percent) and Gulf Coast lignite (80 percent). This is explained by the large difference in calcium (Ca) content of those fuels. The ash from the bituminous coal contained 1.4 weight percent Ca, whereas the ashes from the subbituminous coal and Gulf Coast lignite contained Ca at 10.0 weight percent and 9.0 weight percent, respectively. The alkaline Ca in the fly ash effectively neutralized the SeO_2 acid gas, forming a particulate that is easily removed in the PM control device. The bituminous fuel contained insufficient free Ca to completely neutralize the SeO_2 and the much increased levels of SO_2 in that flue gas. The good performance through the FF (regardless of the fuel being fired) can be attributed to the increased contact between the gas stream and the filter cake on the FF. This allows more of the SeO_2 to adsorb or condense on fly ash particles—either alkaline particles or unburned carbon. Because SeO_2 behaves very similarly to its sulfur analog, SO_2, it can be expected to also be removed effectively in standard FGD technologies (wet scrubbers, dry scrubbers, DSI, etc.). Therefore, Se will either fall in to the category of "non-Hg metal HAP" and be effectively removed in a PM control device, or it will fall into the category of "acid gas HAP" as gaseous SeO_2 and be effectively removed using FGD technologies.

Two of the 11 tests were specifically designated for testing of surrogacy relationships relating to the acid gas HAP. Eastern bituminous coal was fired and duct samples were taken upstream and downstream of the lime-based wet FGD scrubber. Those tests showed, as expected, very high levels of control for HCl (greater than 99.9 percent control). The control of HF was greater than 92 percent for the first run and greater than 76 percent for the second run. The control of Cl_2 was greater than 76 percent for the first run and greater than 92 percent for the second run. (Note that both of these control efficiencies were likely much higher than the reported values because the outlet measurements were below the MDL for both HF and Cl_2. The control efficiencies were calculated using the MDL value.) The control efficiency for SO_2 for the runs was greater than 98 percent.

Tests were also conducted to examine potential surrogacy relationships for the non-dioxin/furan organic HAP. The amounts of Hg, non-Hg metals, HCl, HF, and Cl_2 in the flue gas are directly related to the amounts of Hg, non-Hg metals, chlorine, and fluorine in the coal. Control of these components generally requires downstream control technology. However, the presence of the organics in the flue gas is not related to the composition of the fuel but rather they are a result of incomplete or poor combustion. Control of the organics is often achieved by improving combustion conditions to minimize formation or to maximize destruction of the organics in the combustion environment.

During the pilot-scale tests, sampling was conducted for semi-volatile and volatile organic HAP and aldehydes. On-line monitors also collected data on THC, CO, O_2, and other processing conditions. Total hydrocarbons and CO have been used previously as surrogates for the presence of non-dioxin/furan organics. Carbon monoxide has often been used as an indicator of combustion conditions. Under conditions of ideal combustion, a carbon-based or hydrocarbon fuel will completely oxidize to produce only CO_2 and water. Under conditions of incomplete or non-ideal combustion, a greater amount of CO will be formed.

With complex carbon-based fuels, combustion is rarely ideal and some CO and concomitant organic compounds are expected to be formed. Because CO and organics are both products of poor combustion, it is logical to expect that limiting the concentration of CO would also limit the production of organics. However, it is very difficult to develop direct correlations between the average concentration of CO and the amount of organics produced during the prescribed sampling period in the MPCRF (which was 4 hours for the pilot-scale tests described here). This is especially true for low values of CO as one would expect corresponding low quantities of organics to be produced. Samples of coal combustion flue gas have mostly shown very low quantities of the organic compounds of interest. Some of the flue gas organics may also be destroyed in the high temperature post combustion zone (whereas the CO would remain stable). Semi-volatile organics may also condense on PM and be removed in the PM control device.

The average CO from the pilot-scale tests ranged from 23 to 137 ppm for the bituminous coals tests, from 43 to 48 ppm for the subbituminous coal tests and from 93 to 129 ppm for the Gulf Coast lignite tests. However, it was difficult to correlate that concentration to the quantity of organics produced for several reasons. The most difficult problems are associated with the large number of potential organics that can be produced (both those on the HAP list and those that are not on the HAP list). This is further complicated by the organic compounds tending to be at or below the MDL in coal combustion flue gas samples. Further, there are complications associated with the CO concentration values. Some of the runs with very similar average concentrations of CO had very different maximum concentrations of CO (*i.e.*, some of the runs had much more stable emissions of CO whereas others had some excursions, or "spikes," in CO concentration). For example, one of the bituminous runs had an average CO concentration of 69 ppm but a maximum concentration of 1,260 ppm (due to a single "spike" of CO during a short upset). Comparatively, another bituminous run had a higher average CO concentration at 137 ppm but a much lower maximum CO value at 360 ppm.

In the pilot tests, the THC measurement was inadequate as the detection limit of the instrument was much too high to detect changes in the very low concentrations of hydrocarbons in the flue gas.

Based on the testing described above and the emissions data received under the 2010 ICR, we are proposing surrogate standards for the non-Hg metallic HAP and the non-metallic inorganic (acid gas) HAP. For the non-Hg metallic HAP, we chose to use PM as a surrogate. Most, if not all, non-Hg metallic HAP emitted from combustion sources will appear on the flue gas fly-ash. Therefore, the same control techniques that would be used to control the fly-ash PM will control non-Hg metallic HAP. PM was also chosen instead of specific metallic HAP because all fuels do not emit the same type and amount of metallic HAP but most generally emit PM that includes some amount and combination of all the metallic HAP. The use of PM as a surrogate will also eliminate the cost of performance testing to comply with numerous standards for individual non-Hg metals. Because non-Hg metallic HAP may preferentially partition to the small size particles (i.e., fine particle enrichment), we considered using $PM_{2.5}$ as the surrogate, but we determined that total PM (filterable (*i.e.*, $PM_{2.5}$) plus condensable) was the more appropriate surrogate for two reasons. The test method (201A) for measuring $PM_{2.5}$ is only applicable for use in exhaust stacks without entrained water droplets. Therefore, the test method for measuring $PM_{2.5}$ is not applicable for units equipped with wet scrubbers which are in use at many EGUs today and may be necessary at some additional units to achieve the proposed HCl emission limitations. Thus, we are proposing to use total PM, instead of $PM_{2.5}$, as the surrogate for non-Hg metals. However, as discussed elsewhere, we are also proposing

alternative individual non-Hg metallic HAP emission limitations as well as total non-Hg metallic HAP emission limitations for all subcategories (total metal HAP emission limitation for the liquid oil-fired subcategory).

For non-metallic inorganic (acid gas) HAP, EPA is proposing setting an HCl standard and using HCl as a surrogate for the other non-metallic inorganic HAP for all subcategories except the liquid oil-fired subcategory. The emissions test information available to EPA indicate that the primary non-metallic inorganic HAP emitted from EGUs are acid gases, with HCl present in the largest amounts. Other inorganic compounds emitted are found in smaller quantities. As discussed earlier, control technologies that reduce HCl indiscriminately control other inorganic compounds such as Cl_2 and other acid gases (*e.g.*, HF, HCN, SeO_2). Thus, the best controls for HCl are also the best controls for other inorganic acid gas HAP. Therefore, HCl is a good surrogate for inorganic HAP because controlling HCl will result in control of other inorganic HAP emissions (as no liquid oil-fired EGU has an FGD system installed, there is no effective control in use and the surrogacy argument is invalid). As discussed elsewhere, EPA is also proposing to set an alternative equivalent SO_2 emission limit for coal-fired EGUs with some form of FGD system installed as: (1) The controls for SO_2 are also effective controls for HCl and the other acid gas-HAP; and (2) most, if not all, EGUs already have SO_2 CEMS in-place. Thus, SO_2 CEMS could serve as the compliance monitoring mechanism for such units. EGUs without an FGD system installed would not be able to use the alternate SO_2 emission limit, and EGUs must operate their FGD at all times to use the alternate SO_2 emission limit.

EPA is proposing work practice standards for non-dioxin/furan organic and dioxin/furan organic HAP. The significant majority of measured emissions from EGUs of these HAP were below the detection levels of the EPA test methods, and, as such, EPA considers it impracticable to reliably measure emissions from these units. As the majority of measurements are so low, doubt is cast on the true levels of emissions that were measured during the tests. Overall, 1,552 out of 2,334, total test runs for dioxin/furan organic HAP contained data below the detection level for one or more congeners, or 67 percent of the entire data set. In several cases, all of the data for a given run were below the detection level; in few cases were the data for a given run all above the detection level. For the non-dioxin/furan organic HAP, for the individual HAP or constituent, between 57 and 89 percent of the run data were comprised of values below the detection level. Overall, the available test methods are technically challenged, to the point of providing results that are questionable for all of the organic HAP. For example, for the 2010 ICR testing, EPA extended the sampling time to 8 hours in an attempt to obtain data above the MDL. However, even with this extended sampling time, such data were not obtained making it questionable that any amount of effort, and, thus, expense, would make the tests viable. Based on the difficulties with accurate measurements at the levels of organic HAP encountered from EGUs and the economics associated with units trying to apply measurement methodology to test for compliance with numerical limits, we are proposing a work practice standard under CAA section 112(h).

We do not believe that this approach is inconsistent with that taken on other NESHAP where we also had issues with data at or below the MDL (*e.g.*, Portland Cement NESHAP; Boiler NESHAP). In the case of the Portland Cement NESHAP, the MDL issue was with HCl (a single compound HAP as opposed to the oftentimes multi-congener organic HAP), and in data from only 3 of 21 facilities. As noted elsewhere in this preamble, we dealt with similar MDL issues with HCl in establishing the limits in this proposed rule. In the case of the Boiler NESHAP, the MDL issue was with the organic HAP. For that rulemaking, the required sampling time during conducting of the associated ICR was 4 hours, as opposed to the 8 hours required in the 2010 ICR. Further, a review of the data indicates that the dioxin/furan HAP levels (a component of the organic HAP) were at least 7 times greater, on average, for coal-fired IB units and 3 times greater, on average, for oil-fired IB units than from similar EGUs. We think this difference is significant from a testing feasibility perspective.

For all the other HAP, as stated above, we are proposing to establish numerical emission rate limitations; however, we did consider using a percent reduction format for Hg (*e.g.*, the percent efficiency of the control device, the percent reduction over some input amount, *etc.*). We determined not to propose a percent reduction standard for several reasons. The percent reduction format for Hg and other HAP emissions would not have addressed EPA's desire to promote, and give credit for, coal preparation practices that remove Hg and other HAP before firing (*i.e.*, coal washing or beneficiation, actions that may be taken at the mine site rather than at the site of the EGU). Also, to account for the coal preparation practices, sources would be required to track the HAP concentrations in coal from the mine to the stack, and not just before and after the control device(s), and such an approach would be difficult to implement and enforce. In addition, we do not have the data necessary to establish percent reduction standards for HAP at this time. Depending on what was considered to be the "inlet" and the degree to which precombustion removal of HAP was desired to be included in the calculation, EPA would need (*e.g.*) the HAP content of the coal as it left the mine face, as it entered the coal preparation facility, as it left the coal preparation facility, as it entered the EGU, as it entered the control devices, and as it left the stack to be able to establish percent reduction standards. EPA believes, however, that an emission rate format allows for, and promotes, the use of precombustion HAP removal processes because such practices will help sources assure they will comply with the proposed standard. Furthermore, a percent reduction requirement would limit the flexibility of the regulated community by requiring the use of a control device. In addition, as discussed in the Portland Cement NESHAP (75 FR 55,002; September 9, 2010), EPA believes that a percent reduction format negates the contribution of HAP inputs to EGU performance and, thus, may be inconsistent with the DC Circuit Court's rulings as restated in *Brick MACT* (479 F.3d at 880) that say, in effect, that it is the emissions achieved in practice (*i.e.*, emissions to the atmosphere) that matter, not how one achieves those emissions. The 2010 ICR data confirm the point relating to plant inputs likely playing a role in emissions in that they indicate that some EGUs are achieving lower Hg emissions to the atmosphere at a lower Hg percent reduction (*e.g.*, 75 to 85 percent) than are other EGUs with higher percent reductions (*e.g.*, 90 percent or greater). For all of these reasons, we are proposing to establish numerical emission standards for HAP emissions from EGUs with the exception of the organic HAP standard which is in the form of work practices.

C. How did EPA determine the proposed emission limitations for existing EGUs?

All standards established pursuant to CAA section 112(d)(2) must reflect MACT, the maximum degree of reduction in emissions of air pollutants that the Administrator, taking into consideration the cost of achieving such emissions reductions, and any nonair