

conversations with turbine manufacturers.

The information contained in the inventory database is believed to be representative of stationary combustion turbines primarily because of its comprehensiveness. The database includes both small and large stationary combustion turbines in different user segments. Forty-eight percent are "industrial," 39 percent are "utility," and 13 percent are "pipeline." Note that independent power producers (IPP) are included in the utility and industrial segments.

We examined the inventory database for information on HAP emission control technology. There were no turbines controlled with oxidation catalyst systems in the inventory database so we used information supplied by catalyst vendors. There are about 200 oxidation catalyst systems installed in the U.S. The only control technology currently proven to reduce HAP emissions from stationary diffusion flame combustion turbines is an oxidation catalyst emission control device, such as a CO oxidation catalyst. These control devices are used to reduce CO emissions and are currently installed on several stationary combustion turbines. However, less than 3 percent of existing stationary diffusion flame combustion turbines in the U.S., based on information in our inventory database and information from catalyst vendors, are equipped with oxidation catalyst emission control devices; thus, the average of the best performing 12 percent of existing diffusion flame combustion turbines is no HAP emissions reductions.

We also investigated the use of good operating practices for stationary diffusion flame combustion turbines to determine if the use of such practices might identify a MACT floor. There are no references in the inventory database to good operating practices for any stationary combustion turbines.

Most stationary diffusion flame combustion turbines will not operate unless preset conditions established by the manufacturer are met. Stationary diffusion flame combustion turbines, by manufacturer design, permit little operator involvement and there are no operating parameters, such as air/fuel ratio, for the operator to adjust. We concluded, therefore, that there are no specific good operating practices which could reduce HAP emissions or which could serve to identify a MACT floor.

We also investigated switching fuels in existing diffusion flame combustion turbines using fuels which result in higher HAP emissions with fuels that result in lower HAP emissions. When

we compared the HAP emissions of the various fuels from combustion turbines using the April 2000 revision of Chapter 3.1 (Stationary Gas Turbines) of "Compilation of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume 1: Stationary Point and Area Sources," we could not find a fuel that was clearly less HAP emitting. The summation of emission factors for various HAP when using natural gas (usually considered the cleanest fuel), diesel fuel, landfill, or digester gas were comparable based on the emission factor information that is available. Therefore, we could not identify a MACT floor based on use of a particular fuel.

Another approach we investigated to identify a MACT floor was to review the requirements in existing State regulations and permits. No State regulations exist for HAP emission limits for stationary combustion turbines. Only one State permit limitation for a single HAP (benzene) was identified. Therefore, we were unable to use State regulations or permits to identify a MACT floor.

As a result, we concluded the MACT floor for existing stationary diffusion flame combustion turbines is no emissions reductions.

## 2. MACT for Existing Diffusion Flame Combustion Turbines

To determine MACT for existing stationary diffusion flame combustion turbines, we evaluated regulatory alternatives more stringent than the MACT floor. For existing diffusion flame sources, in terms of an emission control technology which could serve as the basis for MACT, we considered two beyond-the-floor options. The first option considered was the use of an oxidation catalyst emission control device. However, we concluded that the incremental cost per ton of HAP removed for this option is excessive.

The incremental cost per ton is the difference in annual costs between this regulatory option and the MACT floor divided by the difference in annual emissions. It is often used as a measure of the economic feasibility of applying emission control technology to a source.

We also considered the nonair health, environmental, and energy impacts of an oxidation catalyst system, as discussed previously in this preamble, and concluded that there would be only a small energy impact and no nonair health or environmental impacts. However, as stated above, we did not adopt this regulatory option due to cost considerations.

The second option considered was to switch fuels in existing turbines using fuels which result in higher HAP

emissions with fuels that result in lower HAP emissions. As stated above, we could not find a fuel that was clearly less HAP emitting. Therefore, we could find no basis to further consider fuel switching as a beyond-the-floor HAP emissions reductions option. We were unable to identify any other beyond-the-floor regulatory option to consider. As discussed above, we are not aware of any specific good operating practices for diffusion flame turbines that could reduce HAP emissions. As a result, we concluded that MACT for existing diffusion flame combustion turbines is the MACT floor (*i.e.*, no emissions reductions).

## 3. MACT Floor for Existing Lean Premix Combustion Turbines

There are an estimated 800 lean premix combustion turbines in the U.S., of which 160 are estimated to be major sources. For existing lean premix combustion turbines, we must establish a MACT floor which represents the average emission limitation achieved by the best performing 12 percent of the existing sources for which we have emissions information. We have emissions information on five existing lean premix combustion turbines. Therefore, we plan to establish the MACT floor based on the performance of the best performing lean premix combustion turbine. (This best performing turbine represents the top 20 percent of the existing turbines for which we have emissions information and will also be used to establish the MACT floor for new lean premix combustion turbines.) The best performing existing lean premix combustion turbine achieved a level of formaldehyde concentration emission which averaged 6.1 parts per billion (ppb) formaldehyde at 15 percent oxygen (O<sub>2</sub>). This is the best performer out of five lean premix combustion turbine tests for which we have data. The three-run average formaldehyde emissions from these five turbines ranged from 6.1 to 41 ppb formaldehyde. The formaldehyde concentrations for the individual runs for the best performing turbine were 5.1 ppb, 5.7 ppb, and 7.7 ppb.

The test method that was used to measure the emissions from the best performing turbine was California Air Resources Board (CARB) Method 430. We do not believe that the MACT emission limit should be set lower than the limit of detection of the method. If it were, we could not determine whether a source with test results at the limit of detection was actually in compliance with the MACT emission limit. For the test runs on the best