

industrial, commercial, and institutional boilers and process heaters.

As a result of the preceding evaluation of the feasibility of establishing emission limits based on control techniques such as fuel switching and good combustion practices, we concluded that add-on control technology should be the primary factor for purposes of identifying the best controlled units within each subcategory of boilers and process heaters. In order to determine the MACT floor based primarily on add-on control technologies, we first examined the population database of existing sources. Units not meeting the definition of an industrial, commercial, or institutional boiler or process heater, and units located at area sources were removed from the database. The remaining units were divided first into three subcategories based on fuel state: gaseous fuel-fired, liquid fuel-fired, and solid fuel-fired units. Each of these three subcategories was then further divided into subcategories based on capacity: (1) Large units (watertube boilers and process heaters with heat inputs greater than 10 MMBtu/hr); (2) small units (fired tube boilers and any boiler and process heater with a maximum rated heat input capacity of 10 MMBtu/hr or less); and (3) limited use units with capacity utilization less than 10 percent.

We identified the types of air pollution control techniques currently used by existing boilers and process heaters in each subcategory. We ranked those controls according to their effectiveness in removing the different categories of pollutants; including metallic HAP and PM, inorganic HAP such as acid gases, mercury, and organic HAP. The EPA ranked these existing control technologies by incorporating recommendations made by the ICCR, and by reviewing emissions test data, previous EPA studies, and other literature, as well as by using engineering judgement.

Based upon the emissions reduction potential of existing air pollution control techniques, we listed all the boilers and process heaters in the population database in order of decreasing control device effectiveness within each subcategory for each pollutant type. Then we identified the top 12 percent of units within each category based on this ranking, and determined what kind of emission control technology, or combination of technologies, the units in the top 12 percent employed. Finally, we looked at the emissions test data from boilers and process heaters that used the same control technology, or technologies, as the units in the top 12 percent to

estimate the average emissions limitation achieved by these units.

The last part in the process described above, involving the calculation of numerical emission limits, was a two-step analysis. The first step involved calculating a numerical average of an appropriate subset of the emission test data from units using the same technology, or technologies, as the units in the top 12 percent. Based on the initial ranking, we determined what proportion of the units using a particular technology were among the top 12 percent of units in the subcategory. Then we looked at a corresponding proportion of the emission test data from units using that type of control technology, and produced an overall average measured performance level. For example, in the large solid-fuel subcategory, approximately 14 percent of units used the best performing control technology for PM/metallic HAP (baghouses). In order to rank the units using the best technology for which we had emission test data, we generated unit by unit measured performance levels by averaging the multiple tests from each individual unit (if multiple tests were available). Then we looked at the best 12/14 of the units for which we generated such individual averages, and averaged the unit by unit averages from all of these units. This resulted in an overall average measured emissions performance level for units representative of the top 12 percent of units in the subcategory.

The second step in this part of the process involved generating and applying an appropriate variability factor to account for unavoidable variations in emissions due primarily to uncontrollable differences in fuel characteristics and ordinary operational variability. First, we identified all the units for which we had emission test data using the same technology, or technologies, as units in the top 12 percent. Then, for each such unit with multiple emission tests, we calculated the variability in the measured emissions from that unit by dividing the highest three-run test result by the lowest three-run test result. Finally, we calculated the overall variability in the measured emissions from these units by averaging all the individual unit variability factors, and we applied this overall variability factor to the overall average measured emissions performance level (as described above) to derive a emission limit representative of the average emission limitation achieved by the top 12 percent of units.

This approach reasonably ensures that the emission limit selected as the MACT

floor adequately represents the average level of control actually achieved by units in the top 12 percent, considering ordinary operational variability. Both the analysis of the measured emissions from units representative of the top 12 percent, and the variability analysis, are reasonably designed to provide a meaningful estimate of the average performance, or central tendency, of the best controlled 12 percent of units in a given subcategory. Using such an approach, including a variability factor, is reasonable because the estimated performance of the best controlled units must account for variability in the performance of the units over time and under different operational conditions. Absent comprehensive emission data, there is no reason to believe that any individual unit could consistently achieve the emission performance demonstrated by a limited set of emission tests. Because, each emission test is but a snapshot of actual and ongoing performance, taken at one moment in time, evaluating the snapshots collectively is the best way to estimate the unavoidable variation in emissions expected to occur and recur over time at similarly controlled units in the category (or subcategory). As a result, the most reasonable methodology for determining the variability among the best controlled units is to evaluate the overall variability in the performance of the particular control technology that those units use, by examining the variability among the emission test results (the performance snapshots) for all similarly controlled units (excluding any emission values from tests that did not represent a proper functioning system). Accordingly, we have used the available emissions data to reasonably estimate the variability of the top performing units in each subcategory.

The EPA's review of emissions data indicates that some boilers and process heaters within each subcategory may be able to meet the floor emission levels without using the air pollution control technology that is used by the top 12 percent of units in the subcategory. This is to be expected given the variety of fuel types, fuel input rates, and boiler designs included within each subcategory and the resulting variability in emission rates. Thus, for instance, boilers or process heaters within the large unit solid fuel subcategory that burn lower percentages of solid fuels may be able to achieve the emission levels for the large unit solid fuel subcategory without the need for additional control devices.

Furthermore, solid fuels, especially coal, are very heterogeneous and can