an emission factor <u>not</u> provided in the emission factor table at the bottom of the screen, you should select "Other" as the emission basis.*

H. **Other** - If not previously identified, select "Other", and attach supporting documentation. Use of emission factors from the EPA's Compilation of Air Pollutant Emission Factors (AP-42) or Factor Information Retrieval System (FIRE) that are not listed in the MAERS emission factor table should be referenced here. Both AP-42 and FIRE can be accessed at **www.epa.gov/ttn/chief**.

Supporting Documentation
Copies of emission test reports, if available, and detailed calculations must be filed with each E-101 form when the Emission Basis is not MAERS Emission Factor. Submit copies of the test reports and calculations along with the P-101 Signature and Password form.

3-4. List Emission Factor/Exponent: These fields only need to be completed if you are using an emission factor to estimate emissions for the pollutant. If you are using another method to calculate your emissions (e.g. Mass Balance, TANKS, etc.) leave these fields blank. If "MAERS Emission Factor" was entered for Step 2, these fields will be pre-filled. If you are using a different emission factor, you need to complete these fields and provide supporting documentation.

List the proper emission factor, using scientific notation. The emission factor unit code will be pre-filled with the unit code pounds divided by the unit code for the material entered on the A-101 form (e.g. lb/gal, lb/MMCF).

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.

5. Control Efficiency %: Enter the control efficiency percent of the control device(s) for the pollutant being reported (this could be a combination of capture and destruction efficiencies). Control efficiencies may be listed on the equipment, in the equipment documentation, or by contacting the equipment supplier. If you do not have a control efficiency leave this field blank, **DO NOT ENTER ZERO "0."**

If you are using MAERS emission factors, after a control efficiency is entered you can run the Emissions Estimator and it will automatically calculate your actual controlled emissions (see Emission Estimator discussion on page 12-9). If you are not using MAERS emission factors to calculate your actual emissions, see the Control Efficiency Discussion below to calculate your actual emissions after control.

Using the Control Efficiency to Calculate Actual Emissions

If a facility has control equipment, the **actual emissions after control** can be calculated by multiplying the actual uncontrolled emissions by a control factor. Calculate the control factor by subtracting the percent control efficiency (entered for Step 5) from 100 and then dividing that number by 100. Overall control efficiency is calculated by multiplying the capture efficiency by the control efficiency. For example, if you have a control device with a capture efficiency of 85% and a control efficiency of 95%, the overall control efficiency would be 0.85 x 0.95 = **0.8075 (80.75%)**. Use the overall control efficiency to calculate the control factor (100 – 80.75)/100 = **0.19**. Now using the control factor, we can estimate the annual emissions after control. Using the control factor above, if an emission unit has actual uncontrolled emissions of 129,600 lbs/year, the actual emissions after control would be **129,600 lbs/year x 0.19 = 24,624 lbs/year or 12.31 ton/yr**. You would enter 12.31 tons into the Annual Emissions/Unit Code fields (see step 6).

WHAT IF I DON'T KNOW THE CONTROL EFFICIENCY FOR A POLLUTANT?

If you do not know the control efficiency for a particular pollutant you can use the controlled emission factor from the emission factor table on the E-101 form to calculate a "default control efficiency." The steps and example below explain how this is done:

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

$$\textbf{Default Control Efficiency} = 1 - \left(\frac{\textbf{Controlled EF}}{\textbf{Uncontrolled EF}} \right) \times 100$$

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%

Enter This Number in the Control Efficiency Field

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

6. Annual Emissions: Enter your actual annual emissions for the pollutant identified in Step 1 in pounds (LB). You can estimate your emissions using two methods.

(a) If you are using a MAERS emission factor to estimate your emissions, you can use the **MAERS Emission Estimator.** This is a tool in the software that will automatically calculate the emissions for those pollutants you identified with MAERS emission factors. The Emission Estimator discussion on page 12-9 explains how to use this tool. Follow the steps provided to calculate the emissions and generate a report *(if you calculated your emissions using the Estimator previously, you will need to re-calculate the emissions to incorporate any control efficiencies entered in step 5)*. **The Emission Estimator will not automatically pre-fill any fields**. Use the "Emission Unit Totals Report" or "SCC Detail Report," to enter the annual emissions in the "Annual Emissions field" on the E-101 form. Be sure you use the emissions estimate that was calculated after a control efficiency was entered in Step 5, otherwise your estimate will be for uncontrolled emissions instead of controlled emissions.

(b) If you are using another method to calculate your emissions (e.g. mass balance, CEM data), enter the actual annual emissions estimate you calculated in this field. Be sure that the annual emission estimate you enter into these fields takes into consideration any control efficiency you entered in Step 5 (see the control efficiency discussion on page 12-6 to calculate actual controlled emissions).

Note: The Emission Estimator will generate emission estimates for all pollutants that have an emission factor. You do not have to use these estimates; in fact, if you have a more accurate estimation that can be used (refer to the hierarchy in Step 2) select the appropriate emission basis in the "Emission Basis" field and enter your estimate into the "Annual Emissions" field. For

example, if you are estimating emissions for a coating line, emission factors will appear in the emission factor table for VOC. However, emission factors will not produce a very accurate emissions estimate because they are not site-specific. A more accurate way of calculating emissions from coating operations is by using the Mass Balance Method (see the *Coating Operations Emissions Calculation* Fact Sheet, which was included on your MAERS v2005.0.0 CD). When you look at the report generated by the Emission Estimator it will provide an annual emission estimate using MAERS emission factors. This number may not match the estimate that was calculated using the mass balance method. You should use the estimate **you** calculated using the mass balance method since it is site-specific and therefore more accurate.

7. **Comment:** If needed, enter any explanation or description of the information entered on this form in this field. If you have to submit calculations or other data to support your emissions estimate, you may want to enter "Supporting Data Attached" in this field.

- SAVE THE CHANGES AND CLOSE THE E-101 FORM -

NEED HELP?

For assistance with completing the E-101 form, contact your AQD district office (see Appendix D) or the Environmental Assistance Program at (800) 662-9278.

THE MAERS EMISSION ESTIMATOR

When using "MAERS Emission Factor" as the "Emission Basis" in Step 2, the MAERS software can calculate facility emissions by emission unit and SCC in one easy step using the Emission Estimator. The instructions below explain how the Emission Estimator works, how to use it, as well as how to view the results.

How It Works

The Emission Estimator reads the SCC, Material Code, and the Material Unit Code entered on the A-101 form. It then matches these identifiers with the Pollutant Codes that have uncontrolled emission factors entered on the E-101 form**.** Once a match is found, the Estimator multiplies the material throughput (amount) by the uncontrolled emission factor, adjusts the value using the user supplied control efficiency, and then stores the generated data internally, to be displayed in an Emissions Report.

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 software. The user must ensure that the correct identifiers are entered or the software 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 Emission Estimator to Calculate Emissions

Once the A-101 form has been completed and a control efficiency has been entered on the E-101 form, the MAERS Emission Estimator has enough information to calculate **controlled** emissions. To use the Emission Estimator, follow the steps below. **Note:** If a control efficiency is not entered on the E-101 form, the Emission Estimator will calculate **uncontrolled** emissions.

1. Close out of all forms and save any changes.

2. Choose **Tasks** on the menu bar and select **Calculate Emissions**. (The **Tasks** menu item will only appear on the menu bar if all forms are closed).

3. The Emission Estimator will then attempt to calculate controlled 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 (Figure 12-3). If a material throughput value has been entered, emissions will be calculated. In some cases, WT % Sulfur, WT % Ash, or WT % VOC are also required to be entered.

4. When the Emission Estimator is finished calculating your emissions, a message box will notify you. Click "OK."

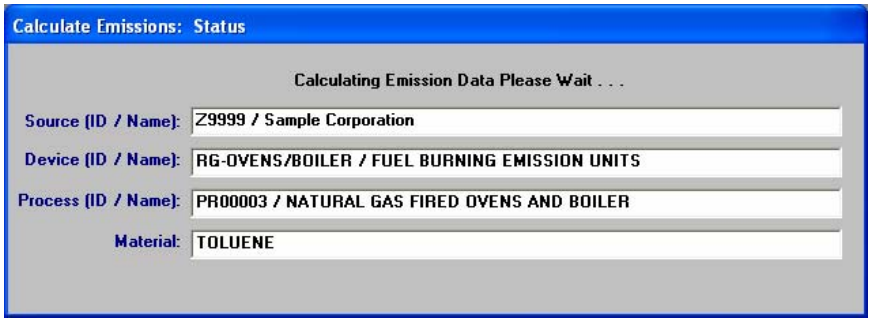


Figure 12-3: Emission Estimator

How to View the Calculated Emissions
Once the estimator is finished calculating emissions, Choose **Reports** on the menu bar and select **Audit Reports**, follow the arrow to **Emission Comparison**, and then **Emission Unit Totals** to view a report that provides emission estimates for each emission unit or select **SCC Detail** to view a report that provides emissions estimates for each SCC (Figure 12-4).

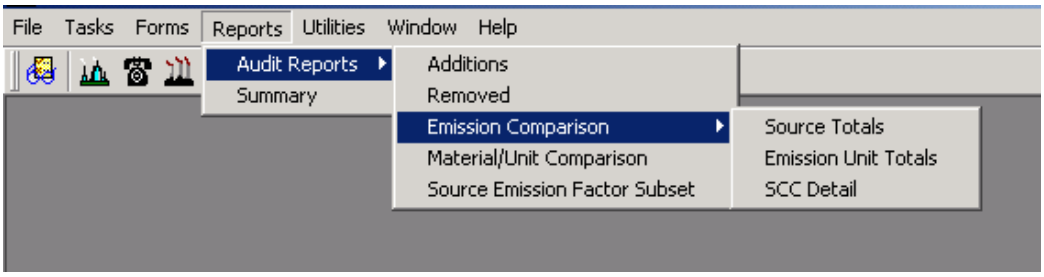


Figure 12-4: How to View Emission Unit Totals

If you choose "SCC Detail" from the report menu options, the **Emission Comparison – SCC Detail** report will appear (Figure 12-5). This report is divided into two columns - "SOURCE REPORTED EMISSIONS" on the left and "AQD CALCULATED EMISSIONS" on the right. The AQD calculated emissions column displays the Amount of pollutant emitted as well as the emission factor used from the MAERS Emission Factor table. Values will appear in the "source reported emissions" column **only** if you entered a number in the annual emissions field on the E-101 form prior to running the Emissions Estimator.

You must report, as a minimum, each of the criteria pollutants listed for each SCC on the E-101 form. If a control efficiency was entered for the pollutant on the E-101 form, the emission estimates provided in this report are **CONTROLLED**. If no control efficiency was entered for the pollutant on the E-101 form, the emission estimates provided in this report are **UNCONTROLLED**. Enter the emission estimate provided in this report into the "Annual Emissions" field for each pollutant (see the diagram on the following page).

IMPORTANT!

The Emission Estimator does NOT automatically pre-fill any of the fields on the E-101 form. You must enter the annual emission from the emission comparison report onto the E-101 form (see figures on the following page).

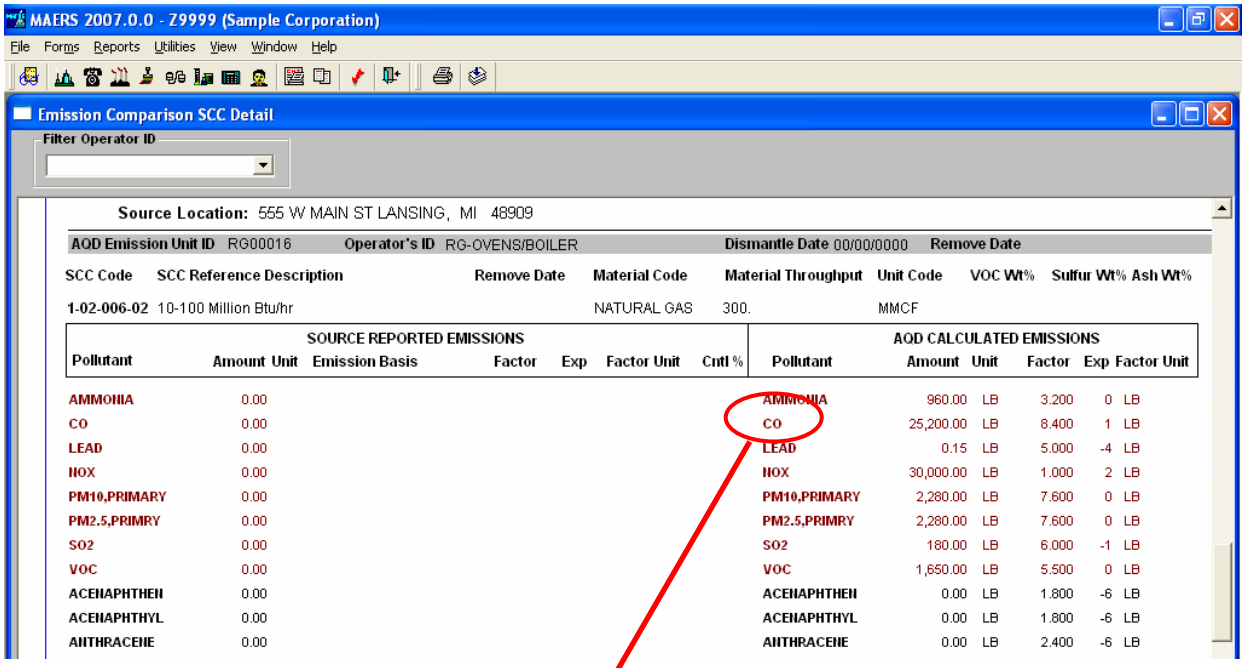


Figure 12-5: SCC Detail Report

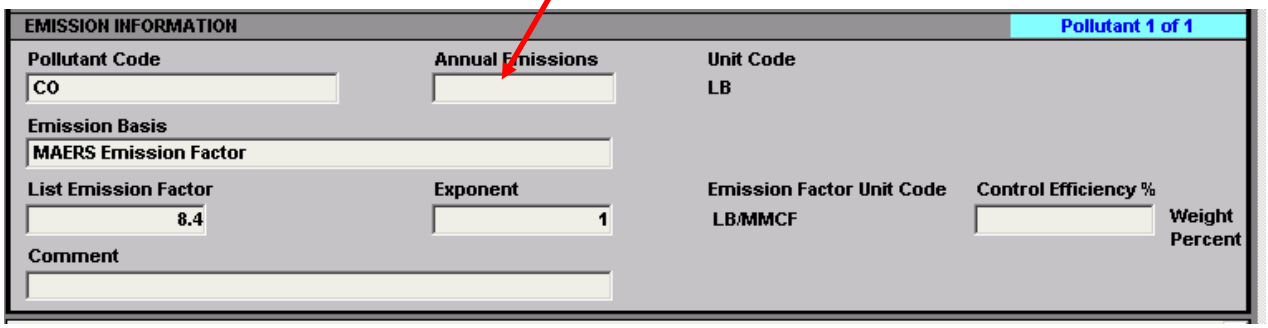


Figure 12-6: E-101 From

CHAPTER LESSON:
ADDING & DELETEING EMISSION RECORDS

ADDING EMISSION INFORMATION

If more than one pollutant needs to be reported for the material identified in the Form Reference section, you will need to add another pollutant. Follow the steps below to add emission information for additional pollutants.

1. After you have selected the first pollutant, choose **Edit** on the menu bar and select **Add Emission**.

2. You will be given a new Emission Information section to complete for the next pollutant.

DELETING EMISSION INFORMATION

If you would like to delete emission information for the material identified in the Form Reference section, follow the steps below.

1. Click anywhere in the Emission Information section (the section title bar will appear blue) and find the emission information you would like to delete.

2. Choose **Edit** on the menu bar and select **Delete Emission**.

3. The emission information will be deleted.