
ERTAC EGU Growth

MATS Case Study White Paper

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1. Purpose

On February 16, 2012, EPA finalized the Mercury and Air Toxics Rule (77 FR 9304, 40 CFR 63 Subpart UUUUU), called MATS. This rule requires control for various hazardous air pollutants on existing electric generating units (EGUs), specifically units with a capacity of more than 25 MW that burn coal or oil. The hydrogen chloride (HCl) and hydrogen fluoride emission limitations included in this rule will result in significant SO₂ reductions from these units as a co-benefit. The purpose of this case study is to estimate potential future year (FY) emission reductions from the EGU sector using the ERTAC tool.

2. Overview

This case study provides results from five scenarios for analysis, to determine the effect of MATS on emissions, and in some scenarios, the effect of MATS on future year activity. The ERTAC tool base cases are version 1.7, using base year (BY) 2007 and version 2.0, using BY 2011. The projected FYs for these analyses are 2017, 2018, 2020, and 2028.

| Scenario # | Scenario Name | Scenario Description |
|------------|----------------------|---|
| 1 | Flat rate option | This scenario applies a 0.2 lbs/mmbtu SO ₂ emission rate to any coal fired unit that will operate in the future year above that rate. |
| 2 | Capacity option | This scenario applies 90% or 98% control to any unit that will not meet 0.2 lbs/mmbtu in the FY and that has a capacity of at least 400 MW. Smaller units with non-compliant FY emission rates will have their emission rates reduced to 0.2 lbs/mmbtu SO ₂ . |
| 3 | Emission rate option | This scenario applies 90% or 98% control to any unit that will not meet 0.2 lbs/mmbtu in the FY and has an emission rate of more than 1.0 lbs/mmbtu SO ₂ in the FY. Units with an emission rate less than or equal to 1.0 lbs/mmbtu SO ₂ in the FY will have 0.2 lbs/mmbtu SO ₂ applied if they do not already meet that standard. |
| 4 | Retirement option | This scenario retires any unit with a capacity of less than 350 MW that does not meet 0.2 lbs/mmbtu in the FY. Coal units with a capacity of at least 350 MW and not meeting 0.2 lbs/mmbtu in the FY will have a 30% reduction in SO ₂ applied in the FY. The 30% reduction in SO ₂ accounts for co-benefits from HCl control strategies. |
| 5 | Fuel switch option | This scenario switches any coal unit with a capacity of less than 350 MW that does not meet 0.2 lbs/mmbtu in the FY to natural gas. Units with a capacity of at least 350 MW and not meeting 0.2 lbs/mmbtu in the FY will have a 30% reduction in SO ₂ applied in the FY. |

3. ERTAC Tool Synopsis

This case study will use the ERTAC tool to analyze potential FY scenarios for MATS, based on variations in the input files to the tool. The ERTAC tool couples (1) growth rate information derived from EIA AEO and NERC data with (2) unit-specific information derived from state input and (3) hourly BY activity and emissions data derived from CAMD to produce likely FY activity and emissions files on an hourly basis for each unit. The tool analyzes those units for which hourly activity data exists, which are mainly those units that report to CAMD under 40 CFR Part 75. The ERTAC tool uses growth factors appropriate for the EGU sector. Therefore, it does not provide FY estimates for units better grown using factors based on industrial classifications, such as units at petroleum refineries and kraft mills that produce steam and/or power for use internally rather than by the electrical grid at large.

Growth rate information from AEO 2013 contains assumptions concerning the effects of MATS on the overall regional fuel usage. In that respect, the ERTAC base cases of 1.7 and 2.0 both reflect the impact of MATS on a regional level. This case study applies assumptions to allow analysis of MATS at the unit and hourly level. State staff and planning organization staff may find estimates of the impact of MATS at the unit level in terms of hourly activity and hourly emissions inventory data illustrative, and these results may help inform future technical work.

4. Background

Combustion turbines, unless part of an IGCC facility, are not applicable to the MATS rule, and therefore the existing unit requirements are mainly applicable to coal and oil-fired boilers. The rule provides alternative emission rate limitations for applicable units to demonstrate compliance with the acid gas provisions. Table 5 in the rule provides these limits for existing coal and oil-fired EGUs. This table applies a 0.2 lbs SO₂/mmbtu limitation on coal-fired units, as one alternative to compliance; however, the table provides no such alternative limitations for existing oil-fired units. The table also provides alternative limitations for solid oil-derived EGUs. The examples of solid oil-derived EGUs provided within the preamble are those that burn pet coke, and these types of units are generally best grown using industry-specific growth factors rather than AEO growth factors for the electrical sector. States have labeled most of these types of units as “non-EGUs” in the UAF. Therefore, this case study will focus on the effects of MATS on coal-fired EGUs.

The rule applies the 0.2 lbs SO₂/mmbtu alternative limitation on a 30 rolling boiler operating day average. Generally facilities will operate at a set point somewhat beneath the 0.2 lbs/mmbtu to ensure compliance. However, the use of a 30 boiler operating day average does allow for some variability above 0.2 lbs/mmbtu on hours within the average. Additionally, the rule allows for emissions averaging at units that are located at the same facility.

Rather than meet the SO₂ limitation, facilities have the option of performing quarterly testing and monitoring to determine compliance with an HCl limitation. Control of HCl will result in SO₂ emission reductions. However, depending on fuel used and other operational considerations, compliance with the HCl limit will not guarantee that a unit will emit at or beneath 0.2 lbs/mmbtu SO₂.

5. Approach

5.1. Base Case

The study will use two base cases. One base case will be the ERTAC tool results version 1.7, which uses a 2007 BY. The second base case will be the ERTAC tool results version 2.0, which uses a 2011 BY. The following table contains the input file names used in this case study.

| 2007 Base Year | | 2011 Base Year | |
|--|--|--|--|
| File Name | File Description | File Name | File Description |
| UAF for 1-7_2017_V3 UAF for 1-7_2018_V2 UAF for 1-7_2020_V2 | UAF for version 1.7 | UAF_2-0_2017_8-16-2013 UAF_2-0_2018_8-16-2013 UAF_2-0_2020_8-16-2013 | UAF for version 2.0 |
| Controls File for 1-7_2017_V3 Controls File for 1-7_2018_V2 Controls File for 1-7_2020_V2 | Controls file for version 1.7 | Controls_File_2-0_2017_8-16-2013 Controls_File_2-0_2018_8-16-2013 Controls_File_2-0_2020_8-16-2013 | Controls file for version 2.0 |
| Input Variables for 1-7_V3 Input Variables for 1-7_2018_V2 Input Variables for 1-7_2020_V2 | Input variables file for version 1.7 | Input Variables_2-0_2017_8-16-2013 Input Variables_2-0_2018_8-16-2013 Input Variables_2-0_2020_8-16-2013 | Input variables file for version 2.0 |
| nonCAMD hourly for 1-7_2017_V3 nonCAMD hourly for 1-7_2018_V2 nonCAMD hourly for 1-7_2020_V2 | Non-CAMD input file for version 1.7 | None | Non-CAMD input file for version 2.0 |
| CAIR_State_Totals_1-7_2017_V3 CAIR_State_Totals_1-7_2018_V2 CAIR_State_Totals_1-7_2020_V2 | State cap input file for version 1.7 based on state specific rules | CAIR_State_2-0_2017_8-16-2013 CAIR_State_2-0_2018_8-16-2013 CAIR_State_2-0_2020_8-16-2013 | State cap input file for version 2.0 based on state specific rules |
| CAIR_Group_Totals_1-7_2017_V3 CAIR_Group_Totals_1-7_2018_V2 CAIR_Group_Totals_1-7_2020_V2 | Group cap input file for version 1.7 based on CAIR | CAIR_Group_2-0_2017_8-16-2013 CAIR_Group_2-0_2018_8-16-2013 CAIR_Group_2-0_2020_8-16-2013 | Group cap input file for version 2.0 based on CAIR |
| Camd_hourly_base_CONUS_49states_non4 140-B3.csv | Base year CAMD hourly data file for version 1.7 | Camd_2011_hourly_camd_ertac_CON US.csv | Base year CAMD hourly data file for version 2.0 |

5.2. Future Years Analyzed

The compliance date for existing units under MATS is April 16, 2015. However, authorities may grant extensions for particular units under a number of circumstances, up to one year from

this date. Therefore, the compliance date for some units may be as late as April 16, 2016. Future years analyzed by this case study will be 2017, 2018, 2020, and 2028. Using these years should allow analyses that do not need to consider partial compliance by the existing source universe of the MATS rule.

5.3. *Assumptions*

The rule applies to coal and oil-fired EGUs of more than 25 MW capacity. The MATS rule does not apply to combustion turbines unless the turbines are part of an IGCC facility. Therefore, this rule's existing unit universe will consist mainly of coal-fired and oil-fired boilers. Oil-fired EGU boilers do not have significant acid gas constraints. Therefore, none are expected to install additional FGD or make other major changes that would result in significant SO₂ emission reductions in any FY. The rule also applies to solid oil-derived fuel fired units, and examples of such units provided are those that burn pet coke. These units are generally defined in the ERTAC tool UAF as "non-EGUs" so that any impact this rule may have on these units will not affect the output of the ERTAC tool. Also, few if any IGCC units are in the version 1.7 or the version 2.0 UAF. Due to these considerations, this case study is limited to the effects of MATS on existing coal-fired boilers.

As part of the MATS rule, units requesting an extension of the compliance date must submit a request for the extension with information delineating the need for such an extension. These submittals may contain a significant amount of data on a unit's final control strategy for MATS. This information may include plans for flue gas desulfurization (FGD) or other control installation; unit retirement dates; or the date of any fuel switch (such as a switch to natural gas) for a unit. This case study assumes that information in these extensions is included, as appropriate, in the version 1.7 and 2.0 UAF and controls file. Therefore, Scenarios 1, 2 and 3 does not attempt to identify additional units that may either retire or switch fuels as a MATS compliance strategy, other than those already identified by state representatives in the version 1.7 and the version 2.0 UAF. Scenarios 4 and 5 use size and emission rates to cull units that may be retired or gasified due to MATS.

Any new unit that is state supplied or is created as a generation deficit unit by the ERTAC tool is expected to meet MATS requirements upon startup. Emission factors associated with new units, either supplied in the control file or calculated by the tool based on information in the input_variable files, should be low enough to meet MATS without further modifications to the tool's output. Therefore, this case study does not attempt to manipulate emission rates from new facilities.

The scenarios listed below within this case study affect information in the version 1.7 UAF and controls file as well as the version 2.0 UAF and controls file. All other files in the 1.7 and 2.0 runs are unchanged.

5.4. Scenario 1/Flat Rate Option

This scenario will determine which coal-fired units operate in the FY at more than 0.2 lbs/mmbtu SO₂. In this scenario, these coal-fired units will have FY emission rates updated to 0.2 lbs/mmbtu. The scenario assumes that all coal-fired units will at least meet the 0.2 lbs/mmbtu alternate limit, and that no retirements, beyond those already listed in the UAF, will occur. This scenario makes no allowances for units that may choose to install control devices that will not meet the 0.2 lbs/mmbtu SO₂ rate but will comply with HCL limitations determined by periodic testing.

5.4.1. UAF input file

Units in the UAF are sorted to determine the subset of units that meets the following criteria:

- Existing coal fired EGUs that are not retiring or switching fuels prior to the FY (offline_start_date>FY);
- Existing coal fired EGUs that have capacities of more than 25 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000>25)

This information from the UAF will be compared to average annual emission rates in the base year obtained from the CAMD database on an annual and unit basis. Units with average annual BY emission rates that are less than 0.2 lbs/mmbtu will be removed from the units examined for potential modification in this scenario.

5.4.2. Controls input file

Units identified in Section 5.4.1 will be compared to data in the controls file. Units that will be controlled in the FY to at least an emission rate of 0.2 lbs/mmbtu SO₂ will not be modified. Units that will not be controlled in the future year to at least 0.2 lbs/mmbtu SO₂ will have an emission rate added to the controls file equal to 0.2 lbs/mmbtu SO₂. The updated control files will be named “MATS_1_v1-7_controls.xlsx” and “MATS_1_v2-0_controls.xlsx.” All output files from this scenario will have the “MATS_1_v1-7” or the “MATS_1_v2-0” label included to allow easy identification of results.

5.5. Scenario 2/Capacity Option

This scenario represents a less conservative approach to estimating emission reductions obtained from MATS. This scenario assumes that units at or above a size limit (400 MW) will install FGD to meet MATS, and that the FGD, with a 90% control efficiency, may reduce emissions to well beneath 0.2 lbs/mmbtu SO₂ for these units. For units where 90% control efficiency does not

allow a unit to achieve the 0.2 lbs/mmbtu SO₂ rate, 98% control efficiency will be applied. Units below 400 MW will have a 0.2 lbs/mmbtu SO₂ rate assigned, unless the unit already emits at less than this rate on an annual average. In all cases where the annual average for a unit is already at or below 0.2 lbs/mmbtu, the unit's emission rates will not be changed.

5.5.1. UAF input file

Units in the UAF are sorted to create two subsets of units meeting the following criteria:

- Subset of small units:
 - Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);
 - Existing coal fired EGUs that have capacities of more than 25 MW but less than 400 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000>25 and <400).
- Subset of large units
 - Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);
 - Existing coal fired EGUs that have capacities of at least 400 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000 ≥ 400).

This information from the UAF will be compared to average annual emission rates in the base year obtained from the CAMD database on an annual and unit basis. Units with average annual BY emission rates that are less than 0.2 lbs/mmbtu will not be changed.

5.5.2. Controls input file

Units identified in Section 5.5.1 will be compared to data in the controls file. Units controlled in the FY to at least an emission rate of 0.2 lbs/mmbtu SO₂ will not be modified. Remaining units that are less than 400 MW and not controlled in the FY to at least 0.2 lbs/mmbtu SO₂ will have an emission rate added to the controls file equal to 0.2 lbs/mmbtu SO₂. Remaining units that are at least 400 MW will have a 90% control requirement added to the controls file. If the 90% control efficiency, multiplied by the base year annual emission rate for SO₂, does not achieve the 0.2 lbs/mmbtu SO₂ rate, this control efficiency will be increased to 98%. The updated control files will be named "MATS_2_v1-7_controls.xlsx" and "MATS_2_v2-0_controls.xlsx." All output files from this scenario will have the "MATS_2_v1-7" or the "MATS_2_V2-0" labels included to allow easy identification of results.

5.6. Scenario 3/Emission Rate Option

This scenario also represents a less conservative approach to estimating emission reductions obtained from MATS. This scenario assumes that units above an emissions rate of 1.0 lbs/mmbtu (annual average) will install wet FGD to meet MATS. The FGD, with a 90% control efficiency, may reduce emissions to well beneath 0.2 lbs/mmbtu SO₂ for these units. Where 90% control efficiency does not allow a unit to achieve the 0.2 lbs/mmbtu SO₂ rate, 98% control efficiency will be applied. For units at or beneath 1.0 lbs/mmbtu SO₂ on an annual average, those with rates above 0.2 lbs/mmbtu SO₂ will have their FY rates set at 0.2 lbs/mmbtu in the controls file.

5.6.1. UAF input file

Units in the UAF are sorted to determine which coal-fired units are operating and subject to MATS in the FY:

- Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);

This information from the UAF will be compared to average annual emission rates in the BY obtained from the CAMD database on an annual and unit basis. Units with average annual emission rates that are less than 0.2 lbs/mmbtu will be removed. Units are further sorted to a subset for those with emission rates between 0.2 lbs/mmbtu and 1.0 lbs/mmbtu SO₂ (Subset 1) and those with emission rates > 1.0 lbs/mmbtu SO₂ (Subset 2).

5.6.2. Controls input file

Units identified in Section 5.6.1 will be compared to data in the controls file. Units controlled in the FY to at least an emission rate of 0.2 lbs/mmbtu SO₂ will not be modified. Remaining units that have FY emission rates between 0.2 lbs/mmbtu and 1.0 lbs/mmbtu SO₂ will have their FY emission rate set at 0.2 lbs/mmbtu. Remaining units that have FY emission rates above 1.0 lbs/mmbtu will have 90% control efficiency applied. If 90% control efficiency does not reduce emissions to at least 0.2 lbs/mmbtu, 98% control efficiency will be applied. The updated control files will be named “MATS_3_v1-7_controls.xlsx” and “MATS_3_v2-0_controls.xlsx.” All output files from this scenario will have the “MATS_3_v1-7” or the “MATS_3_V2-0” labels included to allow easy identification of results.

5.7. Scenario 4/Retirement Option

This scenario, along with Scenario 5, represents an alternative approach to determining the effects of MATS. First, units that are smaller than 350 MW and are not meeting or expected to

meet at least 0.2 lbs/mmbtu in the FY will be retired. These retirements may result from the assumption that investment in controls for these units are not economical given the current economic conditions (e.g., retrofit costs for older units). Units that are at least 350 MW and are not meeting or expected to meet 0.2 lbs/mmbtu in the FY will have a 30% control estimate assumed in the FY. A 30% reduction from BY emission rates may not allow a unit to achieve 0.2 lbs/mmbtu SO₂. The assumption of 30% reduction in SO₂ derives from the potential installation of HCl control technologies other than FGD on units, such as dry sorbent injection (DSI). DSI and other technologies may be a more economical choice for a number of reasons, such as scarcity of water resources, availability of landfill capacity, availability of coal with low chlorine contents, boiler configurations, and other factors. A 30% assumed reduction also makes allowances for the fact that some owners may decide to use higher sulfur (cheaper) coal in units on which controls have been installed for MATS purposes, if no constraints on coal sulfur content exists for a particular unit.

5.7.1. UAF input file

Units in the UAF are sorted to create two subsets of units meeting the following criteria:

- Subset of small units:
 - Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);
 - Existing coal fired EGUs that have capacities of more than 25 MW but less than 350 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000>25 and <350).
- Subset of large units
 - Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);
 - Existing coal fired EGUs that have capacities of at least 350 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000 ≥ 350).

This information from the UAF will be compared to average annual emission rates in the BY obtained from the CAMD database on an annual and unit basis. Units with average annual BY emission rates that are as low as 0.2 lbs/mmbtu or lower and in the small subset will remain unchanged. Units with an average annual BY emissions rate that is more than 0.2 lbs/mmbtu will be retired.

Similarly, units in the large subset will have the average annual emission rates in the BY examined. Those with BY data that is at least 0.2 lbs/mmbtu SO₂ will be removed and unchanged in the scenario.

5.7.2. Controls input file

Units identified in Section 5.7.1 in the large subset of units will be compared to data in the controls file. Units controlled in the FY to at least an emission rate of 0.2 lbs/mmbtu SO₂ will not be modified. Remaining units that have FY emission rates above 0.2 lbs/mmbtu will have a 30% reduction in emissions applied in the FY. The updated control files will be named “MATS_4_v1-7_controls.xlsx” and “MATS_4_v2-0_controls.xlsx.” All output files from this scenario will be similarly labeled to allow easy identification of results.

5.8. Scenario 5/Fuel Switch Option

This scenario is similar to 4/retirement option except that instead of assuming small, under-controlled units are retired, this scenario assumes that these small coal-fired units are switched to natural gas. Again, these gasifications may result from the assumption that investment in controls for these units are not economical given the current economic conditions (e.g., plentiful and cheap natural gas). Units that are at least 350 MW and are not meeting or expected to meet 0.2 lbs/mmbtu in the FY will have a 30% control estimate assumed in the FY. A 30% reduction from BY emission rates may not allow a unit to achieve 0.2 lbs/mmbtu SO₂. As in Scenario 4/retirement option, the 30% reduction in SO₂ may result from the application of HCl controls.

5.8.1. UAF input file

Units in the UAF are sorted as described in Section 5.7.1. However, units with an average annual BY emissions rate that is more than 0.2 lbs/mmbtu will be switched to natural gas. For the new gas units, the program needs certain columns updated or filled in to allow the tool to distribute generation to the new gas units. The table below describes these columns and the information inserted for each of the gasified units.

| UAF Field Name | Data for Gas Unit | Comment |
|--------------------------|---|--|
| BY-CAMD-hourly_data_type | NEW | This field identifies the type of hourly data available for a unit. Choices are FULL, PARTIAL, NON-EGU, and NEW. The gasified units should be marked as “NEW” in this field to allow the tool to properly process them. |
| New_Unit_Flag | Y | This field helps identify new units to the user and for the tool algorithm. |
| Max_Unit_Heat_Input | Equivalent to the value in the field for the existing coal unit | This field identifies the maximum hourly heat input for a unit in mmbtu/hr. The data is generally found in the CAMD facility level database. For this scenario, the value for the gasified unit is assumed to be equal to the value assigned to the coal unit. |

| UAF Field Name | Data for Gas Unit | Comment |
|-------------------|-------------------|---|
| Nominal_Heat_Rate | 10,000 btu/kw-hr | This field identifies the state-supplied heat rate in btu/kw-hrs that the program will use in calculating gross load. This field is not filled in for every unit. New units such as these gasified units are required to have this data available. Otherwise, the tool will not properly apportion gross load to the new units. |

5.8.2. Controls input file

Units identified in Section 5.8.1 in will have the controls file updated as described in Section 5.7.2. The updated control files will be named “MATS_5_v1-7_controls.xlsx” and “MATS_5_v2-0_controls.xlsx.” All output files from this scenario will be similarly labeled to allow easy identification of results.

6. Post Processors

The enhance unit level activity post processor will be used to analyze all data sets.

7. Case Study Output File Location

The input and output files for this case study will be available on the ERTAC tool website.

8. Case Study Timeline

| Milestone | Expected Completion Date | Comments |
|---|--------------------------|---|
| Review and input of case study by MJO staff, state staff, and industry | September 2013 | . |
| Review and analysis of UAF and CAMD data, as well as controls files, to implement scenarios in case study | October 2013 | Will depend on when Wendy gets the final 1.7/2.0 UAF and 1.7/2.0 controls file finished, and when we get the final results from the 1.7/2.0 work. Also, may need to coordinate on how to implement the various runs (updating the tool inputs and rerunning, or post-processing output files). |
| Runs completed | Early November 2013 | |
| Data files, including enhanced unit activity file, available for download | Mid November 2013 | |

9. Case Study Update

After scrutiny of the MATS case study run results, the ERTAC committee created a subsequent base case, called 2.2. The 2.2 base case was created using BY 2011. The 2.2 base case used UAF and controls information updated as of April 22, 2014, to create a 2018 projection year

inventory. This base case included additional retirements, gasifications, and controls placed on existing coal-fired EGUs. Planning organizations expressed interest in obtaining MATS case study results using the 2.2 base case in conjunction with Scenario #2 and Scenario #4. ERTAC members also expressed interest in adding Scenario #6. Scenario #6 would be similar to Scenario #4 but would reduce SO₂ emissions by 15%. This reduction in SO₂ emissions would approximate the expected SO₂ reduction from units burning coal with low chlorine and fluorine contents, such that only minor scrubbing of acid gases need to take place to meet MATS compliance limits. The following table describes these revised runs:

| Scenario # | Scenario Name | Scenario Description |
|------------|------------------------------------|--|
| 2 | Capacity option | This scenario applies 90% or 98% control to any unit that will not meet 0.2 lbs/mmbtu in the FY and that has a capacity of at least 400 MW. Smaller units with non-compliant FY emission rates will have their emission rates reduced to 0.2 lbs/mmbtu SO ₂ . |
| 4 | Retirement option | This scenario retires any unit with a capacity of less than 350 MW that does not meet 0.2 lbs/mmbtu in the FY. Coal units with a capacity of at least 350 MW and not meeting 0.2 lbs/mmbtu in the FY will have a 30% reduction in SO ₂ applied in the FY. The 30% reduction in SO ₂ accounts for co-benefits from HCl control strategies. |
| 6 | Retirement option, reduced control | This scenario retires any unit with a capacity of less than 350 MW that does not meet 0.2 lbs/mmbtu in the FY. Coal units with a capacity of at least 350 MW and not meeting 0.2 lbs/mmbtu in the FY will have a 15% reduction in SO ₂ applied in the FY. The 15% reduction in SO ₂ accounts for co-benefits from HCl control strategies used in conjunction with coal containing low amounts of chlorine. |

9.1. Scenario 6/Retirement Option

In this scenario, units smaller than 350 MW and are not meeting or expected to meet at least 0.2 lbs/mmbtu in the FY will be retired. These retirements may result from the assumption that investment in controls for these units are not economical given the current economic conditions (e.g., retrofit costs for older units). Units that are at least 350 MW and are not meeting or expected to meet 0.2 lbs/mmbtu in the FY will have a 15% control estimate assumed in the FY. A 15% reduction from BY emission rates may not allow a unit to achieve 0.2 lbs/mmbtu SO₂. The assumption of 15% reduction in SO₂ derives from the potential installation of HCl control technologies other than FGD on units, such as dry sorbent injection (DSI). DSI and other technologies may be a more economical choice for a number of reasons, such as scarcity of water resources, availability of landfill capacity, availability of coal with low chlorine contents, boiler configurations, and other factors. A 15% assumed reduction makes allowances for the fact that some owners may decide to use coals lower in chlorine, which require less scrubbing to be compliance with MATS.

9.2. UAF input file

Units in the UAF are sorted to create two subsets of units meeting the following criteria:

- Subset of small units:

- Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);
- Existing coal fired EGUs that have capacities of more than 25 MW but less than 350 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000>25 and <350).
- Subset of large units
 - Existing coal fired EGUs that are not retiring or switching fuels prior to FY (offline_start_date>FY);
 - Existing coal fired EGUs that have capacities of at least 350 MW; (max_unit_heat_input_hourly_summer / ertac_heat_rate*1000 ≥ 350).

This information from the UAF will be compared to average annual emission rates in the BY obtained from the CAMD database on an annual and unit basis. Units with average annual BY emission rates that are as low as 0.2 lbs/mmbtu or lower and in the small subset will remain unchanged. Units with an average annual BY emissions rate that is more than 0.2 lbs/mmbtu will be retired.

Similarly, units in the large subset will have the average annual emission rates in the BY examined. Those with BY data that is at least 0.2 lbs/mmbtu SO₂ will be unchanged in the scenario.

The updated UAF will be named “CONUSv2.2_XXXX2014_MATS_6_UAF.xlsx.” The month and day of the run should be inserted into XXXX.

9.3. *Controls input file*

Units identified in Section 5.7.1 in the large subset of units will be compared to data in the controls file. Units controlled in the FY to at least an emission rate of 0.2 lbs/mmbtu SO₂ will not be modified. Remaining units that have FY emission rates above 0.2 lbs/mmbtu will have a 10% reduction in emissions applied in the FY. The updated control files will be named “CONUSv2.2_XXXX2014_MATS_6_controls.xlsx.” All output files from this scenario will be similarly labeled to allow easy identification of results.

9.4. *Post Processors*

The enhance unit level activity post processor will be used to analyze these new data sets based on 2.2.

9.5. *Case Study Output File Location*

The input and output files for the updated case study based on 2.2 will be available on the ERTAC tool website.