ORAL ARGUMENT NOT YET SCHEDULED

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

UNITED STATES SUGAR
CORPORATION, *et al.*,

Petitioners,

v.

UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY, *et al.*,

Respondents.

Case No. 11-1108 (and
consolidated cases)

ENVIRONMENTAL PETITIONERS' OPPOSITION TO EPA'S MOTION FOR REMAND OF THE RECORD AND CROSS-MOTION FOR REMAND OF THE CASE

Sierra Club, Clean Air Council, Louisiana Environmental Action Network, Environmental Integrity Project, and Partnership for Policy Integrity ("Environmental Petitioners") hereby oppose EPA's Motion (Doc. No. 1482091) for remand of the record and cross-move for a full remand without vacatur of all standards calculated using EPA's contested "upper prediction limit" ("UPL") methodology.

EPA concedes that all of the standards based on the UPL are legally defective under *National Association of Clean Water Agencies v. EPA*, 734 F.3d 1115 (D.C. Cir. 2013) ("*NACWA*"), and that it is appropriate to "do in this case exactly what the Court directed in *NACWA*." Motion at 6-7. But for many of these standards EPA asks this Court to depart from *NACWA*—which remanded the standards to EPA for further proceedings—and instead remand the record only so that EPA can supply a *post hoc* rationale for the standards without reconsidering them and without giving the public opportunity to comment on the new rationale. Because this approach is inconsistent with the Clean Air Act and will disserve judicial efficiency, Environmental Petitioners oppose EPA's request for a remand of the record. The proper course is to follow *NACWA* and remand without vacatur all of the standards that EPA concedes are legally defective.

BACKGROUND

I. THE MAJOR-SOURCE BOILERS RULE.

These consolidated petitions challenge EPA's rule governing emissions of toxic pollutants from industrial, commercial, and institutional boilers and process heaters at major sources of toxic pollutants ("major-source boilers"). Pursuant to Clean Air Act § 112, EPA has set numeric limits on the emissions of several toxic pollutants emitted by various categories of major-source boilers. 78 Fed. Reg. 7138, 7197 tbl.2 (Jan. 31, 2013).

These limits are long overdue. Because major-source boilers emit significant quantities of certain persistent and bioaccumulative hazardous air pollutants, EPA was required to set standards for them under Clean Air Act § 112 by November 15,

2000. 42 U.S.C. § 7412(c)(6); Memorandum from Nathan E. Topham to Docket at 15, Appendix I: Updated 112(c)(6) 1990 Baseline Inventory (Feb. 18, 2011) (attached as Exhibit A). EPA failed to do so, and Sierra Club brought suit to compel EPA to perform its mandatory duty. *Sierra Club v. Johnson*, 444 F. Supp. 2d 46, 61 (D.D.C. 2006) (directing EPA to promulgate regulations limiting emissions of hazardous air pollutants no later than December 15, 2007).

With Sierra Club's consent, the 2007 deadline was extended repeatedly to provide EPA more time – ultimately until January 21, 2011. *Sierra Club v. Jackson*, No. 01-1537(PLF), 2011 WL 181097 at *16 (D.D.C. Jan. 20, 2011). Six weeks before the January 21, 2011 deadline arrived, EPA announced that it wanted another lengthy extension—to April 13, 2012—to complete the required rules. Sierra Club opposed that extension, and the district court ordered EPA to comply with § 112(c)(6) by February 21, 2011. *Id.* at *14.

Acting under this court-ordered deadline, EPA issued regulations for major-source boilers on March 21, 2011, but simultaneously began a process to reconsider them. 76 Fed. Reg. 15,608 (Mar. 21, 2011); 76 Fed. Reg. 15,266 (Mar. 21, 2011). Now, more than thirteen years after the date by which Congress required these standards to be in place, EPA has issued the final reconsidered major-source boilers rule challenged here. 78 Fed. Reg. 7138.

EPA proposed to calculate the numeric pollution limits for this rule using a statistical methodology called the "upper prediction limit" ("UPL"). According to EPA, the UPL yields the "value that 99 percent of the data in the MACT floor data population would fall below." 75 Fed. Reg. 31,938, 31,952/1 (June 4, 2010). Environmental Petitioners objected in comments to setting the standards based on the UPL, pointing out that the Clean Air Act "unambiguously requires EPA to set floors reflecting the 'average' emission level achieved by the best sources" and that "the [UPL] of the emission level achieved by the best performing twelve percent of sources is not the 'average' emission level achieved by those sources." Comments of: Clean Air Task Force, Earthjustice, Natural Resources Defense Council, and Sierra Club at 25 (attached as Exhibit B). Environmental Petitioners further argued that EPA had failed to explain why the UPL was a reasonable estimate of the emissions levels actually achieved by the best performers. *Id.* at 23-24. Despite Sierra Club's objections, EPA set all of the numeric limits in the final reconsidered major-source boiler rule based on the UPL.[1]

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[1] For emissions of certain pollutants from certain major-source boilers, EPA calculated a numeric limit by multiplying a "representative detection limit" by three. 75 Fed Reg. 32,006, 32,021 (June 4, 2010). But EPA adopted this number as the standard only after comparing it to the numeric limit obtained using the UPL, so the lawfulness of these standards also depends on the lawfulness of the UPL. *Id.*

Major source boilers emit mercury, cadmium, benzene, acetaldehyde, hydrogen fluoride, and other hazardous air pollutants listed in Clean Air Act § 112(b)(1). 42 U.S.C. § 7412(b)(1); 76 Fed. Reg. at 15,611. Exposure to these hazardous air pollutants is associated with a variety of adverse health effects, including kidney damage, central nervous system effects, and lung, skin, and mucus membrane irritation. 76 Fed. Reg. at 15,611. Two pollutants emitted from major source boilers are listed as human carcinogens and four more are listed as probable human carcinogens. *Id.*

The standards will yield reductions in hazardous emissions and generate substantial health benefits. Implementation is expected to reduce emissions of mercury by over one ton per year, particulate matter by over 45,000 tons per year, non-mercury metals by over 2,500 tons per year, volatile organic compounds by over 7,000 tons per year, and hydrogen chloride by almost 30,000 tons per year. 76 Fed. Reg. at 15,650 tbl.2. These reductions will prevent an estimated 2,500 to 6,500 premature deaths per year, 4,000 heart attacks per year, and 310,000 lost work days per year, among other significant health benefits. 76 Fed. Reg. at 15,652 tbl.5. The monetized value of these health benefits is estimated at between $22 billion and $54 billion annually (using a 3% discount rate) or between $20 billion and $49 billion annually (using a 7% discount rate), significantly exceeding the standards’ estimated cost impact of $5.1 billion in one-time initial capital expenditures and $1.4 billion in net annual costs. 76 Fed. Reg. at 15,650, 15,652 tbl.4.

II. THE *NACWA* LITIGATION.

On the same day in 2011 that EPA issued its rule for major-source boilers, EPA also issued standards under Clean Air Act § 112 for a different category of polluting facilities—incinerators that burn sewage sludge. 76 Fed. Reg. 15,372 (Mar. 21, 2011). This Court decided consolidated challenges to the sewage sludge incinerator regulations last year, in *NACWA*.

NACWA considered Sierra Club's argument that the UPL does not represent the "average" emission limitation achieved by the best performing 12 percent of incinerators and also its argument that the UPL is not an estimate of what the best units actually "achieve in practice." 734 F.3d at 1140-41. To the extent the Court could discern EPA's statutory interpretation in support of the UPL, the Court rejected it. *Id.* at 1142-44. Holding that EPA had not supplied a "reasoned basis" for its statutory interpretation, the Court instructed EPA to formulate a defensible statutory interpretation on remand. *Id.* The Court further held that EPA had not substantiated its factual conclusion that the UPL reflects what the best units "achieve in practice." *Id.* at 1144-45. The Court remanded these parts of the sewage sludge incinerator rule to EPA for further proceedings without vacating the standards. *Id.* at 1161.

III. EPA'S MOTION.

EPA concedes that its major-source boiler standards are legally defective under *NACWA*. EPA explains that it "used the UPL methodology at issue in *NACWA*" in establishing the numeric limits for major-source boilers, Motion at 5, and that the rationale for use of the UPL in the major-source boiler rule is the rationale the Court "has already found requires supplementation" in *NACWA*. Motion at 7. EPA "seek[s] remand of [certain major-source boiler] standards to address the claim by Environmental Petitioners that EPA's statistical methodology has resulted in standards that are insufficiently stringent." Motion at 13-14.

However, for a subset of these standards—those with more than nine data points—EPA requests that the Court remand the record to EPA without remanding the standards themselves. Motion at 5-6, 9-10. EPA asserts that for standards calculated on the basis of more than nine data points, "it can adequately explain why the [UPL] is consistent with Clean Air Act requirements through a remand of the record for a limited time." *Id.* at 9. Based on the short duration of the remand of the record—just 60 days—it appears that EPA will not provide any opportunity for comment on the new statutory interpretation and factual support it will formulate. Further, EPA is clear that its mind is already made up: "EPA does not intend to make any [changes to] the standards as a result of the remand of the record." *Id.* at 6.

ARGUMENT

I. THE COURT SHOULD DENY EPA'S REQUEST FOR REMAND OF THE RECORD.

A. Standards Based On The UPL Are Unlawful Under *NACWA*.

NACWA held that EPA cannot employ the UPL to calculate numeric emission limits without a new statutory interpretation and further factual support. *Supra* at 6-7. Because EPA concedes that it "used the UPL methodology at issue in *NACWA*" in establishing the numeric limits for major-source boilers, Motion at 5, and that the rationale for use of the UPL in the major-source boiler rule is the rationale the Court "has already found requires supplementation" in *NACWA*, Motion at 7, the major-source boiler standards are defective also. *NACWA*, 734 F.3d at 1145 (quoting *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962)) ("EPA must . . . articulate a 'rational connection between the facts found and the choice made.'").

The problems identified with EPA's use of the UPL in *NACWA* were not confined to standards based on small data sets, as EPA implies. Although the *NACWA* Court's observation that the predictive ability of the UPL appeared "somewhat doubtful" in light of certain statistical anomalies that arose from application of the UPL to small data sets was an additional reason for the remand, *id.* at 1144, it came after the Court already had rejected the statutory interpretation underlying EPA's UPL approach and held that EPA provided an insufficient "explanation on *how* the [UPL] can actually predict the upper limit EPA expects the best-performing unit or units to achieve," *id.* at 1142-44 (emphasis in original). *NACWA* held that all standards based on the UPL lacked a reasoned basis, not just standards calculated on the basis of small data sets, and remanded all the standards to the agency. *Id.* at 1161. The same course is proper here.

B. EPA's Request For A Remand Of The Record Is Inconsistent With The Clean Air Act And Disserves Judicial Efficiency.

EPA's request for a remand of the record is inconsistent with the Clean Air Act. EPA cannot, consistent with Clean Air Act § 307(d), formulate the statutory interpretation needed to support its rule in the course of litigation over the rule. Rather, the rationale for the rule must be articulated in a statement of basis and purpose created contemporaneously with the rule itself, and the rationale must be subject to public comment. A full remand of the standards for the agency to make a new decision based on its new statutory interpretation and corresponding technical analysis would allow the agency to comply with these procedural requirements. EPA's requested remand of the record, by contrast, would deprive the public of opportunity to comment on EPA's interpretation of the statute and prevent EPA from revisiting its decision in light of its new analysis, in violation of the Clean Air Act's procedural requirements.

Section 307(d) of the Clean Air Act "enacted new procedures which represented by and large . . . a legislative adoption of the suggestions for a rulemaking record set forth in" Professor William Pedersen's 1975 article in the Yale Law Journal, *Formal Records and Informal Rulemaking*. *Sierra Club v. Costle*, 657 F.2d 298, 393-94 (D.C. Cir. 1981). The essence of Professor Pedersen's approach was that "Rules would stand or fall on the basis of the data, reasoning and arguments which [the agency] chose to emphasize when the rule was being made." William F. Pedersen, *Formal Records and Informal Rulemaking*, 85 Yale L.J. 38, 77 (Nov. 1975). "[T]he final rule, with its support document, would close the file. *The contents of the file would be the exclusive record for judicial review*." *Id.* at 79 (emphasis in original).

Accordingly, Congress provided that for Clean Air Act rulemakings "[t]he promulgated rule shall be accompanied by a statement of basis and purpose," 42 U.S.C. § 7607(d)(6)(A), that "shall include a summary of . . . the major legal interpretations . . . underlying the [] rule." *Id.; id.* § 7607(d)(3)(c). Furthermore, Congress directed that "[a]ll data, information, and documents . . . on which the proposed rule relies shall be included in the docket on the date of publication." *Id.* § 7607(d)(3).

This Court has held that it would violate "both the structure and spirit of section 307" for "documents of central importance [to be] entered on the docket too late for any meaningful public comment prior to promulgation." *Sierra Club*, 657 F.2d at 398. *See also Tabor v. Joint Bd. for Enrollment of Actuaries*, 566 F.2d 705, 709, 711 n.13 (D.C. Cir. 1977) (holding that a "statement of reasons" supplied during litigation was "a[n] unacceptable substitute[] for a contemporaneous basis and purpose statement."); *Indep. U.S. Tanker Owners Comm. v. Lewis*, 690 F.2d 908, 920 (D.C. Cir. 1982) ("The preparation of a statement of basis and purpose should play an integral part in the decisionmaking process . . . before a decision is published.").

NACWA establishes that EPA has neither articulated the "major legal interpretations," 42 U.S.C. § 7607(d)(3)(C), needed to support use of the UPL nor furnished the "data, information, and documents," *id.* § 7607(d)(3), necessary to validate the UPL as a reasonable estimate of the emissions of the best performing units. *Supra* at 6-7. Because the standards cannot withstand judicial review without this explanation, *NACWA*, 734 F.3d at 1144-45, these are "documents of central importance." *Sierra Club*, 657 F.2d at 398. Under Clean Air Act § 307(d) and this Court's precedent, EPA may not offer these legal interpretations and data for the first time during litigation.

A remand of the record in these circumstances would allow EPA to prop up the major-source boilers rule with new arguments—including a new interpretation of the governing statute—on which the public has had no opportunity to comment.

Although Circuit Rule 41(b) does provide for remands of the record, it was not designed as a means for agencies to evade statutory notice and comment requirements and lard the administrative record for judicial review with post hoc arguments invented after a rulemaking has concluded. In essence, EPA is asking that this Court endorse a gimmick by which EPA hopes to circumvent § 307(d) and gain the deference due statutory interpretations and factual findings reached through the process spelled out in that provision for mere litigation positions that have never seen the light of day in any public administrative process.

EPA argues that remand of the record will "facilitate judicial review." Motion at 5-6. In fact, it will frustrate it. Under current law in this Circuit, any new legal or factual explanation that EPA gives during the remand of the record will be unreviewable in this proceeding. Clean Air Act § 307(d)(7)(B) provides, "Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review." 42 U.S.C. § 7607(d)(7)(B). Remand of the record will not allow time for public comment, so § 307(d)(7)(B) will prevent any objections to EPA's new statutory interpretation and technical explanation from being "raised during judicial review" in this proceeding. *Id.* Petitioners will have to petition for reconsideration of EPA's new rationale, and EPA will be required under § 307(d)(7)(B) to "convene a proceeding for reconsideration of the rule" and "provide the same procedural rights"—including notice and comment—as were afforded during the initial promulgation of the major-source boiler rule. *Id.* And because this Court has held § 307(d)(7)(B) to be jurisdictional, *NACWA*, 734 F.3d at 1158, neither EPA nor this Court can waive its requirements.[2] In short, EPA's proposal to offer a new statutory interpretation and technical explanation through remand of the record will not speed up the resolution of this issue, but significantly delay it by putting off the required notice-and-comment rulemaking process until after EPA has completed its futile 60-day remand process and the results of that process have been presented to this Court in equally futile litigation.

A final reason to reject EPA's proposed bifurcated approach—under which certain standards would be reviewed in this proceeding based on a new record, while others would be remanded and reviewed separately in a later proceeding—is that it would give the Court an incomplete and misleading impression of the consequences of EPA's statutory interpretation and statistical methodology. Just as

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[2] Judge Kavanaugh has recently opined that *NACWA*'s conclusion that § 307(d)(7)(B)'s requirements are jurisdictional conflicts with Supreme Court precedent. *Utility Air Regulatory Group v. EPA*, No. 12-1166, 2014 WL 928230 at *8 (D.C. Cir. March 11, 2014) (Kavanaugh, J., concurring). Even if Judge Kavanaugh is correct, it is not clear that a panel of this Court is empowered to hold that *NACWA* has been abrogated, given that all of the Supreme Court cases cited by Judge Kavanaugh predate *NACWA*. *Id.* And even if a panel of this Court decided that § 307(d)(7)(B) is not jurisdictional, it would be inappropriate in this case to waive the procedural requirements Congress imposed.

a broken clock is right twice a day, EPA's flawed methodology might sometimes yield results that seem reasonable. It makes little sense to review the UPL methodology based on a cherry-picked subset of the standards.

II. THE STANDARDS SHOULD BE REMANDED TO EPA.

Because EPA concedes that it "used the UPL methodology at issue in *NACWA*" in establishing the numeric limits for major-source boilers, Motion at 5, and that the rationale for use of the UPL in the major-source boiler rule is the rationale the Court "has already found requires supplementation" in *NACWA*, Motion at 7, the major-source boiler standards are defective and should be remanded. *A.L. Pharma, Inc. v. Shalala*, 62 F.3d 1484, 1492 (D.C. Cir. 1995). This was the remedy ordered in *NACWA* itself. 734 F.3d at 1161.

Environmental Petitioners' members are harmed by EPA's adoption of pollution limits for major-source boilers based on the flawed UPL methodology rejected in *NACWA*. For example, John Rossi, a member of Clean Air Council, lives near two major-source boilers and breathes the pollution they emit. Rossi Decl. ¶¶5-6, 8. John's enjoyment of his favorite outdoor activities, including fishing and yard work, is diminished by the pollution these facilities emit. *Id.* ¶7. Cynthia Purvis, also a member of Clean Air Council, lives near two major-source boilers and is exposed to the air pollution they emit when she spends time outside. Purvis Decl. ¶¶5-6, 8. Cynthia worries about the impact this air pollution will have on her health and her family's health. *Id.* ¶¶6, 8. Karla Land, a member of Sierra Club, lives near at least twenty major-source boilers, and has experienced health problems like allergies and headaches that she believes are related to her exposure to the pollutants they emit. Land Decl. ¶¶6-9. Karla spends less time in her backyard, camping, riding her motorcycle, and being outside with her pets and neighbors because of this pollution. *Id.* ¶10.

If the Court remands the major-source boilers standards to EPA, Environmental Petitioners will have the opportunity to obtain tougher, Clean-Air-Act-compliant standards that will benefit members like John Rossi, Cynthia Purvis, and Karla Land. *See Ne. Energy Associates v. FERC*, 158 F.3d 150, 154 (D.C. Cir. 1998) ("[The] possibility [that the agency will change course on remand], though not a certainty, is sufficient to meet the redressability requirement.")

III. THE STANDARDS SHOULD NOT BE VACATED.

"[I]t is appropriate to remand without vacatur in particular occasions where vacatur 'would at least temporarily defeat ... the enhanced protection of the environmental values covered by the EPA rule at issue.'" *North Carolina v. EPA*, 550 F.3d 1176, 1178 (D.C. Cir. 2008) (quoting *Envtl. Def. Fund, Inc. v. EPA*, 898 F.2d 183, 190 (D.C. Cir. 1990). That is the case here. Although EPA's newest standards for major-source boilers are far less protective than the Clean Air Act requires, they will save an estimated 2,500 to 6,500 lives and prevent 4,000 heart attacks and 310,000 lost work days every year they are in effect. *Supra* at 5. Vacatur would deprive the public of these protections, which Congress intended EPA to put in place by 2000, more than 13 years ago. 42 U.S.C. § 7412(c)(6). That result would be grossly inequitable, and would run the risk of condemning Environmental Petitioners to spend another decade or more fighting to secure these Congressionally-mandated protections.

Moreover, EPA's conceded errors involve EPA's failure to demonstrate that the major-source boiler standards comply with the minimum stringency requirements of the Clean Air Act. Motion at 13-14 ("EPA is seeking a remand of these standards to address the claim by Environmental Petitioners that EPA's statistical methodology has resulted in standards that are insufficiently stringent."). It would serve no equitable purpose to vacate environmental protections based on EPA's concession that the protections may be too weak. *Envtl. Def. Fund*, 898 F.2d at 190; *see also Nat'l Lime Ass'n v. EPA*, 233 F.3d 625, 634 (D.C. Cir. 2000) (remanding Clean Air Act standards to EPA without vacatur after ruling for Sierra Club); *Sierra Club v. EPA*, 167 F.3d 658, 664 (D.C. Cir. 1999) (same).

Remand without vacatur is particularly appropriate here because "EPA's resolution of the issue [on remand] will depend on the [legal] interpretation it selects" so that "there is no way by which the court can determine what effect the EPA's reasoned exercise of its authority may have." *Envtl. Def. Fund*, 898 F.2d at

190. It would be unduly disruptive, *see Allied Signal, Inc. v. U.S. Nuclear Regulatory Comm'n*, 988 F.2d 146, 150-51 (D.C. Cir. 1993), to vacate these standards based on legal errors that EPA may ultimately conclude on remand do not necessitate any material alteration of the standards.

CONCLUSION

For the foregoing reasons, EPA's motion for remand of the record should be denied and Environmental Petitioners' Cross-motion should be granted. The Court should remand all major-source boiler standards based on the UPL to EPA for further proceedings consistent with *NACWA*. The standards should not be vacated.

DATED: March 27, 2014

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on this 27th day of March, 2014, I have served the foregoing **Environmental Petitioners' Opposition to EPA's Motion for Remand of the Record and Cross-Motion for Remand of the Case** on all registered counsel through the Court's electronic filing system (ECF).

/s/ Neil Gormley
Neil Gormley

Exhibit A

United States Environmental Protection Agency
Research Triangle Park, NC 27711

MEMORANDUM

SUBJECT: Emission Standards for Meeting the Ninety Percent Requirement Under Section 112(c)(6) of the Clean Air Act

FROM: Nathan E. Topham, Environmental Engineer
Metals and Minerals Group, SPPD (D243-02)

TO: DOCKET ID: EPA-HQ-OAR-2004-0505

DATE: February 18, 2011

Section 112(c)(6) of the Clean Air Act (CAA) requires that EPA promulgate emission standards assuring that sources accounting for not less than ninety (90) percent of the aggregate emissions of each of the hazardous air pollutants (HAP) enumerated in section 112(c)(6) are subject to emission standards under section 112(d)(2) or (d)(4).[1] This memorandum describes how the Agency is satisfying this obligation under CAA section 112(c)(6) for all seven HAP. This document describes the 1990 base-year emissions inventory that is used as the baseline for determining whether EPA has promulgated sufficient standards to meet the section 112(c)(6) 90 percent requirement (hereinafter referred to as the “1990 baseline inventory” or “section 112(c)(6) baseline inventory”). Specifically, the document discusses the 1998 Federal Register notice that presents this 1990 baseline inventory and the source categories determined at the time to be needed to meet the 90 percent requirement for each of the seven HAP in section 112(c)(6). The document also describes updates made to the 1990 baseline inventory since the 1998 notice, and any associated changes to the source category list. Appendix I to this memorandum presents the updated 1990 baseline inventory for section 112(c)(6) and the source categories that EPA has

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[1] The seven HAP enumerated in section 112(c)(6) of the CAA are: Polycyclic organic matter (POM), 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), 2,3,7,8-tetrachlorodibenzofuran (TCDF), polychlorinated biphenyls (PCBs), mercury, hexachlorobenzene (HCB) and alkylated lead compounds.

concluded are needed to meet the 90 percent requirement for each of the seven section 112(c)(6) HAP. Appendix II provides the name of the emission standards and Code of Federal Regulation reference for each of the source categories identified in Appendix I.

In 1998, EPA issued a document entitled *Source Category Listing for Section 112(d)(2) Rulemaking Pursuant to Section 112(c)(6) Requirements*, 63 FR 17838, 17839 (1998). In that document, EPA explains how it developed a 1990 base-year emissions inventory for the seven HAP enumerated in section 112(c)(6) of the CAA as the baseline for determining whether 90 percent of those emissions are subject to standards. In the same notice, based on that inventory, EPA identified the source categories that EPA believed at the time were necessary to meet the 90 percent requirement in section 112(c)(6). That 1990 baseline inventory and the category listing have undergone several updates since their initial publication in 1998. For example, in a notice dated November 8, 2002, EPA identified five area source categories that were no longer needed to meet the section 112(c)(6) ninety percent requirement. *National Emission Standards for Hazardous Air Pollutants: Revision of Source Category List for Standards Under Section 112(c)(6) and 112(k) of the Clean Air Act*, 67 FR 68124 (2002).[2] Further, in the same notice, EPA removed the Open Burning of Scrap Tires source category from the 1990 baseline inventory. Due to some of these updates, EPA promulgated emission standards for several additional source categories while determining that certain categories or subcategories are not necessary to meet the 90 percent requirement under section 112(c)(6). These updates and resulting actions are described in more detail below.

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[2] The five area source categories are as follows: (1) asphalt hot-mix production; (2) fabricated metal products; (3) paint and allied products; (4) paper coated and laminated; (5) packaging and transportation equipment manufacturing. Open burning of scrap tires was also removed from the 112(c)(6) and 112(c)(3) inventories. Open burning of scrap tires results from arson, accident, or lightning. There is no industry that uses open burning of scrap tires (this practice is banned in all 50 states). Therefore, it is not considered a source appropriate for regulation under section 112 of the CAA.

I. Additional section 112(c)(6) Source Categories

A. Electric Arc Furnaces

Electric arc furnace (EAF) steelmaking was not included in the section 112(c)(6) baseline inventory published in the 1998 notice. Mercury emissions from EAF during 1990 were evaluated during the development of the EAF area source rule pursuant to section 112(c)(3) and (k)(3)(B) of the CAA. Based on scrap steel charged in EAFs during 1990 (38 million tons) and a revised emission factor[3] from scrap steel, the 1990 base-year mercury emissions from this category were estimated to be 7.8 tons. As shown in Appendix I, we determined that we needed the EAF area source category to meet the 90 percent requirement for mercury under section 112(c)(6). Accordingly, in December 2007, EPA promulgated emission standards for EAF area source steelmaking facilities. *National Emission Standards for Hazardous Air Pollutants for Area Sources: Electric Arc Furnace Steel Making Facilities*, 72 FR 74088 (2007). This rule included mercury emission standards based on maximum achievable control technology (MACT), as required by section 112(c)(6), and standards based on generally available control technology to fulfill section 112(k)(3)(B) obligations for other HAP.

B. Gold Mine Ore Production and Processing

The section 112(c)(6) baseline inventory published in 1998 did not include gold mine ore production and processing. At that time, there was very little available information on mercury emissions from gold mine ore production and processing. Since the 1998 notice, a substantial amount of data and information have become available on mercury emissions from this source category. For example, in 2000, the first estimates of mercury emissions from this source

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[3] Analysis of Mercury Data for Electric Arc Furnace Steelmaking.. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Sector Policies and Program Division, Metals and Minerals Group. July 18, 2007. Docket Item 0070 in EPA Docket Number OAR-2004-0083.

category were published in the Toxics Release Inventory (TRI), largely because of the lower TRI reporting threshold for mercury that went into effect about that time. Following this, from 2001 to 2005, additional data and information were collected through the Voluntary Mercury Reduction Program (VMRP), which was a collaborative agreement between the State of Nevada Division of Environmental Protection (NDEP), EPA's Region 9 Office, and four gold mining companies. Then, in 2005-2006 the EPA's Office of Air Quality Planning and Standards (OAQPS) and the NDEP sent questionnaires to a number of companies seeking additional information and data on mercury emissions. Moreover, starting in 2007, the NDEP has been requiring all facilities in Nevada to conduct annual mercury emissions tests.

Based on these data collected over the past several years, which included information about the industry processing and production levels and activities in the early 1990s, EPA has estimated that gold mine ore processing and production emitted about 4.4 tons of mercury in 1990.[4] These estimated mercury emissions in the 1990 inventory for gold mine ore processing and production are based on emissions from the following thermal processes at gold mine ore processing and production facilities: roasters, autoclaves, carbon kilns, pregnant storage solution tanks ("preg tanks"), electrowinning, melt furnaces, and retorts.

As shown in Appendix I, we determined that we needed the gold mine ore production and processing area source category to meet the 90 percent requirement for mercury under section 112(c)(6). Accordingly, in 2010 EPA promulgated MACT standards for mercury emissions from this source category. *National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category; and Addition to Source Category List for Standards-Final Rule*, signed by the EPA Administrator on December 16, 2010.

C. Sewage Sludge Incineration (SSI)

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[4] See Docket ID EPA-HQ-OAR-2010-0239-0175.

In the 1998 notice, SSI was not among the source categories identified for regulation under section 112(c)(6). As discussed in this memorandum and shown in the inventory in Appendix I, there have been a number of updates to the section112(c)(6) baseline emission inventory for mercury since the 1998 notice. Based on the updated mercury baseline inventory, EPA has determined that additional source categories, including SSI, are needed to meet our 90 percent requirement for mercury under section 112(c)(6).

II. Categories Not Needed to Meet the 90 Percent Requirement

A. Gasoline Distribution (Aviation)

In the 1998 notice, EPA identified the Gasoline Distribution (Aviation) source category for listing due to its alkylated lead emissions. Aircraft use two general types of fuel: aviation gasoline (avgas) and jet fuel. Avgas, which is used for powering piston engine aircraft, is the source of alkylated lead emissions in the source category. Alkylated lead is added to avgas to reduce engine knock and help lubricate internal engine components. Research is underway to find alternatives to lead for use in avgas.

While characterizing evaporative emissions of alkylated lead compounds from aviation gasoline, we became aware of other alkylated lead compounds emissions associated with alkylated lead compounds production in 1990. There was one remaining U.S. facility that manufactured alkylated lead compounds in 1990. Through discussions with industry representatives and technical evaluation of the information supplied, we have been able to quantify an estimate of the 1990-base year alkylated lead emissions for the Alkylated Lead Production source category and have added this information and data to the section 112(c)(6) baseline inventory. Based on information provided in the Toxics Release Inventory (TRI), we identified reported annual emissions of total lead compounds from a single alkylated lead production facility of 22 tons in 1990. The TRI did not provide the amount of alkylated lead in the total. Further analysis of the emission inventory submitted to the State produced an estimate of actual alkylated lead emissions from this facility of approximately 18 tons in 1990. As shown in Appendix I, the Alkylated Lead Production source category contributed 99.7 percent of the alkylated lead compounds emissions in the updated 1990 baseline inventory.[5] Alkylated lead compounds production is regulated by the Hazardous Organic NESHAP (HON), subpart F.[6] EPA has therefore met the 90 percent requirement under section 112(c)(6) for alkylated lead. In light of the above, we conclude that we do not need Gasoline Distribution (Aviation) to meet the 90 percent requirement for alkylated lead under section 112(c)(6).

Alkylated lead emissions from gasoline distribution source categories have also been updated since the 1998 notice. A review of the 1990 alkylated lead emissions from the distribution of leaded gasoline revealed that the inventory data were based on inaccurate estimates of equipment component counts and leak emission factors.[7] Analysis showed that when the corrected equipment leak data are used, the total estimated 1990 alkylated lead emissions from leaded gasoline distribution would be less than ½ the estimate in the 1990 inventory published in the 1998 notice. We have revised the alkylated lead baseline emission

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[5] In addition to adding the baseline emissions for the Alklylated Lead Production source category, the other updates to the section 112(c)(6) baseline inventory for alkylated lead include addition of the Upstream Gasoline Distribution (Aviation) (see section IV.B) and revised baseline emission estimates for Gasoline Distribution Stage I (see section II.B) and Gasoline Distribution (Aviation) discussed in this section.

[6] We further note that U.S. production of alkylated lead compounds ended in 1993.

[7] In the 112(c)(6) inventory published in 1998, the baseline alkylated lead emissions estimate for the Gasoline Distribution (Aviation) source category was based on emission factors from a 1994 proposed major source standard for gasoline distribution stage I (Background Information Document (BID) Volume I, Proposed National Emission Standards for Hazardous Air Pollutants for Gasoline Distribution (Stage I), EPA-453/R-94-002a). Based on analysis of public comments on that proposed rule, EPA applied updated equipment leak emission factors for the promulgated major source standard for Gasoline Distribution (Stage I) (BID Volume II, Promulgated National Emission Standards for Hazardous Air Pollutants for Gasoline Distribution (Stage I), EPA-453/R-94-002b). The updated emission factors were also applied in the promulgation of area source standards for Gasoline Distribution Stage I (Area Source).

estimates for all gasoline distribution source categories, including Gasoline Distribution (Aviation), accordingly.

B. Gasoline Distribution Stage I (area sources)

Alkylated lead compounds and POM are the only two of the seven CAA section 112(c)(6) pollutants that were identified in gasoline. In the 1998 notice, we did not include Gasoline Distribution Stage I area source category in the section 112(c)(6) source category listing, noting the ban on leaded gasoline in on-road vehicles. However, in a notice dated November 8, 2002, we provided a revised 1990 baseline inventory for 16-PAH (sum of 16 polycyclic aromatic hydrocarbons), an indicator for POM, and, as a result, we determined that we needed the Gasoline Distribution Stage I area source category to meet the 90 percent requirement for POM under section 112(c)(6).

As explained in the proposal preamble to the area source Gasoline Distribution Stage I rule[8], naphthalene is the only 16-PAH estimated and reported in the 1990 inventory that is emitted from gasoline distribution facilities. That proposed rule also explained that we revised the 1990 inventory of naphthalene from this source category (major and area sources) based on additional data received and concluded that gasoline distribution facilities (area sources) contribute only 1.73 tons, about 0.02 percent of the total 16-PAH baseline inventory. We concluded in that rulemaking that we did not need this source category to meet the 90-percent requirement for POM under section 112(c)(6).

Alkylated lead emissions from this source category have also been updated since the 1998 notice in a manner consistent with Gasoline Distribution (Aviation), discussed in the

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[8] National Emission Standards for Hazardous Air Pollutants for Source Categories: Gasoline Distribution Bulk Terminals, Bulk Plants, Pipeline Facilities, and Gasoline Dispensing Facilities. November 2006, 71 FR 66064.

previous section. A review of the 1990 alkylated lead emissions from the distribution of leaded gasoline revealed that the inventory data were based on inaccurate estimates of equipment component counts and leak emission factors.[9] Analysis showed that when the corrected equipment leak data are used, the total estimated 1990 alkylated lead emissions from leaded gasoline distribution would be less than ½ the estimate in the 1990 inventory published in the 1998 notice. We have revised the alkylated lead baseline emission estimates for all gasoline distribution source categories, including Gasoline Distribution Stage I (Area Source), accordingly.

C. Area Source Wood/Wood Residue and Oil Boilers

In the 1998 notice, EPA had identified wood/wood residue (biomass) and oil boilers as needed to meet the 90 percent requirement for mercury and POM. There have been a number of significant updates to the 1990 baseline inventory for mercury. As discussed in Section I.B, EPA has added EAF and Gold Mine Ore Production and Processing to the 1990 baseline inventory for mercury and promulgated mercury MACT standards for these categories. Section IV.A of this memorandum discusses other significant updates to 1990 baseline emissions for mercury. Due to these updates, which are reflected in Appendix I, we have determined that we do not need to regulate mercury emissions from area source biomass and oil boilers to meet the 90 percent requirement for mercury under CAA section 112(c)(6). In addition, as discussed below in section III, we are using 16-PAH as the baseline inventory for POM. Based on the 16-PAH baseline inventory, we have determined that we do not need to regulate POM emissions from area source biomass and oil boilers to meet the 90 percent requirement for POM under CAA section 112(c)(6).

III. Use of 16-PAH Inventory for Polycyclic Organic Matter

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[9] See footnote 6.

In the Clean Air Act, POM is defined as "organic compounds with more than one benzene ring and which have a boiling point greater than or equal to 100°C". As shown in the 1998 notice, we created three inventories (7-PAH[10], 16-PAH[11], and extractable organic matter (EOM) [12]) to represent baseline POM emissions. Of the three POM baseline inventories, the 16-PAH inventory is the most robust, with data on 16-PAH emissions for 94 categories. In contrast, we have very limited data on EOM, with data on EOM emissions for only18 source categories.[13] The lack of available data on EOM emission creates a distorted picture of the relative contributions of source categories for which there are available EOM data. The lack of source categories making up the total EOM inventory makes the relative contribution of the few categories that do have data unrealistically inflated. We therefore cannot say with confidence that, by using the baseline inventory for EOM, we are capturing 90 percent of the baseline POM emissions, as required by section 112(c)(6). Similarly, we have data on 7-PAH for 32 categories, considerably fewer than the 94 categories for which we have 16-PAH data. Therefore, the 16-PAH inventory allows for the most accurate representation of the universe of categories that emit POM. Because the use of all three baseline inventories is neither required nor necessary, and in light of the concern described above with the EOM and 17-PAH inventories, we have decided to use only the 16-PAH baseline inventory for determining the 90 percent threshold for POM under section 112(c)(6).

IV. Other Updates to Baseline Emission Inventory

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[10] composed of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene

[11] composed of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, acenaphthene, acenaphthylene, anthracene, benzo(ghi)perylene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene

[12] any methylene chloride extractable organic matter, measured gravimetrically

[13] When justifying its use in the 1998 inventory background document, we said that EPA would undertake an effort to develop a robust inventory for EOM sources to feed into the CAA section 112(c)(6) inventory. Had more data been gathered, perhaps EOM would have proved to be a more useful indicator of POM. However, the anticipated inventory was not developed.

A. Updates to the 1990 baseline emission inventory for mercury

As mentioned above, EPA added 1990 mercury emission estimates for EAF and Gold Mine Ore Production and Processing area source categories into the section 112(c)(6) total baseline inventory for mercury. In addition, EPA discovered that the 112(c)(6) inventory for mercury published in the 1998 Federal Register notice included inaccurate estimates for a number of source categories and updated these estimates. These updates are discussed below.

1. Industrial/Commercial Boilers

The estimate of mercury emissions from Industrial/Commercial Boilers that was presented in the 1998 Federal Register notice for 112(c)(6) was 28.9 tons of mercury for year 1990. There were a number of technical problems with this estimate, especially for coal fired boilers. One significant issue is that the activity level (2820 trillion BTUs) used in the calculations in the 112(c)(6) inventory background document was incorrect. This activity level represented all coal use in industry, including boilers and other uses (e.g., coke ovens). The activity level used should have been for boilers only. A more accurate activity level for 1990 would be about 1633 trillion BTUs.[14]

Additionally, we also believe that the emissions factors used to calculate the original estimate from coal-fired boilers were inaccurate. The emission factors were based on an assumption of zero control and did not account for coal washing. EPA stated at the time that "because mercury reductions from coal washing and any other reductions that may occur across existing control devices are not accounted for, the emissions may be overestimated". [15] Applying

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[14] Estimate based on 1990 historical statistics from the Department of Energy's Energy Information Administration website of coal use in industrial/commercial sectors (not including coke plants).

[15] Mercury Study Report to Congress. December 1997. Available at http://www.epa.gov/hg/report.htm.

emission factors used in the development of the major and area source Boiler NESHAP[16] to the revised activity level for coal fired boilers yields roughly 2 tons and 1 ton for major and area sources, respectively. Emissions factors for oil-fired boilers (6.8 lb/trillion BTUs and 7.2 lb/trillion BTUs) were also too high. Converting these emission factors into mercury concentrations in oil results in an estimate of about 100 ppb mercury concentrations in oil. However, based on data gathered and analyzed for the 1998 EPA Utility Air Toxics Report to Congress, the average mercury concentration in oil is about 10 ppb. Moreover, the emissions factor for residual oil-fired boilers (of 0.4 lbs per trillion BTUs) provided in the 1997 EPA Locating and Estimating document[17] is about 10 times lower than the emission factors used for the original 112(c)(6) estimates for oil-fired boilers. The information discussed above suggests that the estimate shown above for oil-fired boilers was overestimated by an order of magnitude. A more accurate estimate is about 0.6 tons.

2. Aerospace Industries (surface coating)

Aerospace Industries (surface coating) had an estimate of 4 tons of mercury in the 112(c)(6) inventory published in the 1998 notice. Other inventories developed for year 1990 for other regulatory purposes (including the 112(k) 1990 inventory and the 1990 NEI) had much lower estimates for this category (0.0026 and 0.0030 tpy, respectively). Because of the large discrepancy, we reviewed the 112(c)(6) inventory data for this category, including reviewing the original emissions factor and calculations and consulting with an industry representative. The estimate in the 1998 notice was based on an extremely conservative assumption. According to a

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[16] The revised emission factor for major source boilers for this inventory was generated using a weighted average of the six emission factors for various types of control used in the February 21, 2011 Boiler NESHAP. The revised emission factor for area sources was the uncontrolled group in the Boiler NESHAP because these sources were largely uncontrolled with respect to mercury emissions in 1990.

[17] US EPA (1997): Locating and estimating air emissions from sources of mercury and mercury compounds. Report EPA-454/R-97-012, (NTIS PB98- 117054), Office of Air Quality Planning and Standards, Research Triangle Park, NC. Available at: http://www.epa.gov/ttn/chief/le/index.html

1997 docket memo,[18] the emissions estimate was derived from reviewing Material Safety Data Sheets (MSDS) from five of the major coating suppliers. One of these MSDS showed trace amounts of mercury in only two products (0.00002% by weight), which was rounded up five orders of magnitude to 1% in the inventory analysis.

In light of the above, we concluded that this original estimate of mercury emissions (or 4 tons) from Aerospace was substantially overestimated. Therefore, we searched and gathered information to calculate a more reasonable estimate. We obtained information on sales of aerospace coatings and mercuric mildewcides in 1990. Using these data, potential mercury emissions for 1990 were calculated, as follows.

In 1990 aerospace coatings accounted for 0.1% of the volume of coatings produced. In 1990 approximately 400,000 lbs. of mercuric mildewcide/fungicide (as mercury) was sold into the entire coatings market (this amount substantially decreased after 1990 to nearly zero). Assuming these were used throughout the industry - 0.1% * 400,000 lbs. = 400 lbs. of mercuric mildewcides/fungicides used in aerospace coatings. Thus, the maximum emissions would have been 400 lbs. of mercury assuming 100% of mercury in coatings were released. However, mildewcides/fungicides are intended to retard the growth of fungi on applied surfaces over time. They are intended to remain to a large extent in the coating substrate. We believe that at least 50% of the mildewcide/fungicide remains in the substrate. Therefore, mercury releases from aerospace coatings are estimated to be up to 200 lbs in 1990. Given this information and calculations, we estimate that this source category emitted about 0.1 tons of mercury in 1990.

3. Industrial Turbines and Internal Combustion Engines

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[18] Memo from Dave Reeves, Midwest Research Institute to Barbara Driscoll, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards regarding HAP emission estimates for aerospace surface coating. November 17, 1997.

In the 1998 notice, the mercury emissions from industrial turbines and internal combustion engines fired by natural gas were 1.6 tons and 4.7 tons, respectively. The emissions factors used in those original estimates for these two source categories were 6.63×10^{-6} lb/MMBtU and 1.14×10^{-5} lb/MMBtU, respectively. However available data[19] indicate that the level of mercury in natural gas is very low and, therefore, mercury emissions from this category are very low. Based on this information, we updated the 1990 mercury emissions for this category. As shown in Appendix I, the revised mercury emissions from these two source categories are 0.001 and 0.009 tons, respectively.

4. Human Crematories

The mercury emissions from human crematories in the baseline 112(c)(6) inventory (.000377 tons per year) were revised based on data used to calculate mercury emissions in the 112(k) area source inventory. This emission factor led to a value of 0.6 tons of mercury in 1990 emitted from human crematories.

5. Blast Furnaces and Steel Mills

Mercury emissions from blast furnaces and steel mills were reported as 0.25 tons in the baseline 112(c)(6) inventory. Further review of this estimate led to revision of the mercury estimate from blast furnaces and steel mills as well as electric arc furnace steelmaking (as discussed in section I.A above). Based on a revised emission factor[20] from scrap steel, the mercury emissions are 3.1 tons for blast furnaces and steel mills.

6. Portland Cement

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[19] Mercury Study Report to Congress. December 1997. Available at http://www.epa.gov/hg/report.htm. Locating and Estimating Air Emissions from Sources of Mercury and Mercury Compounds. December 1997. Available at http://www.epa.gov/ttnchie1/le/.

[20] Analysis of Mercury Data for Electric Arc Furnace Steelmaking.. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Sector Policies and Program Division, Metals and Minerals Group. July 18, 2007. Docket Item 0070 in EPA Docket Number OAR-2004-0083.

We believe the estimate for mercury emissions from Portland Cement Manufacturing non-hazardous waste kilns (4.13 tons) in the 1998 notice was slightly underestimated. We used the mercury emissions and installed clinker capacity from 2006[21] to generate a ratio of mercury emissions per ton of clinker and applied this ratio to the 1990 clinker capacity. The mercury emissions in 1990 were revised upward to 5.64 tons for this category.

B. Alkylated lead emissions from Upstream Gasoline Distribution (Aviation)

Upstream Gasoline Distribution (Aviation) is being added to the section 112(c)(6) inventory for emissions of alkylated lead. At the time we issued the 1998 notice, we believed that avgas was transported directly from refineries to the airport terminals. Thus, we did not estimate alkylated lead emissions from the distribution of avgas "upstream" of the airport facilities in the section 112(c)(6) emission inventory published in 1998. However, we have since learned that avgas is distributed through bulk terminals located at refineries, as well as through some stand-alone bulk terminals, prior to being delivered to airport facilities. We have therefore updated the 112(c)(6) baseline inventory for alkylated lead to include estimated 1990-base year alkylated lead emissions from the distribution of avgas "upstream" of the airport facilities. The alkylated lead emissions for this category are presented in Appendix I.

C. Updates to the 1990 baseline inventory for HCB

On August 3, 2000 EPA published a notice in the Federal Register summarizing a finding that tire production (renamed rubber tire manufacturing) emits no HCB (65 FR 47725).

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[21] Estimate of 2006 installed clinker capacity: 94,690,000 metric tons clinker per year. Estimate of 2006 mercury emissions from major and area sources: 7.27 tons. Estimate of 1990 installed clinker capacity: 73,518,000 metric tons clinker per year.

APPENDIX I – Updated 112(c)(6) 1990 Baseline Inventory

This appendix presents the updated 1990 baseline inventory for the 112(c)(6) pollutants. Table I.1 shows categories that are used to meet our 90% requirement while Table I.2 shows other source categories not needed to reach our 90% requirement.

Table I.1 – Updated 112(c)(6) 1990 Baseline Inventory

Source Category	16-PAH Emissions (tons per year)	16-PAH (% of Emissions)	16-PAH Cumulative Percentage (% of Emissions)	Dioxin Emissions (pounds per year)	Dioxin (% of Emissions)	Dioxin Cumulative Percentage (% of Emissions)	Mercury (tons per year)	Mercury (% of Emissions)	Mercury Cumulative Percentage (% of Emissions)	PCB Emissions (pounds per year)	PCB (% of Emissions)	PCB Cumulative Percentage (% of Emissions)	HCB Emissions (pounds per year)	HCB (% of Emissions)	HCB Cumulative Percentage (% of Emissions)	Alkylated Lead Emissions (tons per year)	Alkylated Lead (% of Emissions)	Alkylated Lead Cumulative Percentage (% of Emissions)
Categories Subject to Regulation																		
Aerospace industry (Surface coating)	1640.00	20.63%	20.63%			0.00%	0.10	0.06%	0.06%			0.00%			0.00%			0.00%
Agricultural Chemicals (major)	8.31	0.10%	20.74%			0.00%			0.06%			0.00%			0.00%			0.00%
Alkylated Lead Production (Major)			20.74%			0.00%			0.06%			0.00%			0.00%	18.29	99.71%	99.71%
asphalt roofing production (major)	37.20	0.47%	21.21%			0.00%			0.06%			0.00%			0.00%			99.71%
blast furnace and steel mills	499.00	6.28%	27.48%			0.00%			0.06%			0.00%			0.00%			99.71%
commercial/institutional coal combustion (major sources)	34.50	0.43%	27.92%			0.00%			0.06%			0.00%			0.00%			99.71%
commercial/institutional coal combustion (area sources)	138.00	1.74%	29.65%			0.00%			0.06%			0.00%			0.00%			99.71%
industrial coal combustion (major sources)	110.00	1.38%	31.04%			0.00%			0.06%			0.00%			0.00%			99.71%
industrial coal combustion (area sources)	47.10	0.59%	31.63%			0.00%			0.06%			0.00%			0.00%			99.71%
commercial/institutional oil combustion (major sources)	10.70	0.13%	31.77%			0.00%			0.06%			0.00%			0.00%			99.71%
industrial oil combustion (major sources)	35.60	0.45%	32.21%			0.00%			0.06%			0.00%			0.00%			99.71%
commercial/institutional wood/wood residue combustion (major sources)	7.16	0.09%	32.30%			0.00%			0.06%			0.00%			0.00%			99.71%
industrial wood/wood residue combustion (major sources)	55.00	0.69%	33.00%	0.08	0.76%	0.76%			0.06%			0.00%			0.00%			99.71%
Industrial/Commercial/Institutional Coal Boilers (major sources)			33.00%			0.76%	2.05	1.27%	1.33%			0.00%			0.00%			99.71%
Industrial/Commercial/Institutional Coal Boilers (area sources)			33.00%			0.76%	1.06	0.66%	1.98%			0.00%			0.00%			99.71%
Industrial/Commercial/Institutional Oil Boilers (major sources)			33.00%			0.76%	0.42	0.26%	2.24%			0.00%			0.00%			99.71%
Industrial/Commercial/Institutional Wood/Wood Residue Boilers (major sources)			33.00%			0.76%	0.17	0.10%	2.35%			0.00%			0.00%			99.71%
chemical manufacturing: cyclic crude and intermediate production (major)	101.00	1.27%	34.27%			0.76%			2.35%			0.00%			0.00%			99.71%
chlorinated solvents production			34.27%			0.76%			2.35%			0.00%	1161.00	55.92%	55.92%			99.71%
coke ovens: by-product recovery plants	77.80	0.98%	35.25%			0.76%			2.35%			0.00%			55.92%			99.71%
coke ovens: charging, topside & door leaks	539.00	6.78%	42.03%			0.76%			2.35%			0.00%			55.92%			99.71%
coke ovens: pushing, quenching & battery stacks	517.00	6.50%	48.53%			0.76%			2.35%			0.00%			55.92%			99.71%
commercial printing, gravure (major)	28.70	0.36%	48.89%			0.76%			2.35%			0.00%			55.92%			99.71%
Electric Arc Furnaces (EAF) (Area) - Secondary Steel			48.89%			0.76%	7.80	4.82%	7.17%			0.00%			55.92%			99.71%
fabricated metal products (major)	107.00	1.35%	50.24%			0.76%			7.17%			0.00%			55.92%			99.71%
gasoline distribution - stage 1 (major)	0.19	0.00%	50.24%			0.76%			7.17%			0.00%			55.92%			99.71%
Gold Mines (Area)			50.24%			0.76%	4.40	2.72%	9.89%			0.00%			55.92%			99.71%
hazardous waste incineration	0.18	0.00%	50.24%	0.07	0.62%	1.37%	3.20	1.98%	11.87%	55.60	17.72%	17.72%			55.92%			99.71%
industrial organic chemicals manufacturing (major)	223.00	2.81%	53.05%			1.37%			11.87%			17.72%			55.92%			99.71%
industrial stationary IC engines - diesel (major)	3.51	0.04%	53.09%			1.37%			11.87%			17.72%			55.92%			99.71%
industrial stationary IC engines - natural gas (major)	28.60	0.36%	53.45%			1.37%			11.87%			17.72%			55.92%			99.71%
lightweight aggregate kilns			53.45%	0.01	0.07%	1.44%	0.31	0.19%	12.06%			17.72%			55.92%			99.71%
medical waste incineration	0.80	0.01%	53.46%	1.32	12.33%	13.77%	50.00	30.90%	42.96%	80.60	25.69%	43.42%			55.92%			99.71%
Mercury Cell Chlor-Alkali Plants (Major and Area)			53.46%			13.77%	9.80	6.06%	49.02%			43.42%			55.92%			99.71%
municpal waste combustion	0.10	0.00%	53.46%	7.30	68.18%	81.95%	55.00	33.99%	83.01%	160.20	51.07%	94.49%			55.92%			99.71%
naphthalene production (major)	45.20	0.57%	54.03%			81.95%			83.01%			94.49%			55.92%			99.71%
paints and allied products (major)	23.70	0.30%	54.33%			81.95%			83.01%			94.49%			55.92%			99.71%
paper coated and laminated, packaging (major)	54.30	0.68%	55.01%			81.95%			83.01%			94.49%			55.92%			99.71%
pesticides manufacture			55.01%			81.95%			83.01%			94.49%	915.00	44.08%	100.00%			99.71%

Table I.1 (Continued)

Source Category	16-PAH Emissions (tons per year)	16-PAH (% of Emissions)	16-PAH Cumulative Percentage (% of Emissions)	Dioxin Emissions (pounds per year)	Dioxin (% of Emissions)	Dioxin Cumulative Percentage (% of Emissions)	Mercury (tons per year)	Mercury (% of Emissions)	Mercury Cumulative Percentage (% of Emissions)	PCB Emissions (pounds per year)	PCB (% of Emissions)	PCB Cumulative Percentage (% of Emissions)	HCB Emissions (pounds per year)	HCB (% of Emissions)	HCB Cumulative Percentage (% of Emissions)	Alkylated Lead Emissions (tons per year)	Alkylated Lead (% of Emissions)	Alkylated Lead Cumulative Percentage (% of Emissions)
petroleum refining: all processes (major)	1070.00	13.46%	68.48%			81.95%			83.01%			94.49%			100.00%			99.71%
phthalic anhydride production (major)	18.30	0.23%	68.71%			81.95%			83.01%			94.49%			100.00%			99.71%
plastics material and resins manufacturing (major)	8.29	0.10%	68.81%			81.95%			83.01%			94.49%			100.00%			99.71%
portland cement manufacture: hazardous waste kilns	12.60	0.16%	68.97%	0.95	8.87%	90.83%	2.75	1.70%	84.71%			94.49%			100.00%			99.71%
portland cement manufacture: non-hazardous waste kilns	47.90	0.60%	69.57%	0.09	0.80%	91.63%	5.64	3.49%	88.19%			94.49%			100.00%			99.71%
primary aluminum production	662.00	8.33%	77.90%			91.63%			88.19%			94.49%			100.00%			99.71%
pulp and paper - kraft recovery furnaces	649.00	8.17%	86.07%	0.00	0.01%	91.63%	1.90	1.17%	89.37%			94.49%			100.00%			99.71%
pulp and paper - lime kilns	183.00	2.30%	88.37%			91.63%			89.37%			94.49%			100.00%			99.71%
secondary aluminum smelting			88.37%	0.38	3.55%	95.18%			89.37%			94.49%			100.00%			99.71%
secondary lead smelting	70.00	0.88%	89.25%	0.01	0.08%	95.26%			89.37%			94.49%			100.00%			99.71%
sewage sludge incineration (area)			89.25%			95.26%	1.80	1.11%	90.48%			94.49%			100.00%			99.71%
ship building and repair (surface coating)	13.60	0.17%	89.42%			95.26%			90.48%			94.49%			100.00%			99.71%
transportation equipment manufacturing (SICs combined)	38.70	0.49%	89.91%			95.26%			90.48%			94.49%			100.00%			99.71%
wood household furniture manufacturing (major)	11.10	0.14%	90.05%			95.26%			90.48%			94.49%			100.00%			99.71%
Total Mass and Percentage Subject to Regulation	**7157.13**	**90.05%**		**10.20**	**95.26%**		**146.40**	**90.48%**		**296.40**	**94.49%**		**2076.00**	**100.00%**		**18.29**	**99.71%**	
Categories Not Needed to Reach 90% Contribution																		
Abrasive Grain (media) Manufacturing	24.80	0.31%	90.36%			95.26%			90.48%			94.49%			100.00%			99.71%
adhesives and sealants (SICs combined)	4.18	0.05%	90.41%			95.26%			90.48%			94.49%			100.00%			99.71%
agricultural chemicals (area)	0.72	0.01%	90.42%			95.26%			90.48%			94.49%			100.00%			99.71%
asphalt hot-mix production (area)			90.42%			95.26%			90.48%			94.49%			100.00%			99.71%
asphalt roofing production (area)	6.37	0.08%	90.50%			95.26%			90.48%			94.49%			100.00%			99.71%
battery production			90.50%			95.26%	0.02	0.01%	90.49%			94.49%			100.00%			99.71%
blast furnace and steel mills			90.50%			95.26%	3.10	1.92%	92.41%			94.49%			100.00%			99.71%
Industrial/Commercial/Institutional Oil Boilers (area sources)			90.50%			95.26%	0.18	0.11%	92.52%			94.49%			100.00%			99.71%
Industrial/Commercial/Institutional Wood/Wood Residue Boilers (area sources)			90.50%			95.26%	0.04	0.03%	92.55%			94.49%			100.00%			99.71%
industrial waste oil combustion (major and area sources)	7.82	0.10%	90.60%			95.26%			92.55%			94.49%			100.00%			99.71%
commercial/institutional oil combustion (area sources)	42.60	0.54%	91.14%			95.26%			92.55%			94.49%			100.00%			99.71%
industrial oil combustion (area sources)	15.30	0.19%	91.33%			95.26%			92.55%			94.49%			100.00%			99.71%
commercial/institutional wood/wood residue combustion (area sources)	28.60	0.36%	91.69%			95.26%			92.55%			94.49%			100.00%			99.71%
industrial wood/wood residue combustion (area sources)	13.80	0.17%	91.86%	0.02	0.19%	95.45%			92.55%			94.49%			100.00%			99.71%
commercial/institutional natural gas combustion (major sources)	0.01	0.00%	91.86%			95.45%			92.55%			94.49%			100.00%			99.71%
industrial natural gas combustion (major sources)	0.01	0.00%	91.86%			95.45%			92.55%			94.49%			100.00%			99.71%
commercial/institutional natural gas combustion	0.02	0.00%	91.86%			95.45%			92.55%			94.49%			100.00%			99.71%
industrial natural gas combustion (area sources)	0.01	0.00%	91.86%			95.45%			92.55%			94.49%			100.00%			99.71%
carbamate insecticides production	4.08	0.05%	91.91%			95.45%			92.55%			94.49%			100.00%			99.71%
carbon black production	4.33	0.05%	91.97%			95.45%	0.25	0.15%	92.70%			94.49%			100.00%			99.71%
carbon reactivation furnaces			91.97%	0.00	0.00%	95.45%			92.70%			94.49%			100.00%			99.71%
chemical manufacturing: cyclic crude and intermediate production (area)	3.20	0.04%	92.01%			95.45%			92.70%			94.49%			100.00%			99.71%
chemical preparations (SICs combined)	6.79	0.09%	92.09%			95.45%			92.70%			94.49%			100.00%			99.71%
Mercury Cell Chlor-Alkali Plants (Major and Area)	4.52	0.06%	92.15%			95.45%			92.70%			94.49%			100.00%			99.71%
chromium plating: chromic anodizing			92.15%			95.45%	0.00	0.00%	92.70%			94.49%			100.00%			99.71%

Table I.1 (Continued)

Source Category	16-PAH Emissions (tons per year)	16-PAH (% of Emissions)	16-PAH Cumulative Percentage (% of Emissions)	Dioxin Emissions (pounds per year)	Dioxin (% of Emissions)	Dioxin Cumulative Percentage (% of Emissions)	Mercury (tons per year)	Mercury (% of Emissions)	Mercury Cumulative Percentage (% of Emissions)	PCB Emissions (pounds per year)	PCB (% of Emissions)	PCB Cumulative Percentage (% of Emissions)	HCB Emissions (pounds per year)	HCB (% of Emissions)	HCB Cumulative Percentage (% of Emissions)	Alkylated Lead Emissions (tons per year)	Alkylated Lead (% of Emissions)	Alkylated Lead Cumulative Percentage (% of Emissions)
clay refractories (area)	0.50	0.01%	92.16%			95.45%			92.70%			94.49%			100.00%			99.71%
cleaning products (SICs combined)	1.38	0.02%	92.17%			95.45%			92.70%			94.49%			100.00%			99.71%
commercial printing, gravure (area)	0.19	0.00%	92.18%			95.45%			92.70%			94.49%			100.00%			99.71%
commercial printing, letterpress and screen	10.40	0.13%	92.31%			95.45%			92.70%			94.49%			100.00%			99.71%
crematories (area)	0.00	0.00%	92.31%	0.00	0.00%	95.45%	0.60	0.37%	93.07%			94.49%			100.00%			99.71%
custom compound purchased resins manufacture			92.31%			95.45%	0.13	0.08%	93.15%			94.49%			100.00%			99.71%
dental preparation and use			92.31%			95.45%	0.80	0.49%	93.65%			94.49%			100.00%			99.71%
drum and barrel reclamation	0.00	0.00%	92.31%	0.00	0.00%	95.46%			93.65%			94.49%			100.00%			99.71%
electronic and other electric equipment manufacturing (SICs combined)	30.50	0.38%	92.69%			95.46%	0.88	0.55%	94.19%			94.49%			100.00%			99.71%
fabricated rubber products	148.00	1.86%	94.55%			95.46%			94.19%			94.49%			100.00%			99.71%
ferroalloy manufacture (area)	0.56	0.01%	94.56%			95.46%			94.19%			94.49%			100.00%			99.71%
fiber cans, drums, and similar products	5.06	0.06%	94.62%			95.46%			94.19%			94.49%			100.00%			99.71%
fluorescent lamp recycling			94.62%			95.46%	0.01	0.00%	94.20%			94.49%			100.00%			99.71%
food products (SICs combined)	3.54	0.04%	94.67%			95.46%			94.20%			94.49%			100.00%			99.71%
gasoline distribution (aviation)			94.67%			95.46%			94.20%			94.49%			100.00%	0.02	0.09%	99.80%
gasoline distribution - stage 1 (area)	1.73	0.02%	94.69%			95.46%			94.20%			94.49%			100.00%	0.03	0.14%	99.94%
gasoline distribution - stage 1 (major)			94.69%			95.46%			94.20%			94.49%			100.00%	0.00	0.02%	99.96%
general laboratory activities			94.69%			95.46%	0.80	0.49%	94.69%			94.49%			100.00%			99.96%
geothermal power			94.69%			95.46%	1.30	0.80%	95.49%			94.49%			100.00%			99.96%
gum and wood chemical	0.50	0.01%	94.70%			95.46%			95.49%			94.49%			100.00%			99.96%
industrial gases manufacturing	9.43	0.12%	94.82%			95.46%			95.49%			94.49%			100.00%			99.96%
industrial inorganic chemicals manufacturing	15.70	0.20%	95.01%			95.46%	1.00	0.62%	96.11%			94.49%			100.00%			99.96%
industrial machinery and electrical equipment (SICs combined)	2.77	0.03%	95.05%			95.46%			96.11%			94.49%			100.00%			99.96%
industrial organic chemicals manufacturing (area)	4.03	0.05%	95.10%			95.46%			96.11%			94.49%			100.00%			99.96%
industrial organic chemicals manufacturing (major)			95.10%			95.46%	0.02	0.01%	96.12%			94.49%			100.00%			99.96%
industrial stationary IC engines - diesel (area)	1.51	0.02%	95.12%			95.46%			96.12%			94.49%			100.00%			99.96%
industrial stationary IC engines - natural gas (area)	19.00	0.24%	95.36%			95.46%	0.00	0.00%	96.12%			94.49%			100.00%			99.96%
industrial stationary IC engines - natural gas (major)			95.36%			95.46%	0.00	0.00%	96.12%			94.49%			100.00%			99.96%
industrial turbines - diesel fired	0.02	0.00%	95.36%			95.46%	0.09	0.06%	96.18%			94.49%			100.00%			99.96%
industrial turbines : natural gas fired	13.80	0.17%	95.53%			95.46%	0.00	0.00%	96.18%			94.49%			100.00%			99.96%
inorganic pigments manufacturing			95.53%			95.46%	0.01	0.00%	96.18%			94.49%			100.00%			99.96%
instrument manufacturing			95.53%			95.46%	0.50	0.31%	96.49%			94.49%			100.00%			99.96%
iron and steel foundries	0.19	0.00%	95.53%	0.02	0.21%	95.67%			96.49%			94.49%			100.00%			99.96%
lamp breakage			95.53%			95.67%	1.50	0.93%	97.42%			94.49%			100.00%			99.96%
landfill (gas) flares	0.45	0.01%	95.54%			95.67%			97.42%			94.49%			100.00%			99.96%
lime manufacturing			95.54%			95.67%	0.70	0.43%	97.85%			94.49%			100.00%			99.96%
lubricating oils and grease	0.06	0.00%	95.54%			95.67%			97.85%			94.49%			100.00%			99.96%
metal household furniture	0.00	0.00%	95.54%			95.67%			97.85%			94.49%			100.00%			99.96%
miscellaneous manufacturing	6.58	0.08%	95.62%			95.67%			97.85%			94.49%			100.00%			99.96%
miscellaneous plastics products	5.76	0.07%	95.69%			95.67%			97.85%			94.49%			100.00%			99.96%
naphthalene - miscellaneous uses	1.25	0.02%	95.71%			95.67%			97.85%			94.49%			100.00%			99.96%
naphthalene production (area)	19.40	0.24%	95.95%			95.67%			97.85%			94.49%			100.00%			99.96%

Table I.1 (Continued)

Source Category	**16-PAH Emissions (tons per year)**	**16-PAH (% of Emissions)**	**16-PAH Cumulative Percentage (% of Emissions)**	**Dioxin Emissions (pounds per year)**	**Dioxin (% of Emissions)**	**Dioxin Cumulative Percentage (% of Emissions)**	**Mercury (tons per year)**	**Mercury (% of Emissions)**	**Mercury Cumulative Percentage (% of Emissions)**	**PCB Emissions (pounds per year)**	**PCB (% of Emissions)**	**PCB Cumulative Percentage (% of Emissions)**	**HCB Emissions (pounds per year)**	**HCB (% of Emissions)**	**HCB Cumulative Percentage (% of Emissions)**	**Alkylated Lead Emissions (tons per year)**	**Alkylated Lead (% of Emissions)**	**Alkylated Lead Cumulative Percentage (% of Emissions)**
naphthalene sulfonates production	6.53	0.08%	96.04%			95.67%			97.85%			94.49%			100.00%			99.96%
nonmetallic mineral products	0.00	0.00%	96.04%			95.67%	0.01	0.00%	97.86%			94.49%			100.00%			99.96%
office furniture, except wood manufacturing	6.45	0.08%	96.12%			95.67%			97.86%			94.49%			100.00%			99.96%
other biological incineration			96.12%	0.32	2.99%	98.66%			97.86%	4.98	1.59%	96.07%			100.00%			99.96%
other miscellaneous (SICs combined)	1.45	0.02%	96.14%			98.66%	0.25	0.15%	98.01%			96.07%			100.00%			99.96%
other secondary nonferrous metals recovery			96.14%			98.66%	0.25	0.15%	98.17%			96.07%			100.00%			99.96%
other structural clay products	0.56	0.01%	96.14%			98.66%	0.11	0.07%	98.23%			96.07%			100.00%			99.96%
paints and allied products (major)			96.14%			98.66%	0.01	0.00%	98.24%			96.07%			100.00%			99.96%
partitions and fixtures	4.35	0.05%	96.20%			98.66%			98.24%			96.07%			100.00%			99.96%
petroleum refining: all processes (area)	26.87	0.34%	96.54%			98.66%			98.24%			96.07%			100.00%			99.96%
petroleum refining: all processes (major)			96.54%			98.66%	0.04	0.03%	98.26%			96.07%			100.00%			99.96%
pharmaceutical preparations and manufacturing (SICs combined)	0.77	0.01%	96.55%			98.66%			98.26%			96.07%			100.00%			99.96%
phthalic anhydride production (area)	7.86	0.10%	96.64%			98.66%			98.26%			96.07%			100.00%			99.96%
plastic foam products manufacturing	109.56	1.38%	98.02%			98.66%			98.26%			96.07%			100.00%			99.96%
plastics material and resins manufacturing (area)	0.26	0.00%	98.03%			98.66%	0.00	0.00%	98.27%			96.07%			100.00%			99.96%
porcelain electrical supplies	2.08	0.03%	98.05%			98.66%			98.27%			96.07%			100.00%			99.96%
primary copper production			98.05%			98.66%	0.74	0.46%	98.72%			96.07%			100.00%			99.96%
primary lead smelting			98.05%			98.66%	1.30	0.80%	99.53%			96.07%			100.00%			99.96%
primary metal products manufacturing (SICs combined)	26.90	0.34%	98.39%			98.66%			99.53%			96.07%			100.00%			99.96%
public building and related furniture	11.60	0.15%	98.54%			98.66%			99.53%			96.07%			100.00%			99.96%
pulp and paper - sulfite recovery furnaces	6.17	0.08%	98.61%			98.66%			99.53%			96.07%			100.00%			99.96%
scrap or waste tire incineration (major)	0.01	0.00%	98.61%	0.00	0.01%	98.67%			99.53%	10.24	3.26%	99.34%			100.00%			99.96%
secondary copper smelting			98.61%	0.01	0.13%	98.80%			99.53%			99.34%			100.00%			99.96%
secondary lead smelting			98.61%			98.80%	0.01	0.01%	99.54%			99.34%			100.00%			99.96%
secondary mercury production			98.61%			98.80%	0.75	0.46%	100.00%			99.34%			100.00%			99.96%
sewage sludge incineration (area)	1.64	0.02%	98.63%	0.05	0.50%	99.29%			100.00%	2.08	0.66%	100.00%			100.00%			99.96%
ship building and repair - subject to regulation (area)	0.81	0.01%	98.64%			99.29%			100.00%			100.00%			100.00%			99.96%
surface active agents manufacturing	7.41	0.09%	98.74%			99.29%			100.00%			100.00%			100.00%			99.96%
textiles (SICs combined)	9.68	0.12%	98.86%			99.29%			100.00%			100.00%			100.00%			99.96%
Upstream Gasoline Distribution (Aviation) (Major and Area)			98.86%			99.29%			100.00%			100.00%			100.00%	0.01	0.04%	100.00%
wood household furniture manufacturing (area)	0.24	0.00%	98.86%			99.29%			100.00%			100.00%			100.00%			100.00%
wood treatment/wood preserving	90.40	1.14%	100.00%	0.08	0.71%	100.00%			100.00%			100.00%			100.00%			100.00%
Total Inventory	**7948.18**	**100.00%**		**10.71**	**100.00%**		**161.80**	**100.00%**		**313.70**	**100.00%**		**2076.00**	**100.00%**		**18.34**	**100.00%**	

Appendix II – Section 112(c)(6) Source Categories and Associated Standards

This appendix includes tables that cross-reference 112(c)(6) category names with the associated emission standards (which may reference a source category by a name different from that used in the section 112(c)(6) baseline inventory and source category listing) (Table II.1). Additionally, this appendix identifies the Code of Federal Regulation subparts for the emission standards counted towards reaching the 90% requirement for each of the 112(c)(6) pollutants (Table II.2).

Table II.1 – Index of section 112(c)(6) Categories and Section 112 or 129 Source Categories[22]

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
Aerospace Industry (Surface Coating)	National Emission Standards for Hazardous Air Pollutants for the Aerospace Industries	40 CFR part 63 subpart GG
Alkylated Lead Production	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H
	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	40 CFR part 63 subpart I

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[22] Because many of these standards were developed to meet EPA's obligation under CAA section 112(d)(1), EPA had not focused on what was needed to meet its section 112(c)(6) obligation at the time of these rulemakings, Therefore, EPA did not reference section 112(c)(6) in the preambles to these rules.

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
Asphalt Roofing Production	National Emission Standards for Hazardous Air Pollutants for the Asphalt Roofing Manufacturing	40 CFR part 63 subpart LLLLL
Blast Furnace and Steel Mills	National Emission Standards for Hazardous Air Pollutants for the Integrated Iron and Steel Manufacture	40 CFR part 63 subpart FFFFF
Chemical Manufacturing: Cyclic Crude and Intermediate Production	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H
	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	40 CFR part 63 subpart I
Chlorinated Solvents Production	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	40 CFR part 63 subpart I
Coke Ovens: By-Product Recovery Plants	National Emission Standard for Benzene Emissions from Coke By-Product Recovery Plants	40 CFR part 61 subpart L
Coke Ovens: Charging, Topside & Door Leaks	National Emission Standards for Hazardous Air Pollutants for Source Categories and for Coke Oven Batteries	40 CFR part 63 subpart L
	National Emission Standards for Hazardous Air Pollutants for Coke Ovens: Pushing, Quenching, and Battery Stacks	40 CFR part 63 subpart CCCCC
Coke Ovens: Pushing, Quenching & Battery Stacks	National Emission Standards for Hazardous Air Pollutants for Source Categories and for Coke Oven Batteries	40 CFR part 63 subpart L
	National Emission Standards for Hazardous Air Pollutants for Coke Ovens: Pushing, Quenching, and Battery Stacks	40 CFR part 63 subpart CCCCC
Commercial Printing: Gravure	National Emission Standards for Hazardous Air Pollutants: Printing and Publishing Industry	40 CFR part 63 subpart KK
Electric Arc Furnaces (EAF) - Secondary Steel	National Emission Standards for Hazardous Air Pollutants for Area Sources: Electric Arc Furnace Steelmaking Facilities	40 CFR part 63 subpart YYYYY
Fabricated Metal Products	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Miscellaneous Metal Parts and Products	40 CFR part 63 subpart MMMM
Gasoline Distribution (Stage 1)	National Emission Standards for Hazardous Air Pollutants for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)	40 CFR part 63 subpart R

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
Gold Mines	National Emission Standards for Hazardous Air Pollutants: Gold Mine Ore Processing and Production Area Source Category	40 CFR part 63 subpart EEEEEEE
Hazardous Waste Incineration	National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors	40 CFR part 63 subpart EEE
Industrial Organic Chemicals Manufacturing	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H
	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	40 CFR part 63 subpart I
Industrial Stationary IC Engines - Diesel	National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines	40 CFR part 63 subpart ZZZZ
Industrial Stationary IC Engines - Natural Gas	National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines	40 CFR part 63 subpart ZZZZ
Industrial/Commercial/Institutional Boilers	National Emission Standards for Hazardous Air Pollutants for Industrial/ Commercial/Institutional Boilers and Process Heaters	40 CFR part 63 subpart DDDDD

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
	National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers	40 CFR part 63 subpart JJJJJJ
Lightweight Aggregate Kilns	National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors	40 CFR part 63 subpart EEE
Medical Waste Incineration	Standards of Performance and Emissions Guidelines for Hospitals / Medical / Infectious Waste Incinerators	40 CFR part 60 subpart Ce, Ec; & 40 CFR part 62 subpart HHH
Mercury Cell Chlor Alkali Production	National Emission Standards for Hazardous Air Pollutants: Mercury Emissions from Mercury Cell Chlor Alkali Plants	40 CFR part 63 subpart IIIII
Municipal Waste Combustion	Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Large Municipal Waste	40 CFR part 60 subpart Cb, Ea, Eb; & 40 CFR part 62 subpart FFF
	Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Stationary Sources: Small Municipal Waste Combustion Units	40 CFR part 60 subpart AAAA, BBBB & 40 CFR part 62 subpart JJJ
Naphthalene Production	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	40 CFR part 63 subpart I
Paints and Allied Products (Major)	National Emission Standards for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing	40 CFR part 63 subpart FFFF
Paper Coated and Laminated, Packaging	National Emission Standards for Hazardous Air Pollutants: Paper and Other Web Coating	40 CFR part 63 subpart JJJJ
Pesticides Manufacture & Agricultural Chemicals	National Emission Standards for Hazardous Air Pollutants: Pesticide Active Ingredient Production	40 CFR part 63 subpart HHH
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H
Petroleum Refining: All Processes	National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries	40 CFR part 63 subpart CC
	National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units	40 CFR part 63 subpart UUU
Phthalic Anhydride Production	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry	40 CFR part 63 subpart F

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
	National Emission Standards for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater	40 CFR part 63 subpart G
	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks	40 CFR part 63 subpart H
	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks	40 CFR part 63 subpart I
Plastics Material and Resins Manufacturing	National Emission Standards for Hazardous Air Pollutants for Group IV Polymers and Resins	40 CFR part 63 subpart JJJ
Portland Cement Manufacture: Hazardous Waste Kilns	National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors	40 CFR part 63 subpart EEE
Portland Cement Manufacture: Non-Hazardous Waste Kilns	National Emission Standards for Hazardous Air Pollutants for the Portland Cement Manufacturing Industry	40 CFR part 63 subpart LLL
Primary Aluminum Production	National Emission Standards for Hazardous Air Pollutants for Primary Aluminum Reduction Plants	40 CFR part 63 subpart LL
Pulp and Paper – Kraft Recovery Furnaces	National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills	40 CFR part 63 subpart MM
Pulp and Paper – Lime Kilns	National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills	40 CFR part 63 subpart MM
Secondary Aluminum Smelting	National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production	40 CFR part 63 subpart RRR

Section 112(c)(6) Category Name	Emission Standard Name(s)	CFR Part and Subpart
Secondary Lead Smelting	National Emission Standards for Hazardous Air Pollutants for Secondary Lead Smelting	40 CFR part 63 subpart X
Sewage Sludge Incineration	Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Sewage Sludge Incineration Units	40 CFR part 60 subparts LLLL, MMMM
Ship Building and Repair (Surface Coating)	National Emission Standards for Hazardous Air Pollutants for Shipbuilding and Ship Repair (Surface Coating)	40 CFR part 63 subpart II
Transportation Equipment Manufacturing (SICs Combined)	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Automobiles and Light Duty Trucks (Surface Coating of Plastic Parts and Products)	40 CFR part 63 subpart PPPP
Wood Household Furniture Manufacturing	National Emission Standards for Hazardous Air Pollutants from Wood Furniture Manufacturing Operations	40 CFR part 63 subpart JJ

Table II.2 – Subparts Used to Reach 90% for 112(c)(6) Pollutants.

112(c)(6) Pollutant	Percent Subject to Regulation	Code of Federal Regulations Part and Subpart
Alkylated Lead Compounds	99.7%	40 CFR part 63 subparts F, G, H, I
Polycyclic Organic Matter (Using 16-PAH Inventory)	90.0%	40 CFR part 63 subparts F, G, H, I, L, R, X, CC, GG, II, JJ, KK, LL, MM, EEE, JJJ, LLL, MMM, UUU, FFFF, JJJJ, MMMM, PPPP, ZZZZ, CCCCC, DDDDD, FFFFF, LLLLL, JJJJJ; 40 CFR part 60 subpart Cb, Ce, Ea, Eb, AAAA, BBBB; 40 CFR part 62 subpart FFF, HHH, JJJ
Hexachlorobenzene	100%	40 CFR part 63 subparts F, G, H, I, HHH

112(c)(6) Pollutant	Percent Subject to Regulation	Code of Federal Regulations Part and Subpart
Mercury Compounds	90.3%	40 CFR part 63 subparts X, GG, LL, MM, EEE, LLL, DDDDD, IIIII, YYYYY, JJJJJJ, EEEEEEE; 40 CFR part 60 subpart Cb, Ce, Ea, Eb, AAAA, BBBB, LLLL, MMMM; 40 CFR part 62 subpart FFF, HHH, JJJ
Polychlorinated Biphenyls	94.5%	40 CFR part 63 subparts EEE; 40 CFR part 60 subpart Cb, Ce, Ea, Eb, AAAA, BBBB; 40 CFR part 62 subpart FFF, HHH, JJJ
2,3,7,8-Tetrachlorodibenzofurans (furan) and 2,3,7,8-Tetrachlorodibenzo-p-dioxin (dioxin)	95.3%	40 CFR part 63 subparts X, LL, EEE, LLL, MMM, DDDDD, JJJJJJ; 40 CFR part 60 subpart Cb, Ce, Ea, Eb, AAAA, BBBB; 40 CFR part 62 subpart FFF, HHH, JJJ

Exhibit B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

National Emission Standards for)
Hazardous Air Pollutants for)
Major Sources:)
Industrial, Commercial, and)
Institutional Boilers and Process Heaters:)
Proposed Rule)
)
75 Fed. Reg. 32,006 (June 4, 2010))

Docket ID No.
EPA-HQ-OAR-2002-0058

COMMENTS OF: CLEAN AIR TASK FORCE, EARTHJUSTICE, NATURAL RESOURCES DEFENSE COUNCIL, AND SIERRA CLUB

I. Introduction

EPA's proposed MACT rules for major source Industrial, Commercial, and Institutional Boilers and Process Heaters (ICIBPH) is a welcome step towards establishing regulations for the vast quantities of toxic air emissions from this industry, which have been unregulated since the Agency's 2004 rules were vacated. Industrial boilers emit many of the hazardous air pollants (HAPs) listed in Clean Air Act §112(b), including mercury, arsenic, chromium, cadmium, selenium, nickel, lead, manganese, phosphorus, antimony, beryllium, organic HAPs including polycyclic organic matter (POM), benzene, formaldehyde, acetaldehyde, dioxins and furans (D/F), and acid gases including hydrogen chloride (HCl), hydrogen cyanide (HCN), and hydrogen fluoride (HF). 75 Fed. Reg. 32,006, 32,010-32,011 (June 4, 2010). Exposure to these HAPs is associated with a variety of adverse health effects; six of these chemicals are classified as known or probable human carcinogens. The other adverse human health effects associated with exposures to all the HAPs emitted by this industrial category include irritation of the lung, skin, and mucus membranes, central nervous system effects (including adverse developmental effects), damage to the kidneys, and alimentary effects such as nausea and vomiting.

As described below, however, there are still some significant problems with the current proposal for this industrial category, as compared with Congress's directive that the Agency must at a minimum "set limits that, as an initial matter, require all sources in a category to at least clean up their emissions to the level that their best performing peers have shown can be achieved." *Sierra Club v. EPA*, 353 F.3d 976, 980 (D.C. Cir. 2004).

In particular, the Agency sets subcategories that are arbitrary and unreasonable, including one subcategory governing two-thirds of all ICIBPH (for natural gas/refinery gas boilers) that is seemingly designed only to avoid MACT-based emissions standard setting altogether, in favor of a work practice standard for those boilers. The Agency's floor-setting exercise (for those subcategories and HAPs where it does set floors) unreasonably, and unlawfully over-accounts for variability, both at a single source and between sources, such that the resulting floors are not representative of the relevant best performing units. The Agency's beyond-the-floor analysis is incomplete, both in its scope and its failure to require any additional controls on any subcategory. Finally, it is clear from examining the rule as a whole that EPA's subcategories, floors, and beyond the floor standard are based on rationales that are internally inconsistent – and improperly fail to assess fuel-switching as a compliance alternative (while purporting to provide incentives for it).

Although the Agency properly determines it cannot set alternative health-based standards for the hundreds of thousands of tons of HCl and the other acid gases emitted by this industrial category annually, the Agency's surrogate-based MACT floors for these pollutants are wanting for the reasons described below, as are its other surrogate choices (PM filterable for non-mercury metals and CO for non-dioxin/furan organic HAPs). Nor does the Agency properly require continuous emission monitoring systems on the sources regulated by MACT-based emission standards, as required by law. We describe each of the proposal's shortcomings in detail below, and respectfully request the agency to finalize a rule for this industry that corrects the significant deficiencies we identify.

II. EPA's Proposed Subcategories for Industrial Boilers and Process Heaters are Unlawful, Arbitrary, and Unsupported by the Record.

EPA proposes MACT standards (and in some instance work practice alternative standards) for industrial, commercial and institutional boilers and process heaters, based on fuel- and design-specific industrial subcategories. While the CAA provides that the Agency "*may* distinguish among classes, types, and sizes of sources within a category or subcategory in establishing [MACT] standards." 42 U.S.C. § 7412(d)(1)(emphasis added), this language is clear that such subcategorization is not *required*. Where EPA sets MACT standards on the basis of industry subcategories, the Agency's action must be reasonable, and well-supported. 42 U.S.C. §§ 7607 (d)(3), (d)(6), (d)(9). The Agency must offer a reasoned justification for the subcategories it has chosen. *See, e.g., Northeast Maryland Waste Disposal Authority v. EPA,* 358 F.3d 936, 947-950 (D.C. Cir. 2004)(remanding a decision to subcategorize in setting MACT standards because the Agency had not properly justified its subcategorization scheme). Finally, the plain text of the Act demonstrates that Congress intended EPA to creates categories and subcategories as a step towards establishing emissions standards," *NRDC v. EPA*, 489 F.3d 1364, 1371 (D.C. Cir. 2007), not as part of a scheme to provide incentives for existing sources to avoid standards. And yet, that is the effect of EPA's subcategorization scheme.

There is nothing in the Act that requires MACT standards to be based on subcategories designed so that the vast majority of sources in the industry will be able to meet the final standards, without making some adjustment or adding controls in order to do so. And yet, when EPA's subcategories, and the rationale EPA provides for them, are compared with the information about boilers in the industry, that is the outcome that EPA seems to desire to achieve. In particular, EPA unlawfully defines a subcategory (essentially on policy grounds alone) that includes over two-thirds of U.S. major source boilers and process heaters, and proposes not to subject those sources to MACT-based standards at all. Indeed, all of EPA's subcategories, if adopted as proposed, will provide incentives to existing sources simply to make small fuel adjustments to fit themselves into a subcategory with the least stringent floors, while eliminating the need to switch to cleaner fuels even for boilers where such fuel switching is entirely feasible.

As described in more detail below, the record underlying the Agency's rationale for its subcategories is sparse at best – and strongly suggests that the real motivation behind these subcategories was groupings of emissions levels for existing sources, rather than groupings truly based on "class, type, and size" of sources. This is unlawful, as well as arbitrary, and moreover defeats the Act's directive to set standards that ensure that all sources will match the emission levels achieved by the best performers in the industrial category. 42 U.S.C. § 7412(d)(3).

A. EPA's Asserted Rationale for Its Subcategories Makes Clear that They Are Unlawfully Based on Emissions Levels, Not "Class, Type, or Size" of Industrial Boiler or Process Heater.

EPA divides the currently existing 13,555 existing major source ICIBPH in operation in the U.S.[1] into eleven subcategories, assertedly based on fuel type, and on unit design. Specifically, for mercury, PM/filterable as a surrogate for non-mercury metallic HAPs, and HCl as a surrogate for acid gases – EPA asserts that emissions levels directly correlate to the type of fuel burned, and therefore five subcategories are justified. Those are: coal-fired, biomass-fired, liquid fuel fired, natural gas ('Gas 1') boilers and metal process heaters, and "other gas" (Gas 2) boilers and process heaters. For the HAPs that EPA asserts are non "fuel-dependent" – carbon monoxide as a surrogate for non-dioxin/furan organic HAPs, and dioxin/furans – EPA further divides the fuel subcategories based as well on unit design, because organic HAPs are formed by incomplete combustion of various fuel types and the degree and efficiency of combustion is based on unit design and operation. 75 Fed. Reg. 32,016-32,017.

EPA's rationale for what it asserts are fuel- and design-based subcategories for industrial boilers, demonstrates that these subcategories actually are chosen based on the emissions characteristics of the subcategories, not on "class, type, and size" of boilers. What EPA is saying in essence is that different fuels when combusted yield different emissions characteristics – and EPA is subcategorizing to accommodate those emissions characteristics. Similarly, the Agency states that because "differences between given types of units can lead to corresponding differences in the nature of emissions and the technical feasibility of applying emission control techniques," it is justified in distinguishing between unit designs in setting standards. EPA states this is true, particularly for further subcategorizing beyond fuel type for standard setting for

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[1] 75 Fed. Reg. 32048.

organic HAP emissions, for which the Agency notes "different designs and combustion systems, while having a minor effect on fuel-related HAP emissions, have a much larger effect on organic HAP emissions." 75 Fed. Reg. 32,016-32,017. But, the nature of emissions is not an element describing "class, type, or size" of boilers. Subcategorizing based on sources' emissions characteristics instead aims at the eventual achievability of the MACT floor by as many sources in the industrial category as possible – rather than standard setting based on what is achieved in practice by the best performers in the category. *See NRDC v. EPA*, 489 F.3d 1364, 1372 (D.C. Cir. 2007)(holding that EPA lacks authority to designate a subcategory "that allows harmful emissions in a manner contrary to Congress's statutory scheme.").

EPA justifies its subcategories for boilers burning at least 90 percent natural gas/refinery gas, and for metal process heaters essentially on cost and policy grounds, neither of which is a lawful basis for setting subcategories under section 112(d). It is notable, at the outset, that these subcategories include over 11,000 of the 13,555 boilers EPA identifies as the universe of regulated major source industrial boilers. For these boilers and process heaters, EPA first states that setting separate subcategories would assure that they are subject to emissions standards on the basis of their emissions characteristics. 75 Fed. Reg. 32,017. The natural gas/refinery gas subcategory, the Agency asserts, is necessary to ensure standards based on "the best performing units with similar design and operation," *id*., even though what the Agency actually does is to propose a work process standard for this subcategory (which as shown below is further unlawfully supported entirely on the policy grounds that it will incent fuel-switching to gas), For the metal process furnace subcategory, the agency makes much of asserted differences in design and operation of these units compared with other industrial boilers and process heaters, *id*., arguing that these differences create distinct emissions characteristics justifying a separate subcategory (although in fact, EPA proposes work practice standards for this subcategory as well). What EPA really is doing here however, is creating subcategories in order to set up work practice standards that avoid the application of MACT-based emissions limits to a substantial part of the regulated industry. This is clearly unlawful.

EPA also describes a subcategory of small boilers of all kinds. That subcategory, for sources burning any fuel at a rate less than 10 MMBtu per hour, while purportedly based on "size" of source, is justified by the Agency only on assertions that "the standard reference methods for measuring emissions of mercury, CO…, D/F, HCl … and PM…are generally not able to accurately sample small diameter (less than 12 inches) stacks. … Units that have capacity below 10 million MMBtu per hour generally have [such small diameter] stacks…[a]lso, many existing small units do not currently have sampling ports and a platform." 75 Fed. Reg. 32,024. In fact, this distinction is really one of costs – EPA further asserts that the costs to demonstrate compliance with technology based limits at these units "would have a significant adverse effect on these facilities" which EPA says would vary by facility size (i.e., smaller facilities would be less likely to be able to bear the costs). *Id*.

B. EPA's Stated Bases for its Proposed Subcategories is Unsupported by the Data, and Internally Inconsistent, and Therefore Unreasonable and Arbitrary.

EPA's preamble statements and a brief discussion in the memorandum describing the floor setting exercise[2] are the only justification for its subcategories provided by the Agency in the record for this rule. Indeed, the supporting material for the information request underlying the rule simply assumes the continued use of the five subcategories for new and existing boilers as used in the 2004 rule, which the agency states are: "units designed to burn coal, units designed to burn biomass, units designed to burn liquid, units designed to burn natural gas/refinery gas, units designed to burn other process gases." Supporting Statement, Information Collection Request, NESHAP for Industrial, Commercial and Institutional Process Heaters, EPA-HQ-OAR-2002-0058-0801, at 1.

A review of the few limited statements that are in the record for the proposal demonstrates that the arguments EPA puts forward to support its subcategories are themselves internally inconsistent, and unreasonable. For example, EPA asserts it has chosen fuel-based subcategories for what it calls the "fuel-dependent HAPs" – mercury, acid gases, and non-mercury metallic HAPs – because "data indicate that there are significant design and operational differences between units that burn coal, biomass, liquid, and gaseous fuels. Boiler systems are designed for specific fuel types and will *encounter problems* if a fuel with characteristics other than those originally specified is fired." 75 Fed. Reg. 32,017 (emphasis added). At the same time, however, when defining the various subcategories, EPA states, for example, that "if your

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[2] Memorandum from ERG to Jim Eddinger, U.S. EPA, "MACT Floor Analysis (2010) for the Industrial, Commercial, and Institutional Boilers and process Heaters National Emission Standards for Hazardous Air Pollutants – Major Source" (April 2010) at 4. (hereinafter, "Floor Memo").

new or existing boiler or process heater burns at least 10 percent coal on an annual average heat input basis, the unit is in one of the coal subcategories." *Id*. 32,012. This 10 percent rule or a variant of it defines all the fuel-based subcategories EPA uses. But a unit that burns, say, 12 percent coal is burning 88 percent something else, by definition. So, the HAPs it emits are would seem as or more likely to be dependent on the 88 percent of non-coal fuel being burned. And, if EPA's design and operational justifications (that boiler design and operation is very specific to fuel type) are correct, a unit burning 10 percent coal and 90 percent of some other fuel, which EPA's subcategories define as a "coal-fired" unit, should regularly "encounter problems." EPA nowhere explains this inconsistency -- either EPA's statements about the fuel-specific nature of boiler design and operation are not correct, or EPA has proposed MACT standards that will apply to boilers that by their nature are "encountering problems" due to their fuel mix.

In fact, however, EPA's own data show that sources that fall within EPA's definition of "coal-fired" units burn a mix of fuels. The data for the source chosen as EPA's best performer in the coal-fired subcategory shows that it burns a mix of coal and biomass, and that that mix varies from time to time. In 2006 the unit burned about 23% coal and 77% dry biomass, while in 2009 the same unit burned around 51% coal and 49% dry biomass, for example. See Appendix IV-2 (section on coal mercury).

Similarly, with respect to the degree to which units can fuel-switch between liquid and gaseous fuels or between such fuels and solid fuels, EPA strings several conflicting sentences together in the preamble that belie the conclusion it reaches that changing fuel type requires extensive changes to boiler systems. The Agency says "[w]hile many boilers in the population data base are indicated to co-fire liquids or gases with solid fuels, in actuality most of these commonly use fuel oil or natural gas as a startup fuel only, and operate on solid fuel during the remainder of their operation. In contrast, some co-fired units are specifically designed to fire combinations of solids, liquids, and gases." 75 Fed. Reg. 32,017. Data in the floors memorandum, by contrast shows that "many boilers and process heaters are designed to burn multiple fuel types," indeed, "some units reported test burns on more than one material" including the switch between tests between gas and liquid fuels (burned during periods of 'gas curtailment'). Floor Memo at 4. Clearly the distinction between boiler types on the basis of fuels burned, viewed in the best light possible, is not as dramatic as EPA describes – it certainly does not justify EPA's choice of subcategories. EPA's rationale is substantively empty, and therefore unreasonable. Moreover, that fact suggests EPA's real motivation – to define subcategories not by "class, type, and size" as the statute requires, but so that the resulting MACT floors are achievable by the majority of ICIBPH. That rationale is unlawful.

C. EPA's Subcategorization Scheme Creates Perverse Incentives to Fuel Switch to Avoid More Stringent MACT Standards.

By defining the subcategories it has, EPA sets up incentives for existing boiler owners and operators, during the 3 year period between promulgation of final standards and compliance, to tinker with fuel mix in order to fit into the subcategory requiring the least additional controls. While the purpose of MACT at the outset is meant to be for all sources to control to the level actually achieved by the best performers, , however that performance is achieved, see *Cement Kiln Recycling Coalition v. EPA*, 255 F.3d 855, 861 (D.C. Cir. 2001), EPA's subcategories seem designed instead to at best perpetuate the *status quo*.[3] The fuel-switching likely to result from EPA's subcategories (leaving aside the natural gas subcategory for which work practice standards are proposed) is likely to gravitate towards avoidance of control costs, not towards meeting the emissions performance of the best performers in the industry. In summary, EPA's proposed subcategories circumvent the fundamental objective of section 112(d), which is that "all sources in a category [will] at least clean up their emissions to the level that their best performing peers have shown can be achieved." *Sierra Club v. EPA*, 353 F.3d 976, 980 (D.C. Cir. 2004). EPA's scheme will motivate change, certainly, but not emissions clean up to the level of the best performing relevant sources. Moreover, where the Agency knows that fuel switching is possible and yields the best performance across the industry, subcategorizing in such a way as to provide disincentives to that compliance option runs counter to the statute's goal that MACT floor standards truly reflect the best performers. See also 42 U.S.C. § 7412(d)(2)(requiring consideration of "process changes [and] substitution of materials").

III. **EPA's Selection Of Surrogates Is Unlawful and Arbitrary and Capricious**.

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[3] This is true with the exception of the natural gas work practice standard – which may provide (as EPA suggests) incentives to fuel-switch to at least 90 percent natural gas to avoid MACT-based controls. The natural gas work practice standard is unlawful, however, as we discuss *infra*.

Clean Air Act "section 112(d)(1) requires EPA to set emission standards for every [listed] HAP emitted from each category or subcategory of major sources." *Mossville Envt'l Action Now v. EPA*, 370 F.3d 1232, 1236 (D.C. Cir. 2004)(citing *National Lime Ass'n v. EPA*, 233 F.3d 625,634 (D.C. Cir. 2000). Although the D.C. Circuit Court has held it is within EPA's authority to regulate a surrogate air pollutant that stands in the shoes of the listed HAP, EPA must identify each of the HAPs it is regulating in this way, and for those HAPs, the agency must show that three well-established conditions are satisfied:

1) the identified listed HAP is "invariably" present in the surrogate pollutant;
2) methods to control or capture the surrogate pollutant "indiscriminately" control or capture the listed HAP as well; and
3) surrogate controls are the "only means" by which facilities "achieve" reductions of the listed HAP.

Sierra Club v. EPA, 353 F.3d 976, 984 (D.C. Cir. 2004) (quoting *National Lime*, 233 F.3d at 639).

Here, EPA engages in several layers of surrogate-based regulation. EPA first asserts that because boilers and process heaters can emit a wide variety of compounds, depending on the fuel burned, and because of the large number of HAPs potentially present and the variation in the quantities and quality of emissions data available to it, that it is justified in "group[ing] the HAP [emitted by ICI boilers and process heaters] into five categories: Mercury, non-mercury metallic HAP, inorganic HAP, non-dioxin organic HAP and [dioxin/furans] DF." 75 Fed. Reg. at 32,018. The Agency further justifies this choice on the basis that "the pollutants in each group have similar characteristics and can be controlled with the same techniques." *Id.*

EPA then regulates three of these five groups through surrogates. EPA chooses to regulate the non-mercury metallic HAP (including arsenic, selenium, cadmium, chromium, nickel and other metals) through a PM filterable surrogate, non-dioxin organic HAP through carbon monoxide (CO) as a surrogate, and non-metal inorganic HAP (the acid gases, primarily hydrochloric acid (HCl), chlorine gas (Cl_2), hydrogen fluoride (HF), and hydrogen cyanide (HCN)) through (HCl) as a surrogate. Each of these surrogates fails the well-established 3-part test on some dimension, as shown below. And, EPA has not even fully explained why it thinks its surrogates are lawful – the Agency does not provide anything more than a cursory description of its decision to select the surrogates in the first instance; certainly nothing approaching a fully reasoned basis for its proposal clearly supporting all three parts of the Sierra Club test, for any of its proposed surrogacy choices.

A. EPA's Choice of Filterable PM as a Surrogate For Non-mercury Metallic HAPs is Unlawful, Arbitrary, and Capricious.

EPA, in describing the expected reductions in HAP emissions from the its proposed standards, identifies antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, phosphorus, and selenium as the non-mercury metals emitted by ICIBPH in various amounts. 75 Fed. Reg. 32,010, 32,048. But nowhere else in the preamble to the proposed rule, or in the proposed rule language itself, does the Agency identify which specific listed HAP would be controlled by the limits on PM emissions it proposes. Nor does the Agency state or demonstrate that these HAP "invariably" appear with PM -- EPA simply asserts: "Most, if not all, non-mercury 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-mercury metallic HAP." 75 Fed. Reg. at 32,018. EPA does not claim –, and provides no detailed support to show that non-mercury metallic HAPs are "*invariably*" present in filterable PM, and in fact, they are not.[4] *See, attached hereto*, Exhibit III-1 at 223-224, and Exhibit III-2. Most notably, 50 to 100% of the selenium created by coal-fired boilers exists as a vapor in exhaust gases.[5] Similarly, up to 52% of the arsenic also may be present as a gas. Depending upon the fuel and control train, some of the otherwise nonvolatile trace metals, including chromium and nickel, may be present in the vapor phase. Controls on particulate matter will not capture such gaseous HAP emissions.

Nor does the Agency assert, as it must to meet the third prong of the Sierra Club surrogacy test, that PM control techniques are the "only means" by which facilities achieve controls on the non-mercury metallic HAP. Indeed, "[particulate matter] control is not the only means by which facilities 'achieve' reductions in HAP metal emissions." *Sierra Club*, 354 F.3d

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[4] Fuel Processing Technology, v. 85 (2003), at 215-237. See also William P. Linak and Jost O.L. Wendt, Trace Metal Transformation Mechanisms During Coal Combustion, Fuel Processing Technology, v. 39 (1994) at 173-198.

[5] *See supra*, n.4, Linak and Wendt.

at 984. By utilizing less HAP-intensive fuels (even within EPA's proposed sub-categories), plants achieve lower emissions in non-mercury metallic HAP.[6]

Furthermore, while asserting that "non-mercury metallic HAP tend to be on small size particles" (i.e., PM 2.5), EPA instead chose as the surrogate " PM (filterable)" – a larger diameter particle – and regulates simply "PM", defined as "any finely divided solid or liquid material, other than uncombined water…." 75 Fed. Reg. 32,065 (definition in proposed 40 CFR § 63.7575). In effect, PM filterable is chosen as the surrogate for the surrogate for non-mercury metallic HAP. As such, it also should meet the tests for surrogacy, which it does not.

As EPA acknowledges, non-mercury metallic HAPs exist primarily amidst the smallest particulates emitted by boilers (fine particulates, or $PM_{2.5}$). 75 Fed. Reg. 32,065, and see Exs. III-5 through III-11. *Total* filterable particulates do not bear the necessary fixed relationship to non-mercury metallic HAP; the amount of non-mercury metallic HAP in total PM will vary, depending upon the balance between large and fine particles amongst those total particulates. A prescribed particulate matter limit can be met by removing larger particles, without removing all of the smaller particles on which the target HAPs are found. Control devices removing filterable particulates do not, in other words, "indiscriminately capture" non-mercury metallic HAPs "along with other particulates." Indeed, EPA itself has found that a control device may be effective in capturing large particles without having any significant effect on emissions of metallic HAPs. 75 Fed. Reg. 31,896, 31,908 (June 4, 2010)(rejecting control technology that reduces large particles as effective for metallic HAPs because "non-mercury metallic HAP tend to be on small-size particles."). Although the Agency does note that it based this choice on actual emissions data, showing that "the majority of the filterable PM emitted from units that are

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[6] The effect of fuel-related inputs on metallic HAP emissions differs from such inputs' effect on particulate matter for three reasons. First, the ash content of the coal used as a fuel determines the particulate matter concentration in a plant's flue gases. Exh. III-3. The summary of Powder River coal quality attached as Exh. III-4 shows that the ash content remains stable across many coals, while the trace elements can vary significantly. For example, coal from the Jacobs Ranch mine contains about 5.5% ash and lower concentrations of antimony, arsenic, cadmium, chromium, lead and selenium than coal from the Cordero mine. Thus, lower stack emissions of these elements could be obtained by burning Jacobs Ranch coal instead of Cordero coal. Alternatively, a plant could switch from a coal containing low amounts of HAPs, or to a similar coal containing higher amounts of HAPs, increasing HAP emissions without affecting particulate matter emissions. Such alterations in fuel supply thus "affect HAP metal emissions" in a far different fashion than they affect particulate matter. *Sierra Club*, 353 F.3d at 985.

well controlled for PM is fine particulate," this does not amount to a showing that PM2.5 (and non-mercury metallic HAP) is 'invariably present' in PM filterable, or that methods for controlling or limiting PM filterable "indiscriminately" capture PM2.5 (and the target HAPs). It could just as easily show that the PM controls at those units capture only larger particles, while allowing the fine particles (and the target HAPs) to escape.

The two most common particulate matter control devices (fabric filter baghouses and electrostatic precipitators) do, in fact discriminate between large particles and the fine particles bearing HAPs. Both tend to have much higher control efficiencies for big particles than small particles.[7] Such control devices can as a result, provide low filterable particulate emissions, but high metallic HAP emissions.[8] A fine-meshed baghouse designed to capture $PM_{2.5,}$ in contrast, may produce similar emissions of total particulates to those of an electrostatic precipitator – but the fine-meshed baghouse will produce far lower metallic HAP emissions.

EPA's stated reasons for nevertheless selecting filterable particulate matter as its surrogate do not suffice. First, the agency suggests that EPA's test method for measuring $PM_{2.5}$ "is not applicable for units equipped with wet scrubbers," which "likely will be necessary to achieve the proposed HCl emission limits," whereas filterable particulates are more easily and affordably measured. 75 Fed. Reg. at 32,018. But the agency cannot regulate a "surrogate" that diverges from the target HAPs, however, merely because the surrogate is easily measured. *See Cement Kiln Recycling Coal. v. E.P.A.*, 255 F.3d 855, 865 (D.C. Cir. 2001) (difficulties in quantifying variation in emissions from units does not justify departure from statutory requirements). The Clean Air Act requires EPA to prescribe the maximum achievable reduction in hazardous air pollution, 42 U.S.C. § 7412(d)(3); the agency may substitute a surrogate limit *only* if that substitution results still yields those maximal reductions. By proposing an admittedly inadequate, but easily measured, surrogate, the agency risks repeating the mistake of the drunk who seeks his wallet underneath a street-light not because he lost it there, but because the space is well-lit.

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[7] See Exhs. III-1 (Table 1.1-7), III-2 (Fig. 8), and III-12.

[8] AP-42, Table 1.1-5; *see also* Exhs. III-13 (Table 1.1-15) and III-14 (JoAnn S. Lighty, John M. Veranth, and Adel F. Sarofim, Combustion Aerosols: Factors Governing their Size and Composition and Implications to Human Health, 50 *J. Air & Waste Mgt. Assoc*. 1565, 1582 (2000)).

EPA's second reason for selecting filterable particulates is that "the majority of the filterable PM emitted from units that are well controlled for PM is fine-particulate (PM2.5)." 75 Fed. Reg. 32,018. That does not, however, indicate that those units are *capturing* a proportionate quantity of $PM_{2.5}$ (or non-mercury metallic HAPs), or that those units are well-controlled for $PM_{2.5}$ (or non-mercury metallic HAP). As noted above, a pollution-reduction device may achieve large reductions in total filterable particulates, without achieving similar reductions in fine particulates. *See* Ex. III-12.

EPA's choice of filterable PM as a surrogate for non-mercury metallic HAPs clearly fails the Sierra Club 3-part test for an effective surrogate for those HAPs.

B. EPA's Choice of HCl as a Surrogate For non-metal inorganic HAPs (Acid Gases) is Unlawful, Arbitrary, and Capricious.

EPA's choice of HCl as the surrogate for all non-metallic inorganic HAPs emitted by ICIBPH also fails all three prongs of the Sierra Club test for the choice of a reasonable surrogate. EPA offers very little support for this choice in the preamble to the proposed rule – certainly not sufficient support to satisfy the Sierra Club three part test for surrogacy. While the emissions test data show that the primary non-metallic inorganic HAP emitted from boilers and process heaters are acid gases, with HCl present in the largest amounts, the agency does not say or show that all the other acid gases are "invariably" present when HCl is present – or that their emissions concentrations fluctuate directly with HCl emissions levels. Indeed, this is not a showing EPA can make – for example, HCN peaks intermittently when coal is burned, while HCl does not.[9] Moreover these pollutants are "fuel dependent" – each different combination of fuels burned will produce different proportions of these pollutants, and different peaks. An examination of the emissions profiles of three units in EPA's sampling show that the relationship between HCl and other inorganic non-metal HAPs varies by fuel mix. The emissions database and survey database in the docket support only the assertion that HCl is present in much higher concentrations than the other acid gases, but not that the other acid gases are 'invariably present' with HCl. The emissions database contains approximately 44,000 data points for major and area source boilers. A quick scan of the acid gas values shows that HCl emissions were reported in

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[9] Personal communication with Dr. Ranajit Sahu, Ph.D (consultant to Clean Air Task Force) (August 21, 2010).

pounds per Million British Thermal Units (lb/mmBtu) and ranged from roughly 0.00001 to 0.8. The database contains information on type of fuel burned, type of control technology, and type of sample collected. Table III-1 gives examples of the information for three boilers:

Table III-1 : Sample emissions rates for acid gases from boilers burning various fuel combinations.

Boiler	Test Results
#1 Major source boiler, burns coal, nat. gas, wood; wet scrubber; downstream samples	HCl : 0.84, 0.8, and 0.69 lb/mmBtu
#2 Major source boiler, burns coal; fabric filter; downstream samples	HCl: 0.0035, 0.0032, 0.0031 lb/mmBtu Cl_2: 0.043, 0.04, 0.042 lb/hour
#3 Major source boiler (Duke Univ.): burns coal; fabric filter and dry lime injection; downstream samples	HCl: 0.0124, 0.01, 0.0137 lb/mmBtu HF: 0.0000399, 0.0000483, 0.0000483 lb/mmBtu

Furthermore, although EPA asserts that control technologies that reduce HCl also control other inorganics like chlorine and other acid gases, the agency does not say that these controls "indiscriminately capture" other acid gases, or that they are the "only" controls available for the other gases, only that the "the best controls for HCl would also be the best controls for other inorganic HAP that are acid gases." While applying the best controls on HCl may be a laudable goal, this explanation is not sufficient to support the choice of HCl as a surrogate for HF, Cl_2, and hydrogen cyanide. EPA must show that these other acid gases are invariably present when HCl is present in the exhaust gases from each of the subcategories it has selected, that controls on HCl indiscriminately also capture these other acid gases, and that such controls are the only way facilities now actually achieve lowered acid gas emissions levels. This EPA fails to do with this proposal; indeed by allowing sources to "elect[] to demonstrate compliance with the HCl or mercury limit by using fuel which has a statistically lower pollutant content than the emissions limit," 75 Fed. Reg. 32,033, EPA has openly acknowledged that fuel-switching is an available method of reducing both pollutants.

C. EPA's Choice of CO as a Surrogate For non-dioxin/furan organic HAPs is Unlawful, Arbitrary, and Capricious

EPA proposes to control the highly toxic organic chemicals other than dioxins and furans emitted by ICIBPH, including polycyclic organic matter (POM), acetaldehyde, acrolein, benzene, ethylene dichloride, formaldehyde, and polychlorinated biphenyls (PCBs) indirectly through MACT standards on carbon monoxide (CO). 75 Fed. Reg. 32,028-32,029; *and see* 75 Fed. Reg. 32,048(listing the organic HAP emitted by the industry). This is equally as unreasonable and unlawful as the choices EPA has made for its other HAP surrogates – and, for POM and PCBs, moreover it directly conflicts with the requirements of §112(c)(6).

1. EPA's choice of CO as a surrogate for organic HAPs violates the requirements of CAA section 112(c)(6).

Section 112(c)(6) of the Act requires "[w]ith respect to" certain listed highly toxic HAPs, including the carcinogenic POM and PCBs, the Administrator "shall …list categories and subcategories of sources assuring that sources accounting for not less than 90 per centum of the aggregate emissions of *each* such pollutant are subject to standards under subsections [112](d)(2) or (d)(4) …." 42 U.S.C. § 7412(c)(6)(emphasis added). Section 112(c)(6) thus provides the public with extra protection from these exceptionally toxic HAPs – by requiring listed sources of each such pollutant to be subject to MACT-based standards. Regardless of what authority EPA might have to use surrogates for other hazardous air pollutants, the agency must set specific emission standards under § 112(d)(2) or (d)(4) for the highly toxic HAP enumerated in § 112(c)(6).

In 1998, EPA listed 'industrial coal combustion' industrial oil combustion,' 'industrial wood/wood residue combustion,' commercial coal combustion,' 'commercial oil combustion,' and 'commercial wood/wood residue combustion,' under section 112(c)(6). 75 Fed. Reg. 32,008, 32,042 (citing 63 Fed. Reg. 17838, 17848 (April 10, 1998)). While EPA asserts that the 1998 listing was on the basis of emissions of POM and mercury, 75 Fed. Reg. 32,008, that alone is not enough to permit the Agency to escape the requirement to set MACT standards for all the 112(c)(6) pollutants it now knows are emitted by ICIBPH, which include not only POM, and mercury, but also PCBs.

Specifically, EPA claims that it has met its obligations under § 112(c)(6) by setting by setting carbon monoxide (CO) standards, and that "POM is effectively reduced by the combustion and post-combustion practices require to comply with the [other] CAA section 112 standards." 75 Fed. Reg. 32,042. But this is not enough to satisfy the requirements of the stateute. First, EPA makes no mention of the other §112(c)(6) pollutants emitted by ICIBPH, and how they might be affected by this proposal. Second, nothing in the statute's language authorizes EPA to use a surrogate to regulate POM, or any of the other pollutants specifically enumerated in §112(c)(6), including the PCBs also emitted by ICIBPH. EPA's attempt to do so in fact contravenes the plain language requirements of the statute. Third, § 112(c)(6) requires the Agency to "assure" that sources of these pollutants are regulated by MACT-based standards – so that "not less than 90 percentum of the aggregate emissions of *each such pollutant*" are so regulated. 42 U.S.C. § 7412(c)(6). It is implausible to quantify the degree to which emissions of POM and PCBs are lowered by standards that only set limits on – and demand compliance for the CO surrogate. Nor is EPA's "belief" that CO serves as an effective surrogate for POM sufficient. And finally, it is not enough to satisfy the requirement of §112(c)(6) to say, as EPA does, merely that because "the emissions tests obtained at currently operating units show that the proposed MACT regulations will reduce *mercury* emissions by about 86 percent," it is somehow "reasonable to assume that POM emissions will [also] be substantially controlled." 75 Fed. Reg. 32,042 (emphasis added).

In any event, as shown below, CO is not a sufficient lawful surrogate for any organic HAP, including for POM or PCBs. And, while EPA agrees that "standards established under section 112(d)(2) must reflect the performance of MACT, 75 Fed. Reg. 32,008, there is no demonstrated correlation in the record for this proposal between levels of the CO surrogate and levels of emissions of POM, or PCBs emitted by ICIBPH. Nor is there any demonstration that the CO proposed floors will provide the equivalent health and environmental protection provided by a MACT floor standard if one were set for each of those pollutants. EPA therefore cannot "assure" through use of a surrogate that this listed industry's §112(c)(6) pollutant emissions are controlled to the level required by 112(d)(2) as it could if separate MACT floors were set, and compliance with those floors required, for those carcinogenic organics. Even if CO were a valid surrogate, though, on this record, § 112(c)(6) requires EPA to set § 112(d)(2) or (d)(4) standards with respect to POM and PCBs.

2. CO is not a lawful surrogate for any organic HAPs.

EPA says that it considered both total hydrocarbon (THC) and CO as surrogates, but chose CO because "CO has generally been used as a surrogate for organic HAP because CO is a good indicator of incomplete combustion and organic HAP are products of incomplete combustion." 75 Fed. Reg. 32,018. EPA correctly recognizes that this is not true for dioxin and furans, as these organic HAPs can be formed outside of the combustion unit, not as part of the combustion process, and so sets separate standards for these carcinogens. But for the remaining organic HAP, EPA simply states that "minimizing CO emissions will result in minimizing non-dioxin organic HAP. Methods for the control of [these HAP] would be the same methods used to control CO emissions. These emission control methods include achieving good combustion or using an oxidation catalyst." *Id.* EPA further asserts that "establishing emission limits for specific organic HAP (with the exception of D/F) would be impractical and costly." *Id.* None of these reasons is sufficient to support the selection of CO as a surrogate, over the requirement to set emissions standards for specific organic HAPs.

First, EPA does not assert that organic HAP are "invariably present" when CO is present – only that CO indicates incomplete combustion and in those conditions the organic HAP are present. Second, while EPA says that "minimizing CO emissions will result in minimizing non-dioxin organic HAP," the agency does not assert in the preamble, and there is nothing in the record to indicate that this relationship is indiscriminate – i.e., that all the non-dioxin organics will always be minimized when CO are minimized. Indeed, EPA cannot make this assertion.

There are three classes of non-dioxin/furan organic HAPs that behave differently during combustion: (1) volatile organic compounds, which are gases; (2) semi-volatile organic compounds, which may be gases or solids, depending on where in the exhaust gas train they are; and (3) particulate organic compounds, such as polynuclear aromatic compounds, which are present in the particulate fraction.[10] A single indicator, CO, cannot be used as a surrogate for these three diverse groups of chemicals because they are chemically and physically dissimilar. Most of the particulate organic compounds for example, form primarily immediately downstream of the combustion chamber, as do dioxin/furans. This is far from the same mechanism by which CO is formed. Several of these compounds are not products of incomplete

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[10] See John A. Dean, Lange's Handbook of Chemistry, 13th Ed., McGraw Hill Book Co., 1985; Robert H. Perry and Don W. Green, Perry's Chemical Engineers' Handbook, 7th Ed., 1997; David R. Lide (Ed.), CRC Handbook of Chemistry and Physics, CRC Press, 75th Ed., 1994.

combustion, like CO, but rather are formed via distinct chemical reaction pathways. Polynuclear aromatic hydrocarbons are formed in condensation reactions, for example.[11]

Because of these diverse physical relationships, CO minimization or control does not indiscriminately minimize or capture non-dioxin/furan organic HAPs. Additionally sources can achieve lowered emissions of such organic HAP emissions by means other than CO control. For example, "combustion optimization" is a typical means that is used to control carbon monoxide. This includes changes in combustion residence time, turbulence, and temperature. Yet, combustion optimization can actually *increase* some organic HAPs (such as polynuclear aromatic hydrocarbons) while reducing others (such as VOCs). Other carbon monoxide controls, such as substituting alternative fuels (natural gas, or distillate oil), would reduce such organic HAPs at a far higher rate than methods for the limitation of carbon monoxide.

But EPA does not note these limitations on using CO as a surrogate for non-D/F organics. In fact, evidence from the test data show that EPA's testing protocols were designed from the beginning to test only for CO, not the organic HAPs for which it stands as a surrogate. Major Source ICR Testing Protocol Summary Supporting Statement at 7 (EPA-HQ-OAR-2002-0058-0801. EPA therefore cannot show that CO and organic HAP are invariably present together and that minimizing or controlling CO always minimizes or controls all the organic HAP. Indeed, the results of those tests show that even for a single source, CO emissions differ radically from test to test – for the best performing coal-fired source for CO, EPA's data show:

Table III-2 Data for EPA's Best-performing Coal Fired Source for CO.

Unit Name		HAP			concentration(ppm)
ILDukeEnergyTuscola	Unit 3	CO	Sample #1	3/29/2007	77.89812
ILDukeEnergyTuscola	Unit 3	CO	Sample #1	3/30/2007	0.0557
ILDukeEnergyTuscola	Unit 3	CO	Sample #1	3/29/2007	0.0607

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[11] William Bartok and Adel F. Sarofim, *Fossil Fuel Combustion: A Source Book*, John Wiley & Sons, 1991; J. Warnatz, U. Maas, and R.W. Dibble, *Combustion: Physical and Chemical Fundamentals, Modeling and Simulation, Experiments, Pollutant Formation*, 2nd Ed., Springer, 1999; *D.J. Hucknall, Chemistry of Hydrocarbon Combustion*, Chapman and Hall, 1985.

ILDukeEnergyTuscola	Unit 3	CO	Sample #2	3/30/2007	0.0564
ILDukeEnergyTuscola	Unit 3	CO	Sample #2	3/29/2007	0.0543
ILDukeEnergyTuscola	Unit 3	CO	Sample #2	3/29/2007	75.93595
ILDukeEnergyTuscola	Unit 3	CO	Sample #3	3/29/2007	0.0562
ILDukeEnergyTuscola	Unit 3	CO	Sample #3	3/30/2007	0.0538
ILDukeEnergyTuscola	Unit 3	CO	Sample #3	3/29/2007	71.23277

Based on these data, as noted elsewhere in these comments, EPA has shut its eyes and prepared a MACT floor, set at 90 ppm CO – despite the fact that the data do not fit any sort of clear distribution or readily subject themselves to the statistical analysis EPA employs to set floors in this proposal. Even for the surrogate, EPA has crammed the square peg into the round hole.

Third, and most notably, EPA does not assert that measures for the control of CO are the *only* means by which facilities 'achieve' lower emissions of non D/F organic HAP. Instead EPA relies on a cost-related argument to reject the idea of setting individual HAP-specific emissions limits for each of the non-D/F organic HAPs, noting that "CO, which is less expensive to test for and monitor, is appropriate for use as a surrogate," and that this is true despite the fact that "the level and distribution of organic HAP associated with CO emissions will vary from unit to unit." In other words, EPA cannot say, as it must to satisfy the Sierra Club test for the use of surrogates, that controls on or minimization of CO are the *only* method for controlling organic HAPs. EPA can only say, as it has, that relying on CO control as a surrogate for individualized MACT emissions limits for these HAPs will "eliminate costs associated with speciating numerous compounds." *Id*. EPA can't choose a surrogate just because it's cheaper. EPA must show that the surrogate actually meets the test for valid surrogates established by the D.C. Circuit. The agency has failed to do so here.

EPA's decision not to regulate dioxin/furan organics through the CO surrogate further belies the problems with its use of a CO surrogate for any organic HAP. Although the Agency properly (and correctly) notes that one basis for setting separate D/F standards is that these organic HAPs are formed differently than the non-D/F organic HAPs, EPA also asserts that somehow it is the “high toxicity associated with even low masses of these compounds,” *id.*, justifies setting a MACT standard for these HAPs, rather than relying on the surrogate. But the statute nowhere establishes this framework for standard setting, such that some HAPs should be regulated pollutant by pollutant because of their high toxicities, whereas others can be regulated by surrogates. On the contrary, the default under the statutory language is for the Agency to set MACT emissions standards for all listed HAP, based on the actual performance of the best performing sources, without reference to the relative toxicities of each HAP, or the costs of control or compliance with HAP-specific emissions limits. Further, as EPA is aware, other organic HAPs, including PCBs and POM are also highly toxic even at very low masses.

EPA clearly has failed to show that the CO surrogate meets the Sierra Club 3-part test for an effective surrogate for non-D/F organic HAPs. That deficiency might be cured if EPA in its background material or preamble provided a reasoned explanation , supported by substantial record evidence why using the CO surrogate otherwise will or can ensure that each of the organic HAPs that are emitted by various subcategories of ICIBPH will be controlled to the level of the relevant best performing sources, with respect to each of those HAPs. The Agency has not done so, however, and so its reliance on the CO surrogate is unreasonable.

IV. EPA’s FLOOR SETTING EXERCISE IS UNLAWFUL AND ARBITRARY.

A. MACT standards must reflect the performance achieved by the best performers.

The Act requires that at a minimum, MACT standards be based on the emission levels actually achieved by the best performing source in the category or subcategory, for new sources, or “the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information).” 42 U.S.C. §7412(d)(3)(A). These minimum stringency requirements (known as the ‘MACT floor’), must reflect the actual performance of the relevant best performing sources, *Sierra Club v. EPA*, 479 F.3d 875, 880-881 (D.C. Cir. 2007) (citing *Cement Kiln Recycling Coalition v. EPA*, 255 F.3d 855, 861 (D.C. Cir. 2001)). This must be “ ‘demonstrate[d] with substantial evidence – not mere assertions’ ….” *Northeast Maryland Waste Disposal Authority v. EPA*, 358 F.3d 936, 954 (D.C. Cir. 2004)(quoting *Cement Kiln*, 255 F.3d at 866 and *Sierra Club v. EPA*, 167 F.3d 658, 662 (D.C. Cir. 1999)).

Although EPA may assess the variability in the emissions of the relevant best performers to determine their performance over time, it may not assess the performance of the best performers based on the variability of other sources. *Sierra Club*, 479 F.3d at 883. EPA may not set floors of "no control" for any listed HAP, or otherwise avoid the statute's requirements that MACT floors must be based on the emissions performance achieved by the best performing relevant sources. *See, e.g., National Lime Ass'n v. EPA*, 233 F.3d 625, 633-64 (D.C. Cir. 2000)(unlawful to set floors of "no control"); *Northeast Maryland*, 358 F.3d at 955 (the MACT standard need not be "achievable" by all units in a subcategory, but must reflect what is actually achieved by the best performers). Nor may EPA excuse sources from continuous compliance with §112 standards. *Sierra Club v. EPA*, 551 F.3d 1019 (D.C. Cir. 2008).

EPA's floors for ICIBPH are based on some of the data available to the Agency via information collection requests, undertaken both in support of this rulemaking (undertaken in 2007-2009) and in support of the Agency's previous (and now vacated) 2004 rules for this industrial category. However, EPA has arbitrarily refused to consider actual emissions data for major source boilers gathered by the National Association of Clean Air Agencies (NACAA). As the agency itself has stated, "EPA *must* consider available emissions information to determine the MACT floors." 75 Fed. Reg. at 32019 (emphasis added). Because the NACAA data is "available" to EPA, the agency must consider it in setting floors.

EPA not only failed to consider valid data regarding boilers' HAP emissions but manipulated the data it used in a way that produces floors that do not reflect the actual performance of the relevant best performing source or sources.[12] Indeed, the calculated floors are orders of magnitude less stringent than the Clean Air Act requires them to be. This is the result of several important problems with EPA's analysis – the EPA does not accurately select the relevant best performers; in setting existing source floors, EPA unlawfully and arbitrarily inflates sources' actual performance to account for differences in performance between sources (differences EPA misleadingly labels "inter-source variability"); EPA unjustifiably overestimates variability in performance by using a 99th percentile upper prediction limit (UPL); EPA double counts variability by using both the UPL and an arbitrary "fuel variability factor" to inflate

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[12] Dr. Ranajit Sahu, Ph.D. performed an extensive review and analysis of EPA's floor-setting at the request of Clean Air Task Force. The results of this review and analysis are presented in Appendices IV-1 (existing source floor analysis) and IV-2 (new source floor analysis), hereto, and are on file in the Boston office of Clean Air Task Force.

sources' performance; EPA arbitrarily refuses to consider test results showing no emissions of a given pollutant or treats them as showing that pollutant to have been emitted at the full detection level; and EPA "rounds up" the resulting floor to the nearest integer – this step alone effectively weakens the proposed floor in some instances by half. These problems with EPA's analysis are summarized here, and then further explored in detail through examples of the mercury MACT floors for new and existing coal boilers.

1. EPA does not select the true best performers. First, although EPA asserts it selects the "best performers" in each subcategory, a glance at examples from the new and existing source floor analyses shows that that is not the case. That is most clearly because although EPA selects the top performer based on the average of the 3 best data points it has for each of the sources for which it has data, the Agency then averages all the data it has on a source to define the performance of that "best performer" – even where there are two sets of data from that source that are quite different, and separated by a period of many years. In addition, EPA's apparent decision not to rely on some sources for which it has non-detect levels of actual performance means it overlooks several very low emitting sources in selecting what it calls the "best". So, from the start, EPA's "best performer" does not reflect the best achieved performance in the subcategory, based on the data available to the Administrator.

Nor does the value EPA calculates as the performance of the relevant best performers reflect what is achieved in practice. Moreover, because EPA falsely assumed that all test results below the detection limit show emissions at the detection limit, the agency artificially created a data set that "is truncated at the lower end of the measurement range (i.e., no values reported below the method detection level)." 75 Fed. Reg. at 32,020. EPA then worries that its falsely inflated emission values at the lower end "may not adequately account for data measurement variability" and solicits comment on whether it should develop a method for further inflating the actual emissions levels. *Id.* at 32,020-32,021. Specifically, EPA asks whether it should develop a method that simply declares the floor to be a value three times higher than the detection limit in some circumstances. *Id.* at 32,021. The answer is no. Because a number three times the detection limit would not purport to reflect the actual emission level achieved by any source, and because EPA does not and cannot possibly demonstrate with substantial evidence that such a number does reflect the best sources' emission levels, such an inflation approach would be blatantly unlawful.

2. EPA Over-accounts for Variability in Performance. EPA also over-counts for the potential for future variability by calculating the 99% upper prediction limit (UPL) statistic for the entire data set[13] for its best performer – the statistic that assertedly assures that 99% of the average of any three future tests from the same unit (or averaged performance for the top 12% in the case of existing sources) will be below the value derived. See 75 Fed. Reg. 32,020 (discussion re: existing sources), 32,027-28 (same, new sources). This, EPA says is necessary "to account for variation in control technology operation."[14] 75 Fed. Reg. 32,038. But EPA does not explain why this quite generous inflation of the figure that actually represents the average performance of the relevant sources does not adequately account for ALL variability from all possible dimensions (control technology, fuel variability, general operational variability, e.g.). After all, selecting this statistic to inflate the actual performance of the best performer ensures that only one percent of future samples from that unit will be above the resulting emissions rate. That is not the best performance of the best performer – it's representative of a level that is worse than the worst tested performance of the best performer.[15]

EPA does not provide any explanation for its apparent assumption that sources' actual emission levels will vary to the full extent of the 99th percent UPL. By its nature, a UPL predicts sources' variability in performance based on characteristics of the data already available for them, the number of data points, the median of the data points, and the standard deviation. The UPL does not consider an operator's efforts to limit variability in emissions – or at least upward variability – by maintaining and operating the source carefully to control emissions. Yet, as both EPA and the D.C. Circuit have recognized, operator training and care and source maintenance do

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[13] Including old data that arguably reflect different operating and/or control conditions than the most recent data.

[14] EPA's approach arguably assumes that the best performer achieves that performance through a technological system of control, which may or may not be the case. EPA's chosen best performer for its new coal mercury floor (the IAUniversity of Iowa EP7Unit 11), actually burned both 100% bituminous coal and a mixture of approximately 50% coal and 50% biomass during the several data collection periods underlying the FVF.

[15] For example, for the University of Iowa boiler selected as the best performer in the coal boiler subcategory for mercury, the best actual tested performance is $7.54E^{-9}$ lb/MMBtu, and the worst actual tested performance is $3.37E^{-7}$ lb/MMBtu; the resulting performance level defined by the 99% UPL for that source is $3.89E^{-7}$ lb/MMBtu, two orders of magnitude higher than the absolute best performance, and higher as well than the actual tested worst performance. Had EPA chosen the 95% UPL, the figure would have been $2.92\ E^{-7}$ lb/MMBtu (which is better than the worst tested performance); had EPA chosen the 90% UPL, the figure would have been $2.49\ E^{-7}$ lb/MMBtu (same).

operate to control emissions. By using the UPL, EPA ignores the effect of operator training and care and source maintenance on emission levels. Doing so is just as unlawful and arbitrary as setting floors that ignore the effects of cleaner fuel use; it results in floors that do not reflect the best sources' actual performance.

While EPA is permitted to assess variability in MACT floor setting, its specific selection of the 99% UPL as opposed to a 95% UPL, a 90% UPL, or some other UPL is not explained, justified, or even discussed anywhere in the record. Thus, EPA's choice of this particular UPL, which then determines the outcome of its floor analysis, is seemingly picked from thin air in a process antithetical to reasoned agency decisionmaking.EPA's reason for deciding not to be more conservative in standard setting for air toxics with significant adverse public health effects should be adequately justified in the record. And yet, it is not.

3. EPA Unlawfully Sets Existing Source Floors That Do Not Reflect The "Average" Emission Limitation Achieved By The Best Performing Sources. For existing sources, EPA claims that it first ranked boilers in each subcategory by the "lowest emission test average (mean) for each pollutant at each boiler/process heater." Floor Memo at 2.1. The agency then states that it identified the best performing twelve percent as the twelve percent of sources in each category (rounded up to the nearest integer) with the lowest emission test averages. *Id.* Significantly, however, the "average" test results that EPA used to identify the best performers ware not averages of *all* the test results for a given source but averages only of the individual runs within each source's single best test. To identify the emission levels achieved by the sources it selected as best performers, however, EPA used a different metric. Rather than looking to the lowest emission test result, the agency considered all tests for each source in the top twelve percent to "evaluate intra-unit variability of emission tests over time, considering variability in control device performance, unit operations, and fuels fired during the test." *Id.* at 2.2.

EPA then calculated the 99th percentile UPL from all the data for the sources in the top twelve percent. The UPL, according to EPA, is a statistically derived prediction of an emission level that all sources in the top twelve percent could be expected to meet ninety-nine percent of the time. The UPL is based on the median of the data points in a given set, the number of data points in that set, and the standard deviation of those points. *Id.* Significantly, EPA did not apply the UPL to the test results for individual sources, or indeed, even attempt to predict the performance of individual sources over time. Rather, EPA applied the UPL to all the test results for all the sources in the top twelve percent.

Whatever else may be said of the EPA's 99th percentile UPL approach, the upper prediction limit of the emission level achieved by the best performing twelve percent of sources is not the "average" emission level achieved by those sources. Because Clean Air Act § 112(d)(3) unambiguously requires EPA to set floors reflecting the "average" emission level achieved by the best sources, setting floors that instead reflect a UPL for those sources is unlawful.

By claiming that it can use the UPL for all sources in the top twelve percent, EPA misreads its authority to consider variability under the Clean Air Act and relevant caselaw. Although EPA may consider variability in estimating an individual source's actual performance over time, nothing in the Act or the caselaw even suggests that the agency may account for differences in performance *between* sources except as § 112(d)(3) provides, by averaging the emission levels achieved by the sources in the top twelve percent. Indeed, EPA errs by viewing the different emission levels achieved by different sources as "variability" at all. The different emission levels achieved by different sources are just differences in performance and provide no basis for applying statistical methods.

Notably, EPA claims that its objective of its statistical approach was to "estimate a MACT floor that is *achievable* by the average of the best performing sources if the best performing sources were able to replicate the compliance tests in our data base." 75 Fed. Reg. at 32,019-32,020 (emphasis added). The Clean Air Act requires EPA to set floors reflecting what the best sources actually achieved, not what the agency thinks is "achievable" – either for the best performing sources or any other group. Thus, EPA not only fails to propose floors reflecting the "average" emission level "achieved" by the relevant best sources, but admits that its goal was to set floors that would be "achievable" by those sources ninety-nine percent of the time. That stated goal is a result that the Clean Air Act does not permit. By attempting to rewrite the Clean Air Act to advance its own policy preferences – floors that reflect EPA's subjective notions about what is "achievable" ninety-nine percent of the time for all sources in the top twelve percent rather than the average emission level actually achieved by these sources, EPA acts unlawfully and frustrates Congress' intent in enacting § 112(d)(3).

4. <u>EPA's Fuel Variability Factor for Mercury and HCl is Arbitrary and Capricious and Unreasonably Double Counts Fuel HAP Content Variability</u>. EPA further and unreasonably inflates the MACT floors for new (and existing) sources for the pollutants it calls "fuel dependent" (HCl as a surrogate for the acid gases, and mercury), by applying a "fuel variability factor" (FVF) – which the Agency asserts is the result of dividing "the highest observed HAP concentration by the lowest observed HAP concentration from the fuel analysis for the best-controlled source." 75 Fed. Reg. 32,028. EPA says this will account for variability in the pollutant content in the fuel, although the Agency does not explain why the 99% UPL statistic it has already applied to the data does not more than adequately account for that element of variability. As will be shown below, EPA derives this figure from the average of all the data it has on the source – combining data sets from two different sampling periods/years that show obvious differences in unit performance that are unexplained, and are not necessarily fuel-dependent – rather than from the data it has from the most recent tests for the source. This choice can have make a significant difference – for example, and as discussed in more detail below, EPA's FVF for mercury in coal at new units is 2.70. This seems to be based on all fuel data from 2006 and 2009 (although EPA's method for deriving its FVFs is far from transparent); but an FVF based on only the more recent tests and sampling for the same source would be 1.125.

5. <u>EPA's Use Of Inconsistent Metrics To Identify The Best Performers And To Identify Those Sources' Actual Performance Is Unlawful And Arbitrary</u>. As noted above, EPA selected the best performers based on each source's *lowest* test result but then measured the best sources' actual performance based on their *average* test results. EPA's use of different measures of performance to identify the top sources on the one hand and to evaluate their performance on the other is inconsistent, irrational, and unexplained. No matter what metric EPA uses to measure sources' performance, the same metric should apply for purposes of identifying the best performers and identifying those sources' actual performance. Moreover, EPA's inconsistent approach to measuring performance has important practical effects. By using the lowest test result to identify the best performers but the average test result to reflect their performance, EPA artificially increases the variability of the data on which it bases floors. Specifically, the data for

the top twelve percent of sources has more variability than if EPA had picked the top twelve percent based on the best average test result, and as a result the variability factor and the floors themselves are also higher. If EPA had either: (1) used average test results consistently to pick the best performers *and* measure their performance; or (2) consistently used sources' lowest emissions test to calculate floors *and* pick the top performers, the floors would be lower. EPA does not provide any explanation for using different metrics to measure sources' performance for the purpose of identifying the best sources and for the purpose of assessing their performance. Given that EPA's choice affects the outcome of its floor analysis, the absence of a rational explanation for that choice is especially arbitrary.

6. EPA Unreasonably Weakens the Proposed Floors through its Rounding Convention. Finally, EPA determined that it should "round[] up the UPL values[16] less than 100 to one significant figure, round[] up the UPL values between 100 and 1,000 to two significant figures, and round[] up the UPL values greater than or equal to 1,000 to three significant figures. … [to] allow for an appropriate level of precision depending on the scale of the measured value." Floors analysis Memo at 10. EPA asserts that "the significant figure approach and associated rounding does not meaningfully change the emissions limits." Id. Comparing the floor result before rounding with the floor result after rounding, however, shows that this statement is false. The resulting floors in some instances become dramatically more lenient with this extra step, so that floors with rounding may be nearly twice as several orders of magnitude less stringent than the actual tested performance of the best performing relevant sources. Moreover, the Agency no where explains why this is necessary. See Exh. # (analysis of existing sources mact floor as proposed by EPA).

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[16] The rounding convention is applied not to the UPL, but rather to the figure obtained after multiplying by the FVF, for fuel-dependent HAPs floors. See, e.g., Table IV-1 (Analysis of Existing Sources MACT Floor as Proposed By EPA)(rounding applied to figures in 99 UPL x FVF column yields the results reported in Table 1 at 75 Fed. Reg. 32,012).

Table IV-1: Analysis of Existing Sources MACT Floor As Proposed By EPA

				EPA Analysis					**Effect of Rounding Only**	**Stringency Ratio**	
		# Sources	# MACT Floor	Avg of Top 12%	99 UPL	FVF	99 UPL x FVF	Rounding (FR Table 1)	**Proposed Floor/(99 UPL x FVF)**	**Proposed Floor/Avg of Top 12%**	**Percentile That Floor Corresponds To**
Biomass	PM-Filt	192	24	6.06E-03	1.62E-02	1	1.62E-02	2.00E-02	123%	330%	34
Coal	PM-Filt	366	44	7.24E-03	1.79E-02	1	1.79E-02	2.00E-02	112%	276%	49
Liquid	PM-Filt	91	11	1.40E-03	3.20E-03	1	3.20E-03	4.00E-03	125%	286%	23
Biomass	Mercury	91	11	3.46E-07	7.52E-07	1.18	8.87E-07	9.00E-07	101%	260%	57
Coal	Mercury	285	35	5.95E-07	1.64E-06	1.76	2.89E-06	3.00E-06	104%	504%	54
Liquid	Mercury	177	22	1.91E-06	2.78E-06	1.43	3.98E-06	4.00E-06	101%	209%	Skewed by 1 Source
Biomass	HCl	92	12	4.34E-03	6.00E-03	1	6.00E-03	6.00E-03	100%	138%	87
Coal	HCl	318	39	4.23E-03	7.38E-03	1.51	1.11E-02	2.00E-02	**179%**	473%	31
Liquid	HCl	190	23	2.59E-04	3.26E-04	2.46	8.02E-04	9.00E-04	112%	347%	55
Biomass - DO	CO	17	3	362	1.01E+03	1	1.01E+03	1.01E+03	100%	279%	65
Biomass - FB	CO	7	5	97.1	2.45E+02	1	2.45E+02	2.50E+02	102%	257%	Too few sources
Biomass - FC	CO	16	5	130	2.62E+02	1	2.62E+02	2.70E+02	103%	208%	44
Biomass - ST	CO	119	15	203	5.51E+02	1	5.51E+02	5.60E+02	102%	276%	62
Coal - FB	CO	17	3	12.5	2.14E+01	1	2.14E+01	3.00E+01	140%	240%	41
Coal - PC	CO	41	5	19.2	8.28E+01	1	8.28E+01	9.00E+01	109%	469%	88
Coal - ST	CO	61	8	21.4	4.88E+01	1	4.88E+01	5.00E+01	102%	234%	20
Biomass - DO	PCDD/PCFD TEQ	3	1	9.52E-03	2.79E-02	1	2.79E-02	3.00E-02	108%	315%	Too few sources
Biomass - FB	PCDD/PCFD TEQ	6	5	5.07E-03	1.27E-02	1	1.27E-02	2.00E-02	157%	394%	Too few sources
Biomass - FC	PCDD/PCFD TEQ	7	5	5.52E-03	1.48E-02	1	1.48E-02	2.00E-02	135%	362%	Too few sources
Biomass - ST	PCDD/PCFD TEQ	16	2	8.19E-04	3.39E-03	1	3.39E-03	4.00E-03	118%	488%	24
Coal - FB	PCDD/PCFD TEQ	12	2	4.71E-04	1.68E-03	1	1.68E-03	2.00E-03	119%	425%	25
Coal - PC	PCDD/PCFD TEQ	10	2	1.58E-03	3.07E-03	1	3.07E-03	4.00E-03	130%	253%	40
Coal - ST	PCDD/PCFD TEQ	14	2	1.82E-03	2.74E-03	1	2.74E-03	3.00E-03	109%	165%	35

Moreover, the need for EPA's integer rounding up convention is not justified on the grounds EPA asserts. EPA's own data sampling, and experience with continuous emissions monitoring devices (CEMs) show that compliance evaluation is often measured to the second or third decimal place. Therefore rounding up to a "clean" integer based MACT floor standard is not necessitated by compliance testing related issues.

B. Examining EPA's New Source Floor Analysis for Mercury From Coal Boilers Shows the Unlawfulness of EPA's New Source Floor-setting.

As discussed above, the CAA requires that the new source floor for a HAP emitted by an industrial category or subcategory "shall not be less stringent than the emission control that is achieved in practice by the best controlled similar source, as determined by the Administrator." 42 U.S.C. §7412(d)(3). While the Administrator has some authority to evaluate variability of performance in her floor determination, the exercise of that discretion must be "reasonable" and must result in floors that actually reflect what is *achieved* by the best performer – not what is *achievable* by all (or even most or many) sources in the subcategory. Examining EPA's mercury floor setting exercise for new sources in its coal boilers subcategory shows that

- EPA has not selected the best performing source in the subcategory based on actual data available to the Administrator;
- EPA improperly uses old data to derive the performance of the best performer;
- EPA's use of the 99% UPL statistic unreasonably inflates the performance of the best performer more than 3 times;
- EPA's use of a fuel variability factor in addition to its 99% UPL statistic inflates the performance of the best performer by an order of magnitude beyond what record evidence suggests is the actual variability of the best performer;
- EPA's rounding convention further inflates the resulting floors two times.

The net result of EPA's analysis, is a new source MACT floor emissions limit for coal boilers that is 11 times higher than the actual performance of the best performer considering all data for that performer, and 26 times higher than the actual performance of the best performer based on the average of the top three test data points for that source. The new source floor selected can be met by the source that is ranked 34th out of the 35 sources making up the top 12 percent of coal boilers for which the Administrator has data, at least based on the average of all test data for each source.[17]

EPA's choice of the best performer in the subcategory is the IAUniversity of Iowa Unit EP7 Boiler 11. There are two sets of data used by the Administrator, as shown in Appendix IV-2 (section on coal mercury)and shown in Figure IV-1.Example 1. The first data set used by EPA dates from February 2006, and the second from the most recent ICR sampling in August 2009. The August 2009 data show less variability than the 2006 data, and moreover the average of the 2009 data evidences a mercury emissions rate that is about half the average of the 2006 data. It is clear that the same unit is behaving quite differently in 2009 than it did in 2006, and based on that, it would seem that EPA reasonably should use the 2009 data, alone, in forming the basis for the current "best performance" from this source. And indeed, in selecting the University of Iowa boiler as its top performer, EPA has relied on the 2009 data.[18] Figures IV-2 and IV-3 show that this issue is not limited to EPA's analysis for mercury from coal burners, it also infects the Agency's other new source floor setting.

But, in deriving the emissions rate it uses to represent the *performance* of its top performer, EPA reaches out and averages *all* of the data it has available for this source, to get what it says is a figure representing the "best performance" of any source in the category. This method overcounts the intrasource variability for this source – because there are effectively two data sets showing quite different performance from the University of Iowa boiler in 2009 than in 2006. This is graphically illustrated in Figure IV-1. The performance is different enough that these data sets might as well be for two separate boilers. Certainly, when the resulting all data

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[17] See Table IV-2.

[18] In the MACT floor analysis memo describing what EPA did for new coal mercury floors, EPA's contractor says that "the second lowest test average was used because the lowest test average was based on only two test runs." Floor Memo at 12. We do not see any reason to reject otherwise valid and consistent test data simply because there were only two runs.

Table IV-2: Analysis of New Sources MACT Floor As Proposed By EPA

		EPA Analysis						**Effect of Rounding Only**	**Stringency Ratio**	**# in Top 12 That Floor Corresponds To**
		# Sources in Top 12%	Avg of Best Performing Source	99 UPL	FVF	99 UPL x FVF	Rounding (FR Table 1)	**Proposed Floor/(99 UPL x FVF)**	**Proposed Floor/Avg of Best Performing**	
Biomass	PM-Filt	24	2.16E-03	7.11E-03	1	7.11E-03	8.00E-03	113%	370%	22/24
Coal	PM-Filt	44	3.96E-04	9.28E-04	1	9.28E-04	1.00E-03	108%	253%	6/44
Biomass	Mercury	11	9.73E-08	1.86E-07	1	1.86E-07	2.00E-07	108%	206%	5/11
Coal	Mercury	35	1.18E-07	3.89E-07	2.7	1.05E-06	2.00E-06	190%	1695%	34/35
Biomass	HCl	12	7.85E-04	3.07E-03	1	3.07E-03	4.00E-03	130%	510%	11/12
Coal	HCl	39	3.85E-05	5.21E-05	1	5.21E-05	6.00E-05	**115%**	156%	3/39
Biomass - DO	CO	3	6	1050	1	1050	1010	96%	18297%	3/3 DATA HAS ISSUES
Biomass - FB	CO	5	25	34	1	34	40	117%	159%	1/5
Biomass - FC	CO	5	110	264	1	264	270	102%	245%	5/5
Biomass - ST	CO	15	920	3730	1	3730	560	15%	61%	15/15
Coal - FB	CO	3	8	40	1	40	30	75%	363%	3/3
Coal - PC	CO	5	25	98	1	98	90	92%	360%	5/5
Coal - ST	CO	8	4	7	1	7	7	107%	163%	1/8

Red=Reduced to Existing Source Floor Value

Figure IV-1: Coal Mercury Data from IAUnivofIowa EP7 Blr11

Example 1 - Mercury from Coal

Name	Unit	Pollutant	Data Date	Data	Data Unit
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	2/15/2006	1.26E-08	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	2/21/2006	7.54E-09	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	2/21/2006	2.27E-08	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	2/22/2006	3.37E-07	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	2/23/2006	3.77E-07	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	2/23/2006	1.28E-07	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	8/4/2009	6.14E-08	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	8/5/2009	5.99E-08	lb/MMBtu
IAUofIowa	EP7 Boiler 11	Mercury (Hg)	8/5/2009	5.90E-08	lb/MMBtu

This single data set consists of data from 2006 and 2009. The data are plotted below.

The average of ALL data in the set above is	1.18E-07	lb/MMBtu
The average of just the 2009 data in the set above is	6.01E-08	lb/MMBtu

The data from 2009 are lower than the full data set, more consistent and show less variability. It is clear that the same unit is behaving quite differently in 2006 as compared to 2009.

Conclusion: It is improper to treat all of the data as 1 source.

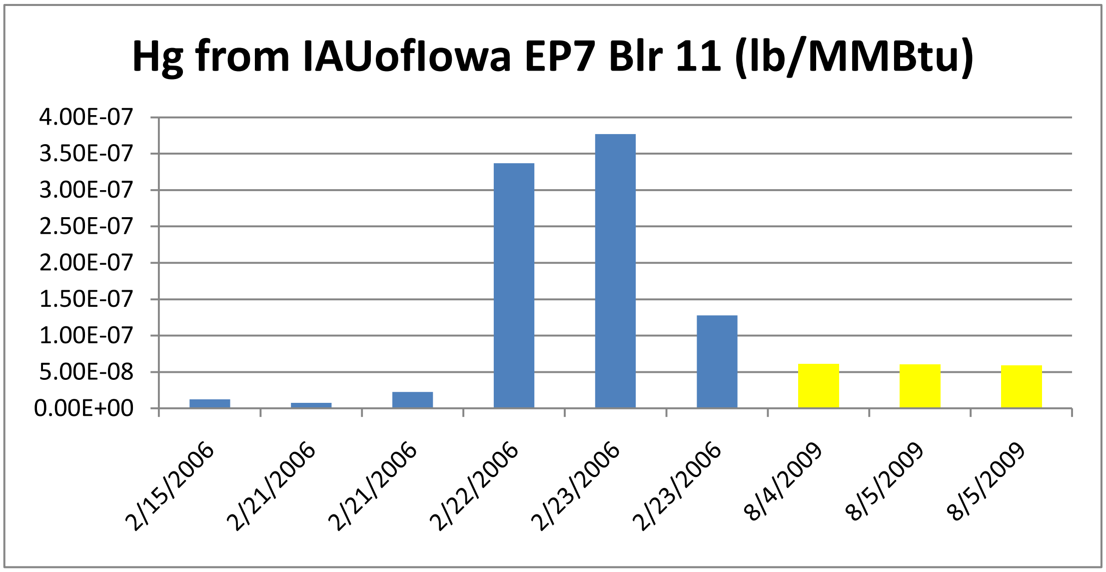


Figure IV-2: HCl Data from NCBlueRidgePaper Unit G11042

Example 2 - HCl from Coal

Name	Unit	Pollutant	Data Date	Data	Data Unit
NCBlueRidgePaper	G11042	Hydrogen Chloride (HCl)	8/4/2009	7.47E-04	lb/MMBtu
NCBlueRidgePaper	G11042	Hydrogen Chloride (HCl)	8/4/2009	9.57E-04	lb/MMBtu
NCBlueRidgePaper	G11042	Hydrogen Chloride (HCl)	8/5/2009	1.22E-03	lb/MMBtu
NCBlueRidgePaper	G11042	Hydrogen Chloride (HCl)	1/12/1994	1.90E-03	lb/MMBtu
NCBlueRidgePaper	G11042	Hydrogen Chloride (HCl)	1/12/1994	3.20E-03	lb/MMBtu
NCBlueRidgePaper	G11042	Hydrogen Chloride (HCl)	1/12/1994	3.30E-03	lb/MMBtu

Here data from 2009 are combined with data from 1994, 15 years earlier.

The average of ALL data in the set above is	1.89E-03	lb/MMBtu
The average of just the 2009 data in the set above is	9.75E-04	lb/MMBtu

The data from 2009 are lower than the full data set, more consistent and show less variability.
It is clear that the same unit is behaving quite differently in 2009 as compared to 1994.

Conclusion: It is improper to treat all of the data as 1 source.

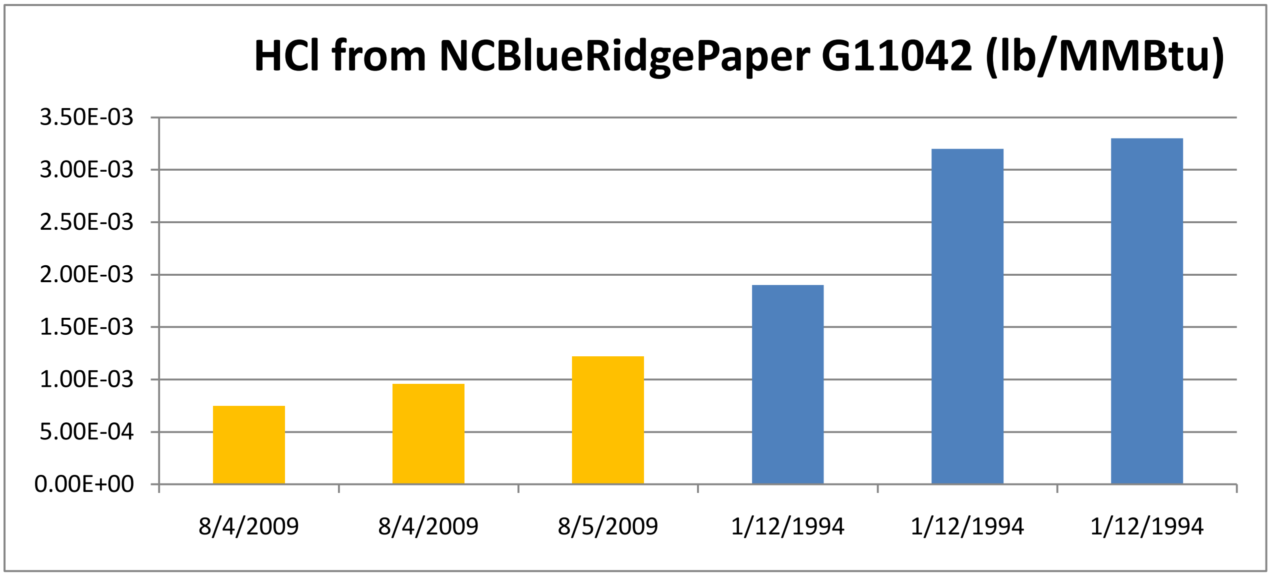


Figure IV-3: CO Data from GATempleIandThomson BW-B001

Example 3 - CO from Biomass (Stoker/Sloped Grate/Other)

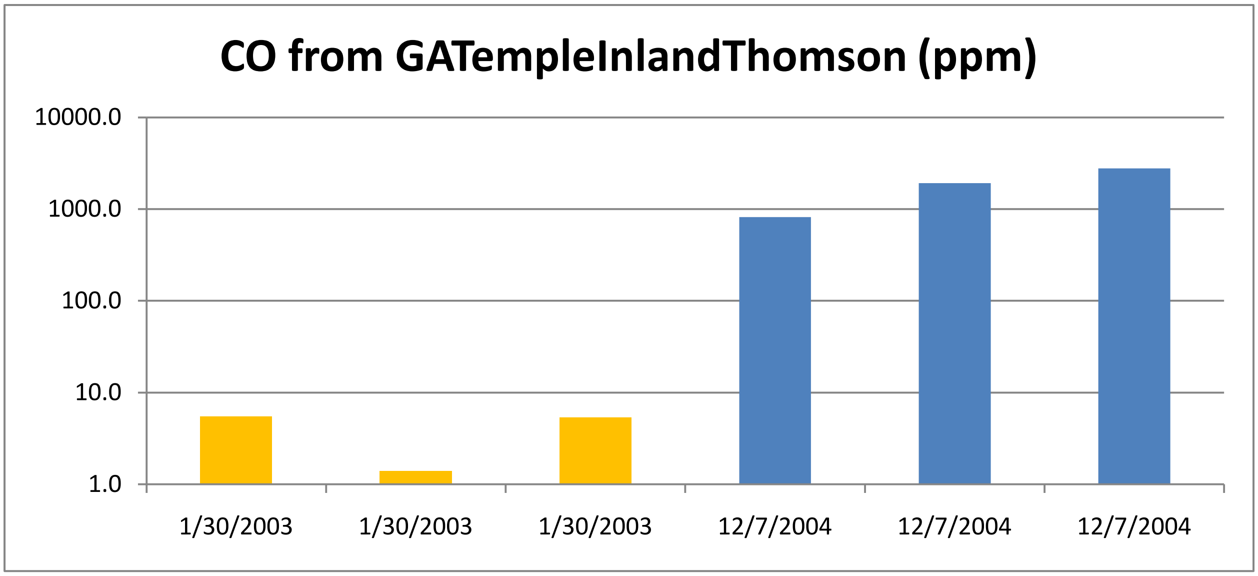
Name	Unit	Pollutant	Data Date	Data	Data Unit
GATempleInlandThomson	BW-B001	CO	1/30/2003	5.5	ppm
GATempleInlandThomson	BW-B001	CO	1/30/2003	1.4	ppm
GATempleInlandThomson	BW-B001	CO	1/30/2003	5.4	ppm
GATempleInlandThomson	BW-B001	CO	12/7/2004	816.4	ppm
GATempleInlandThomson	BW-B001	CO	12/7/2004	1913.4	ppm
GATempleInlandThomson	BW-B001	CO	12/7/2004	2780.9	ppm

This single data set data from 2003 and 2004.

The average of ALL data in the set above is	920	ppm
The average of just the 2003 data in the set above is	4.1	ppm

The data from 2003 are so much lower than the full data set that it is highly unlikely that they come from the same source.

Conclusion: It is improper to treat all of the data as 1 source.



Note: Y-Axis is logarithmic given the vastly different scales of the two sets of data for this source.

average figure for the University of Iowa boiler (1.18E^{-7} lb/MMBtu) is compared with the average for the source EPA calls the 2d ranked source, the MITB Simon Power Plant Unit 4 (3.075E^{-8} lb/MMBtu), or even EPA's 3d ranked source, the Archer Daniels Midland DesMoines Asea Boiler No.1 (3.83667 E^{-8} lb/MMBtu), it is clear that EPA's "best performing source" is actually not the best performer. Even assuming that EPA does not choose either of these units (MIT or Archer Daniels Midland) because some of their data points are at the "non-detect" level,[19] the next source on the list (source rank number 4, the IA Roquette AmericaCFB Boiler 121) has better average performance data (6.16856E^{-08} lb/MMBtu) than the 1.18E^{-7} lb/MMBtu limit calculated by EPA as that representing the performance of the best performer in the subcategory. EPA's basis for this new source floor, therefore, is unlawful – it does not represent the current data EPA has about the actual performance of *any* of the top best performers in the subcategory. And, it sets up the MACT floor analysis that follows with a figure that does not comport with the requirements of the plain language of the statute: EPA does not start with an emissions figure that represents the actual performance of the best performer in the subcategory.

After selecting the "best performing" new coal unit for mercury, and deriving the figure representing that best performance, EPA then takes the 99% Upper Prediction Limit (UPL) for that data set, by which it asserts it accounts for "ordinary operational variability" for the best performer over time. 75 Fed. Reg. 32,027-32,028. EPA does not justify its decision to use the 99% UPL as opposed to the 95% UPL (the statistic describing an emissions level that could be met by a 3 sample average from the same unit in the future, at least 95 percent of the time), or the 90% UPL.[20] The emissions level resulting from applying that statistical analysis to the

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[19] This illustrates that the way EPA has dealt with these non-detects in the case of setting new coal floors seems to be by simply ignoring or skipping over those sources with such low emissions that they fall into the non-detect area. So, while EPA asks for comment on "approaches suitable to account for measurement variability in establishing the floor emissions limit when based on measurements at or near the method detection level," stating that the Agency "did not adjust the calculated floor for the data used for this proposal," 75 Fed. Reg. 32,020-32,021, it is clear that what the Agency actually did to deal with non-detects is to skip over sources reporting emissions below the method detection level in choosing the best performer at least in floor setting for the new coal subcategory.

[20] EPA does explain that it has decided to use an upper prediction level (UPL) statistic, rather than the Upper Limit statistic (which corresponds to the 99th percentile of the actual data distribution for the sample), because it asserts that the UPL is more suited to evaluating a random sample for a population, whereas the UL assumes that the data evaluated represent the population. Floors Memo at 5. The choice

calculated average performance of the best performer (3.89 E^{-7} lb/MMBtu) is about 3.3 times the calculated average performance for the unit (1.18E^{-7} lb/MMBtu).

Rather than setting the new source floor for mercury for the coal-fired subcategory based on the 99% UPL, alone, however, EPA asserts it must *also* apply a fuel variability factor (FVF) to that figure to account for the "inherent and unavoidable variations in the HAP content of the fuel that such unit might potentially use." 75 Fed. Reg. 32,038. EPA does not explain why the 99% UPL statistic does not, alone, account for that variability when it is applied to the average mercury emissions levels in the coal subcategory. Indeed, common sense would suggest that using a UPL – particularly the 99 % UPL – in accounting for "ordinary operational variability" in mercury emissions from a coal source would include variability from mercury in the fuel.

Nor does EPA adequately explain how it has selected a fuel variability factor of 2.70 for mercury in coal samples. Our consultant was unable to replicate this number, using EPA's data and asserted method for obtaining the FVF (dividing the worst mercury concentration in coal sample data by the best mercury concentration in coal sample data). That exercise yielded an FVF of 1.125 for EPA's best performer. Applying the FVF for coal brings the resulting figure for the MACT floor for new coal units to 1.05E^{-6} lb/MMBtu, which is 8.9 times higher than the average of the data set for the best performer (1.18 E^{-7} lb/MMBtu). Applying the alternate FVF of 1.125 would yield a figure of 4.38 E^{-7} lb/MMBtu – a figure 3.7 times higher than the average of the data set for the best performer, but still less than half of the figure EPA uses.

Finally, EPA "rounds up to the nearest integer" to get the final MACT floor for new coal units for mercury, which it sets at 2.00E^{-6} lb/MMBtu. That emissions level is 17 times higher than the average of the data set for the best performer.[21] Moreover, as shown in Table IV-3, if EPA had started with a figure based on the lowest 3 data points for its best performer, the same 99% UPL it chose, and an FVF based on the data for that best performer – and even if EPA's rounding convention were adopted, the resulting MACT floor level for mercury emissions from

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of the UPL may indeed be reasonable, but the choice of the 99% vs. 95% vs. 90% UPL is nowhere explained, so it is not possible to say on what basis that choice was made.

[21] Using the alternative FVF our consultant derived from EPA's data set and EPA's asserted method for setting an FVF, the resulting floor would be 4.38E^{-7} lb/MMBtu as shown in Table IV-3, a figure 4 times higher than the average test data for the best performer.

Table IV-3: Analysis of the New Source Floor for Coal-Mercury

MACT Floor by Fuel Type Reported Values

Parameters	**Hg (lb/mmBtu)**
Coal	
No. of sources =	1
No. in MACT floor =	1
Avge of top performer [IAUofIowa ALL] =	1.18E-07
Std Deviation of top performer =	1.40E-07
Skewness =	1.38
Kurtosis =	0.37
SE Skewness	0.82
Skewness Test	normal
SE Kurtosis	1.63
Kurtosis Test	normal
Number of test runs =	9
Number of test runs that contained non-detect	4
Highest test run =	3.77E-07
99% t-statistic for UPL	2.90E+00
99% UPL of top performer (test runs)	3.89E-07
95% t-statistic for UPL	1.86E+00
95% UPL of top performer (test runs) =	2.92E-07
90% t-statistic for UPL	1.40E+00
90% UPL of top performer (test runs) =	2.49E-07

MACT Floor by Fuel Type Reported Values

Parameters	**Hg (lb/mmBtu)**
Coal	
No. of sources =	1
No. in MACT floor =	1
Avge of top performer [IAUofIowa 3Low]=	1.43E-08
Std Deviation of top performer =	7.72E-09
Skewness =	9.33E-01
Kurtosis =	#DIV/0!
SE Skewness	1.41
Skewness Test	normal
SE Kurtosis	2.83
Kurtosis Test	#DIV/0!
Number of test runs =	3
Number of test runs that contained non-detect values	1
Highest test run =	2.27E-08
99% t-statistic for UPL	6.96E+00
99% UPL of top performer (test runs) =	5.82E-08
95% t-statistic for UPL	2.92E+00
95% UPL of top performer (test runs) =	3.27E-08
90% t-statistic for UPL	1.89E+00
90% UPL of top performer (test runs) =	2.62E-08

MACT Floor by Fuel Type Reported Values

Parameters	**Hg (lb/mmBtu)**
Coal	
No. of sources =	1
No. in MACT floor =	1
Avge of top performer [IAADMDesMoines]=	3.84E-08
Std Deviation of top performer =	1.48E-08
Skewness =	1.60
Kurtosis =	#DIV/0!
SE Skewness	1.41
Skewness Test	normal
SE Kurtosis	2.83
Kurtosis Test	#DIV/0!
Number of test runs =	3
Number of test runs that contained non-detect values	2
Highest test run =	5.53E-08
99% t-statistic for UPL	6.96E+00
99% UPL of top performer (test runs) =	1.22E-07
95% t-statistic for UPL	2.92E+00
95% UPL of top performer (test runs) =	7.36E-08
90% t-statistic for UPL	1.89E+00
90% UPL of top performer (test runs) =	6.11E-08

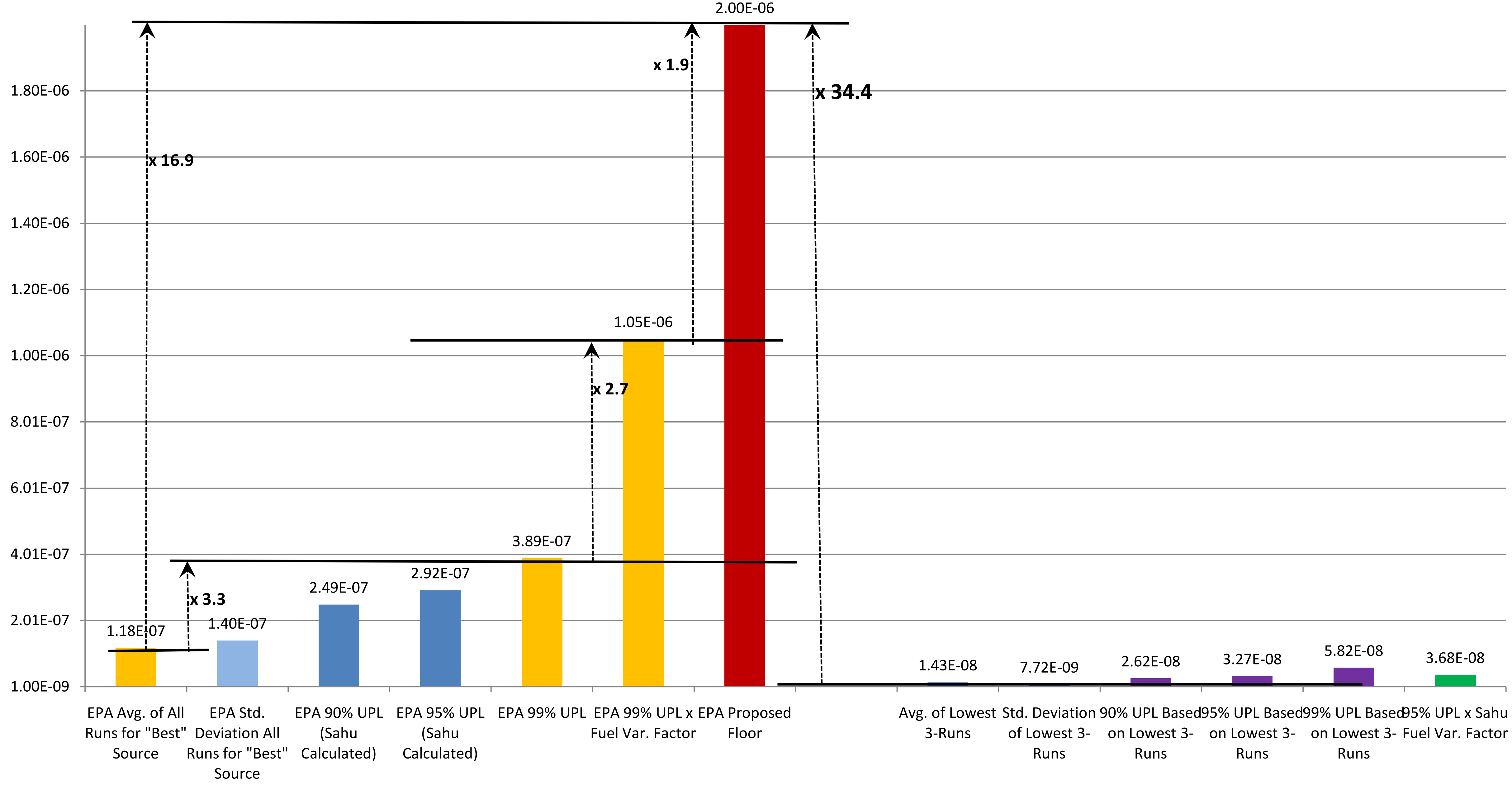
EPA Fuel Variability Factor	2.70
99% UPL x EPA FVF	1.05E-06
95% UPL x EPA FVF	7.88E-07
90% UPL x EPA FVF	6.72E-07
EPA Floor with Rounding	2.00E-06

Sahu Fuel Variability Factor (IAUofIowa ALL)	1.125
99% UPL x Sahu FVF	4.38E-07
95% UPL x Sahu FVF	3.29E-07
90% UPL x Sahu FVF	2.80E-07

Sahu Fuel Variablity Factor for (IAUof Iowa 3 Low)	1.125
99% UPL x Sahu FVF	6.54E-08
95% UPL x Sahu FVF	3.68E-08
90% UPL x Sahu FVF	2.94E-08

Sahu Fuel Variablity Factor for IAADMDesMoines	1.167
99% UPL x Sahu FVF	1.43E-07
95% UPL x Sahu FVF	8.59E-08
90% UPL x Sahu FVF	7.13E-08

Figure IV-4: MACT Floor for Mercury for Coal Units (lb/MMBtu)



coal-fired sources would be 7.00E^{-8} lb/MMBtu – a floor standard almost 30 times more protective than the MACT floor proposed by the Agency for this pollutant and subcategory. This point is graphically presented in Figure IV-4. Indeed, if EPA's raw data for the units in the subcategory are examined, it is clear that the proposed floor limit can be met by the unit that is the 34th of the 35 units making up the top performing 12 percent of EPA's coal-fired boiler data set.[22] The statute requires EPA to set the level of the MACT floor at that achieved in practice by the best performing similar source, not to find a MACT floor level that is achievable by almost every source in the top 12 percent of the 285 units for which it has data. EPA's new source floor for mercury from coal-fired boilers does not meet the statutory requirements for MACT.[23]

C. EPA's Existing Source Floor Analysis for Mercury From Coal Boilers Similarly Demonstrates that the Proposed Floors Do Not Represent the Performance Achieved by the Relevant Best Performers.

EPA must set MACT floors for existing sources for each regulated toxic air pollutant for each category or subcategory that "shall not be less stringent, and may be more stringent than – (A) the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information), … in a subcategory or subcategory with 30 or more sources, or (B) the average emission limitation achieved in practice by the best performing 5 sources (for which the Administrator has or could reasonably obtain emissions information) … for categories or subcategories with fewer than 30 sources." 42 U.S.C. §7412(d)(3)(A) & (B). As the D.C. Circuit has noted, the basic "idea is to set limits that, as an initial matter, require all sources in a category to *at least* clean up their emissions to the level that their best performing peers have shown can be achieved." *Sierra Club v. EPA*, 353 F.3d 976, 980 (D.C. Cir. 2004)(emphasis added). MACT-based emission limit floors are not

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[22] See Table IV-2, far right column, which illustrates not only that the new source coal boilers floor does not represent the performance of the best performers, but that the other MACT-based floors EPA has set also suffer from this problem.

[23] EPA's other new source floors for fuel dependent HAPs suffer from the same improper selection for the best performers and unreasonable over accounting for variability and rounding conventions that weaken the resulting MACT floors to levels that can be met by units well down into the data sets for each pollutant and fuel. While new source floors for CO, PM, and D/F are not weakened by application of the arbitrary "fuel variability factor" they are nonetheless orders of magnitude less stringent than the actual performance data EPA collected for those pollutants in the various subcategories.

meant to be set to reflect what is "achievable" by all sources in the subcategory, but rather what is "achieved" by the best performing relevant sources.

Because EPA's existing source floors for ICIBPH suffer from the same defects as do the new source floors, as described above, they do not meet even this basic definition of the statute's requirements.[24] The existing source floor setting exercise for mercury from existing coal-fired boilers shows that in fact the proposed floor for this subcategory is 5 times higher than the actual performance achieved by the best performing 12 percent of sources in the subcategory, and is *achievable* by almost half of the sources in the subcategory for which the Administrator has data. This is because, as shown in more detail in the example below:

- The value derived as the performance of the top 12 percent of boilers in the subcategory unlawfully inflates to account for inter-source differences in performance, overcounts intra-source variability, and therefore does not reflect the performance achieved in practice by those boilers individually or the top 12 percent of sources in the subcategory;
- EPA's selection of the 99% UPL statistic further and unreasonably overestimates "Operational Variability";
- EPA's arbitrary "Fuel Variability Factor" further and unreasonably double counts for mercury variability in the fuels used by the relevant best performers, beyond what record evidence demonstrates is the actual variability of the best performers; and
- EPA's rounding convention unjustifiably inflates the resulting floor levels further.

EPA selected the top performing 12 percent of existing sources in each subcategory in the same way as the Agency selected the best performing source for the new source floor analysis – that is, on the basis of the average of the top 3 data points for each unit for which the Agency has information. Floors Memo at 3. For subcategories with fewer than 30 units for which the Administrator had data, EPA took information from the top 5 units in the set.[25] *Id.* at 4.

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[24] EPA asserts that it set the existing source MACT floors at levels "achievable by the average of the best performing sources if the best performing sources were able to replicate the compliance test in our data base" 99 percent of the time. 75 Fed. Reg. 32,019-32,020. In fact, however, as Figure IV-1 demonstrates, the resulting existing source floors are achievable by more than the top 12 percent of the subcategory in every subcategory for which there is a sufficient number of sources to make that determination.

[25] Some subcategories of existing sources had very limited numbers of sources for which the Administrator had data. For example, the 14 fuel-and-design-based subcategories selected for floor

As described above in the new source analysis, EPA averaged *all* the data it had for each source in the resulting top 12 percent list, in order to develop a figure the Agency asserts represents the average performance of the top 12 percent. In doing so, the Agency often combined several sets of data it collected for each unit – including in some cases data sets that span timeframes as long as 14 years (see Figure IV-2 describing the data set for NC Blue Ridge Paper Unit G11042, a coal boiler in the top 12 percent for HCl which included sample data from January 1994 and August 2009). Combining data sets of such different vintages is unreasonable, as many operational and physical changes may have occurred between the times the two data sets were collected – so much so that the unit might properly considered to be two different units. Certainly this method over accounts for intrasource variability – and the average developed from all the data for the top performing 12% violates §112(d) (3) by accounting for inter-source differences in performance variability in a manner other than "average[ing]." In addition, it effectively includes more than the top 12% of sources, as where there are two sets of data for a source, the data set properly should be considered two separate data sets, as for two sources.

EPA then selects the 99% UPL statistic for the average of all the data for the 12 percent best performers – which it asserts accounts for operational variability among the sources making up the top 12 percent. EPA does not explain, however, why simply taking the average performance of the top 12 percent does not adequately account for "inter-source" differences in performance. Such differences are not "variability", as EPA appears to believe, however, but just the differing performance levels that § 112(d)(3) requires EPA to "average", when it sets floors. Nor does EPA does not explain why operational variability for coal-fired boilers, for example, does not include all kinds of operational variability, including fuel-related pollutant variability. Instead, for HCl and for mercury, EPA unreasonably and arbitrarily inflates the 99%

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setting for dioxins and furans, and for CO as a surrogate for non-D/F organics include 11 with fewer than 30 sources, and of those 11, 5 had 10 or fewer sources. See Table P Analysis of Existing Sources MACT Floors As Proposed By EPA. EPA seeks comment on whether it should be permitted to "read[] the intent of Congress to allow [EPA] to consider five sources rather than [the top 12 percent where that may be] just one or two." 75 Fed. Reg. 32,022. EPA does not have discretion to ignore the plain language of the statute in this way. Congress defined the cutoff point at which the 5 sources alternative would be available; EPA does not have discretion to reinterpret that plain language. Furthermore, if EPA were to reinterpret the Act in that way, the resulting floors will be less stringent than would be the case if the top 12 percent of the subcategory was used – clearly not a result Congress intended for controlling these toxic pollutants. Finally, permitting this deviation from the requirements included in the plain language would permit gaming the standard setting process in ways Congress could not have intended.

UPL statistic *further* by applying a "fuel variability factor" – this time derived from sampling for all the fuel data for the top 12 percent of existing sources for that fuel and pollutant. Finally, EPA applies its rounding up convention.

The final existing source floors are shown in Table IV-1, "Analysis of Existing Sources MACT Floor As Proposed by EPA," *supra*. That table shows for each subcategory and pollutant, EPA's average of the top 12 percent of existing sources,[26] the 99% UPL statistic, the "fuel variability factor" for mercury and HCl sources, and the effect of the rounding convention. Table IV-1 shows that the effect of the rounding convention alone inflates the existing source floors so that the result is anywhere between 1 and 79 percent higher than would be the case without the rounding. The effect of all of EPA's statistical analysis is shown in second column to the far right of the table, which shows the "stringency ratio" – that is how the proposed floor relates to the EPA's average of the top 12 percent of existing sources. This figure ranges between 138% and over 500% -- that is, EPA's floors range between 3 and 5 times the average achieved performance of the top 12 percent of existing sources in the subcategories. The final column in Table IV-1 demonstrates where the proposed source falls, in terms of the percentile for each subcategory. For example, the existing source floor for mercury from coal-fired units can be achieved by 54 percent of the existing sources in the subcategory, for which the administrator has data. Clearly, EPA's existing source floors do not reflect "the average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)."

D. Setting work practice standards for small boilers, natural gas/refinery gas boilers, and metal process furnaces is unlawful and arbitrary.

EPA proposes to set work practice standards under §112(h) for more than two-thirds of the existing major source boilers,[27] in lieu of MACT-based §112(d) standards required by the Act. As noted above, EPA also unjustifiably creates separate subcategories for small boilers and

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[26] Again, this figure already overcounts intrasource variability, as it is inflated by the inclusion of all data for every source in the set – even sample data sets for a unit that effectively represent separate sources, because they vary so much and because long periods of time separate the sampling dates.

[27] EPA's data show that of the 13,555 total existing major source boilers and process heaters, Floor Memo at 3, over 11,000 fall into the natural gas/refinery gas or metal process unit subcategories. 75 Fed. Reg. 32025 (Table 4).

process heaters (with less than 10 MMBtu per hour heat input). For this subcategory as well, EPA proposes work practice standards under CAA §112(h), rather than proposing to set MACT floors. Both sets of work practice standards are unlawful and arbitrary.

Section 112(h) allows EPA to set a work practice standard for a category or subcategory of industrial sources, only if it is "not feasible … to prescribe or enforce an emission standard for control of a [HAP] or [HAPs]," if such a standard is "consistent with the provisions of subsection [112](d)…." 42 U.S.C. §7412(h)(1). It is "not feasible" to prescribe or enforce a MACT-based standard, under this provision, where the Administrator determines that "… the application of measurement methodology to a particular class of sources is not practicable due to technological and economic limitations." Id. §7412(h)(2)(B).

1. EPA's work practice standards for natural/refinery gas boilers and metal process furnaces violate the requirements of CAA §§ 112(h) and 112(d)

For existing boilers and process heaters combusting natural gas or refinery gas, and for other units included in the metal process subcategory, EPA proposes to set a work practice standard (biennial tune-up) in lieu of an emission standard under § 112(d). EPA does not even claim that it is "not feasible to prescribe or enforce an emission standard" for gas-fired boilers and, for this reason alone, the agency's proposed work practice standards are flatly unlawful and arbitrary.

EPA provides only two reasons for that proposal. It claims that the "capital costs estimated for installing controls on these units" is too high and that setting actual emission standards for gas-fired boilers "would have the negative benefit of providing a disincentive for switching to gas as a control technique (and a pollution prevention technique) for boilers and process heaters in the other fuel subcategories." 75 Fed. Reg. at 32025. Both of those arguments are irrelevant to the statutory requirement for setting work practice standards in lieu of emission standards, that it is "not feasible to prescribe or enforce an emission standard." 42 U.S.C. § 7412(h)(1).

EPA's claims about control costs do not even speak to the feasibility of prescribing or enforcing an emission standard. Section 112(h)(2) defines "not feasible to prescribe or enforce an emission standard" as meaning that

> (A) a hazardous air pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such pollutant or that any

> requirement for, or use of, such a conveyance would be inconsistent with any Federal, State or local law, or
>
> (B) the application of *measurement* methodology to a particular class of sources is not practicable due to technological and economic limitations.

42 U.S.C. § 7412(h)(2) (emphasis added). The alleged cost of "control" technologies is unrelated to either of these tests. Regardless of what EPA may think about the cost of control technologies, such costs do not show that it is not "practicable" to apply "measurement methodology" either technologically or economically. Thus, EPA's claims about control costs do not remotely justify or support the agency's decision to set work practice standards in lieu of emission standards for gas-fired units.

In reality it clearly is "feasible" to prescribe MACT-based floor standards for these subcategories – EPA has done so, and set them out in Table 4 of the preamble, based on actual data retrieved from actual sources – which belies its statements about the impossibility of applying measurement data to these sources. EPA does not show with data in its record that the application of measurement technologies to assure compliance with its MACT-based standards is not practicable for technological or economic reasons – indeed, the Agency seeks comment on this point. And, while the Agency asserts that "installing controls" on these boilers and process heaters to comply with MACT limits will be prohibitively expensive, 32025, the Agency nowhere explains why sources in the category would need to "install controls" at all to meet the proposed MACT standard. Moreover, EPA's rationale that requiring these standards would be too costly simply is not allowed by the statute. Congress did not allow EPA to set work practice standards in lieu of MACT-based emissions limits whenever the Agency as a policy matter viewed that the costs of compliance would be too high, but only if economic limitations rendered the measurement of emissions truly "impracticable". Furthermore, Congress required MACT-based emissions limits be set at least as stringent as the floors, regardless of cost. And, if a work practice standard were to be established, the Agency must show it yields HAPs reductions such that the results of such a standard are "consistent with" what would be accomplished if a MACT standard were set. EPA's cost rationale fails on all counts.

The Agency's second rationale – and real objective—is entirely policy based. EPA admits it proposes work practice standards for these subcategories (which again, total over two-thirds of the major sources boilers and process heaters in this industrial category) in order to avoid setting up "a disincentive for switching to natural gas as a control technique (and a pollution prevention technique) for boilers and process heaters in the other fuel subcategories." 75 Fed. Reg. 32,025. This is not only clearly outside the statute's acceptable bases for work practice standards, and so, unlawful, but arbitrary, as it directly contradicts EPA's statements elsewhere in the preamble, concerning fuel switching as an alternative control measure or pollution prevention technique. That is, EPA elsewhere in the record asserts that it is impossible or impracticable to require fuel switching as the basis for MACT floors or beyond the floor requirements, but here says it is *imperative* to set work practice standards so as not to set up any disincentive to fuel switching. Compare *id*. (concern about disincentives to fuel switching to gas if MACT floors set for gas) *with id*. at 32,019 (describing asserted extreme difficulties with requiring fuel switching or a fuel neutral existing source MACT floor) *and id. at* 32,026 (asserting fuel switching to gas was not an appropriate beyond the floor requirement because of gas supply and cost issues).

In short, EPA's policy arguments about incentives to fuel switch are, if possible, even further removed from the statutory requirements for setting work practice standards in lieu of emission standards. Section 112(h) does not say that EPA may set work practice standards if the agency believes that doing so is preferable from a policy perspective. Rather, it allows the agency to set work practice standards only when it is "not feasible to prescribe or enforce an emission standard." EPA's averred goal of encouraging fuel switching does not even relate to that requirement, far less satisfy it.

EPA should promulgate MACT-standards based on the relevant best performing sources for these subcategories – if the agency truly wishes to lawfully promote fuel switching as a HAP reduction measure, EPA clearly has the legal tools to do so, and should simply use them to set a fuel neutral MACT floor for all sources in the industry.

2. EPA's work practice standards for "small" major source boilers work practice standards are not lawful.

EPA asserts it is not feasible to enforce MACT-based emissions standards for what it calls "small" major source boilers (combusting less than 10 MMBtu per hour of fuel) because standard test methods are not able to accurately sample the small diameter stacks it says characterize "many" of the 7400 boilers in this subcategory, and because annual testing and monitoring costs would be prohibitive. *Id*. 32,024. But just as is the case with its work practice proposal for gas/refinery boilers and metal process heaters, EPA's rationale for its proposed small boiler work practice standard is, at its most fundamental, purely cost-based, and therefore unlawful.

With respect to technical limitations, EPA claims that boilers with capacities less than 10 MMBtu/hr "generally" have stacks less than twelve inches in diameter, that the standard method of measuring PM may block a significant portion of the stack. *Id.* EPA also claims "many area source boilers" do not currently have sampling ports or a platform for accessing the stack. *Id.* With respect to economic limitations, EPA states that the compliance costs of conducting an annual stack test for mercury and PM and a continuous emissions monitor (CEM) for CO would be greater than three percent of average revenue for seventy-nine percent of area source boilers.

EPA's claims about technical and economic limitations on the enforcement of emission standards for boilers with heat input capacity less than 10 MMBtu/hr do not satisfy Clean Air Act § 112(h)'s conditions for setting work practice standards in lieu of emission standards. Section 112(h)(1) allows the agency to do so only if it is "not feasible to prescribe or enforce an emission standard." 42 U.S.C. § 7412(h)(1). Section 112(h)(2) then defines that phrase, in relevant part, to mean that "the application of measurement methodology to a particular class of sources is not *practicable* due to technological or economic limitations." 42 U.S.C. § 7412(h)(2) (emphasis added).

The limitations identified by EPA do not make measurement methodology impracticable. EPA does not claim that any measurement method other than method 5 raises any technical issues at all for stacks less than twelve inches in diameter. Method 5, as EPA points out, is a method for measuring emissions of PM. Thus, the alleged technical limitation on measuring emissions in stacks with diameters less than twelve inches are not even relevant to emissions of other HAPs. Even if valid, such concerns would lend no support to setting work practice standards in lieu of emission standards for pollutants other than PM.

Further, EPA's alleged concerns about the absence of sampling ports and platforms are unsupported by record evidence and unconnected to the statutory standard. EPA does not say how many major source boilers with less than 10 MMBtu/hr heat input capacity do not have sampling ports or platforms, and thus gives no indication about whether the absence of such equipment is even an issue for a significant portion of the population. Moreover, EPA does not even claim that it would be impracticable to install sampling ports or platforms on boilers that currently lack them, far less provide record evidence to support such a claim. Absent showings that boilers do not have and cannot install sampling ports or platforms, EPA's bare assertion that some boilers currently lack them is statutorily irrelevant. Notably, the record for EPA's area source boilers rule includes discussion of a study in which the majority of emissions data for the study was from boilers smaller than 10 MMBtu/hr. EPA-HQ-OAR-2006-0790-0048. Stack tests were taken for PM10, PM2.5, and condensable PM. The document containing that study notes that many state permitting authorities require "a number of technical analyses" which can include emissions tests, from these small boilers. *Id.* at 1. If small boilers must provide this information to state regulatory agencies, boiler operators must have developed ways to test emissions from small boilers.

Apparently attempting to support a claim that it is not economically "practicable" to enforce emission standards for boilers with a heat input less than 10 MMBtu/hr, EPA conflates the cost of measuring emissions with the cost of "installing control equipment" which, the agency claims, would be $6.3 billion for all such units. 75 Fed. Reg. at 32,024. As explained above with respect to EPA's attempt to set work practice standards for gas-fired units, the costs of controls are not relevant under § 112(h), which considers on the economic practicability of measuring emissions from a source, not the cost of controlling those emissions. 42 U.S.C. § 7412(h)(2). Therefore, EPA's attempt to base its work practice determination on control costs is unlawful and arbitrary.

EPA also argues that sources would need to rent or install scaffolding and install test ports for testing purposes, and estimates that "these small sources would incur an additional $185 million" to do so. 75 Fed. Reg. at 32,024. But virtually every element of that argument is false or misleading. First, EPA does not know how many sources would need to take either of these steps. The agency appears to simply assume – without any record basis – that every one of the 7400 sources with heat input less than 10 MMBtu/hr would have to do so. Second, the facilities EPA is discussing are not small, regardless of whether the individual boiler is; the agency's rule by definition addresses only major sources of hazardous air pollutants. Third, the costs of preparing units for testing, whatever it might be, is not “additional.” EPA might wish to conflate control costs with measurement costs, but those costs are irrelevant under § 112(h)(2) for the reasons given above. Fourth even assuming every one of the 7400 boilers had to install scaffolds and test ports and the total cost did amount to $185 million, that amounts to only $25,000 per source. Although EPA implies that it views that number as excessive, the agency does not even claim that it renders measurement of emissions impracticable due to economic limitations. Nor does the agency provide the slightest record basis for such a notion which is, in any event, counterintuitive for major sources of hazardous air pollution. For these reasons as well, EPA’s attempt to set work practice standards in lieu of emission standards for boilers with heat input less than 10 MMBtu/hr is unlawful and arbitrary.

It bears emphasis that Congress did not authorize EPA to set work practice standards in lieu of emission standards whenever the agency viewed compliance costs as undesirable from a policy perspective. Rather, it allowed EPA to establish work practice standards only if economic limitations rendered the measurement of emissions “not practicable.” Congress’ decision to limit the availability of work practice standards must be respected. Congress required EPA to set emission standards at least as stringent as the floors regardless of cost. In attempting to circumvent that requirement by setting work practice standards when it merely views costs as undesirable from a policy perspective, EPA contravenes the Clean Air Act and frustrates Congress’ intent.

V. EPA’S Beyond-the-floor Approach Is Unlawful and Arbitrary.

A. EPA’s Beyond-The-Floor Approach For Existing Sources Is Unlawful And Arbitrary.

The Clean Air Act requires EPA to set standards requiring the “maximum” degree of reduction in emissions of listed hazardous air pollutants (including a complete prohibition on HAP emissions where achievable) through:

> application of measures, processes, methods, systems or techniques including, but not limited to, measures which-
>
> (A) reduce the volume of, or eliminate emissions of, such pollutants through process changes, substitution of materials or other modifications,

> (B) enclose systems of processes to eliminate emissions,
> (C) collect, capture or treat such pollutants when released from a process, stack, storage or fugitive emissions point,
> (D) are design, equipment, work practice, or operational standards, including requirements for operator training or certification) as provided in subsection (h) of this section, or
> (E) are a combination of the above.

42 U.S.C. § 7412(d)(2). This language requires EPA to go "beyond the floor" in setting standards where the Administrator finds such additional HAP reductions are achievable considering the cost of achieving them and any non-air quality health and environmental impacts and energy requirements.

In its beyond-the-floor analysis for major ICIBPH sources, EPA states it "could not identify better HAP emission reduction approaches that could achieve greater emissions reductions of HAP than the control technology combination (fabric filter, carbon injection, scrubber, and GCP) that we expect will be used to meet the MACT floor level of control." 75 Fed. Reg. at 32,026. Having said that (a position which is belied by the manner in which EPA has defined subcategories and set floors for this industrial category, as shown above), EPA then briefly considers but summarily rejects fuel-switching as a beyond-the-floor option, on cost grounds. *Id*. *But see* 75 Fed. Reg. 32,033 (noting that sources may "elect[] to demonstrate compliance with the HCl or mercury limit by using fuel which has a statistically lower pollutant content."). The Agency instead proposes a toothless requirement (at least insofar as it will yield any additional HAP reductions at all), under which all existing major sources would conduct an "energy assessment/audit." 75 Fed. Reg. at 32,026-32,027.

Specifically, EPA proposes requiring all existing source operators to conduct a one-time energy assessment – apparently at the facility level (not specific only to the boiler) to identify cost-effective energy conservation measures, which the Agency proposes to define as "any measure that has a payback (return of investment) period of 2 years or less…based on section 325(o)(2)(B)(iii) of the Energy Policy and Conservation Act…." Id. EPA goes into great detail about its proposed assessment, including directing that the "facility assess it energy management program and practices using EPA's ENERGY STAR Facility Energy Management Assessment Matrix. Id. at 32,026-32,027. But, regardless of the results of that assessment for any given facility, EPA does not propose to require the *application* of any energy efficiency, pollution prevention or productivity improvements, nor does the agency propose emission standards reflecting any such improvements. Indeed, although EPA asserts that it knows already that its sister agency the Department of Energy has reported that "facilities can reduce fuel/energy use by 10 to 15 percent by using best practices to increase their energy efficiency," that "many best practices are considered pollution prevention" and that "the most common best practice is simply tuning the boiler to the manufacturer's specification," EPA fails to propose even that this pollution prevention measure be adopted as a beyond-the-floor standard if it is identified in the mandatory audit. 75 Fed. Reg. at 32,026. Requiring energy assessments in the name of HAP reductions, but not then requiring actual *application* of the identified improvements so that those HAP reductions actually might be achieved, is more than just silly – it is unlawful.

Because the Clean Air Act unambiguously requires EPA to demand the maximum achievable degree of reduction through application of the full range of potential emission reduction choices, EPA's failure to direct that implementation of identified energy conservation measures that might achieve additional reductions beyond its floors is unlawful and arbitrary. Additionally, the agency's failure to more fully evaluate and consider measures reflecting the use of cleaner fuels and the deployment of pollution control technology is also unlawful and arbitrary. The major source floors EPA has set nowhere require the pollution control technologies the Agency assert it assumes will be deployed – indeed the subcategorization scheme, floors, and the workpractice standards for gas units may allow existing source boiler owner/operators to avoid applying the technologies EPA somehow assumes will need to be adopted wholesale by existing sources.

Notably, the agency does acknowledge that switching from a variety of different fuels to natural gas would yield significant reductions in emissions. *Id*. 32,026. For example, the agency indicates that fuel switching would lower national emissions of metallic HAP by 4296 tons per year, lower emissions of mercury by 8 tons per year, and lower inorganic HAP emissions (acid gases) by over 50,000 tons per year. *Id*. citing Development (2010) of Fuel Switching Costs and Emission Reductions for Industrial, Commercial, and Institutional Boilers for the National Emission Standards for Hazardous Air Pollutants (April 2010)(EPA-HQ-OAR-2002- 0813).

Although EPA concedes that switching fuels is technically feasible, the agency argues that it will yield no more reductions than the floor standards will yield and that it will cost more. EPA appears to reject fuel switching as a beyond the floor measure on those grounds, although the agency does not find that it is not "achievable" in any sense.

EPA's analysis for beyond the floor standards does not satisfy § 112(d)(2), which requires the agency to determine the "maximum" achievable degree of reduction considering cost and the other statutory factors. Specifically, EPA's apparent belief that it should compare the costs and reductions attributable to potential beyond the floor standards with the costs and reductions attributable to floors is incorrect. EPA must set standards that satisfy § 112(d)(3)'s floor requirements regardless of costs and regardless of the emission reductions EPA thinks will result. Whether beyond the floor standards exceed the costs of the floors is irrelevant to the statutory question of whether they are "achievable" considering cost and the other statutory factors. If EPA wishes to reject fuel switching as unachievable considering cost, the agency must show that the industry as a whole cannot afford to pay for it. EPA has not done so and, indeed, does not even claim that fuel switching would be unachievable considering cost.

Also irrelevant is whether beyond the floor standards would yield more or less reductions in emissions than the floors. Because floors are mandatory the reductions attributable to floors will happen whether or not the agency also sets beyond the floor standards. The only emission related question that is relevant for the purposes of setting beyond the floor standards is whether such standards will yield additional reductions beyond those provided by the floors. EPA does not even attempt to answer this question, but the agency does not and dispute that setting more stringent standards based on fuel switching would necessarily yield more emission reductions.

B. EPA's Beyond-The-Floor Approach For New Sources Is Unlawful And Arbitrary.

EPA's beyond the floor analysis for new sources consists of a cursory statement that "[n]o technologies were identified that would achieve mercury or POM reduction greater than the new source floor for each of the subcategories." 75 Fed. Reg. at 32,029. EPA further asserts that it need not set a beyond-the-floor standard for new sources based on fuel switching, because "based on current trends in the industry, EPA projects that the majority of new boilers and process heaters will be built to fire natural gas as opposed to solid and liquid fuels, such that the overall emissions reduction associated with [a beyond-the-floor requirement to rely on gas] would be minimal." 75 Fed. Reg. 32,029. EPA's beliefs about what fuels will be fired in future boilers is irrelevant to the statutory standard, which is whether standards more protective than the floor are "achievable." By refusing to set standards based on a criterion that does not appear in § 112(d)(2), EPA contravenes the Clean Air Act and acts arbitrarily. If the agency wishes to reject beyond the floor standards it must show that such standards are not achievable, not merely postulate that because new units are likely to be gas units, beyond the floor standards reflecting the use of gas as a fuel are likely to be unnecessary.

Moreover, EPA's statement regarding the use of gas in new boilers,which may or may not be based on the analysis contained in EPA's New Unit Analysis Memo (the Agency offers no citation in the preamble, just its assertions about market trends), seems naïve at best. Even a cursory glance at EPA's data supporting the MACT floors shows that industrial boilers burn a wide variety of fuels – and EPA's memo offers no reasons why this reality should suddenly change. Indeed, the assertion EPA makes here about its expectation that only new gas boilers will be built directly contradicts the statements it makes in rejecting fuel switching as a beyond-the-floor option for existing sources, namely that "natural gas supplies are not available in some areas, and supplies to industrial customers can be limited during periods when natural gas demand exceeds supply." *Id*. at 32,026. For this reason, as well, EPA's refusal to set beyond-the-floor standards for new sources that reflect the use of natural gas as a fuel is arbitrary and capricious.

VI. EPA may not lawfully invoke Section 112(d)(4) health risk-based alternatives to MACT floor setting for ICIBPH in this rulemaking.

EPA sets numerical MACT floor limits for acid gases (chlorine (Cl_2), hydrogen chloride (HCl), hydrogen fluoride (HF), and hydrogen cynanide (HCN)) emitted by industrial, commercial and institutional boilers through limits on HCl as a surrogate for those 'non-metal inorganic HAPs'. While we have serious concerns with the Agency's surrogacy decision, as outlined above, commenters do applaud EPA's decision to set MACT-based standards for acid gases. The Agency also considered, in the alternative, whether to "exercise [its] discretionary authority to establish health-based emission standards under CAA section 112(d)(4) for HCl and each of the other relevant HAP acid gases – Cl_2, HF, and HCN". 75 Fed. Reg. 32,010. EPA specifically asks several questions pertaining to the limits on the exercise of its § 112(d)(4) authority, and seeks comment on that point as well as soliciting further technical information about the health effects of these pollutants. We offer some responses to those questions here. Our responses should not be taken to suggest in any way, however, that we agree EPA is authorized to exercise the very limited authority it has under §112(d)(4) in this rulemaking.

A. The Statute Does Not Permit EPA to Establish Standards under § 112(d)(4) for any HAP for which there is no Existing Health Threshold Based on No Observable Adverse Effects

CAA section 112(d)(4) states that "[w]ith respect to pollutants *for which a health threshold has been established*, the Administrator may consider such threshold level, with an ample margin of safety, when establishing emission standards under this subsection." 42 U.S.C. § 7412(d)(4) (emphasis added). The use of the phrase "has been established," shows that Congress did not intend for this provision to be used by EPA to spend time and resources during the MACT standard-setting exercise to figure out whether a given pollutant might have a health threshold, but may rely on this authority only where an accepted threshold already is in existence. See Brief for Respondent Environmental Protection Agency in *National Lime Ass'n v. EPA*, (July 14, 2000). That health threshold, at a minimum must be based on the "no observable effects level" for any health endpoint associated with that pollutant. *See* S. Rep. No. 101-228 at 171 (1990).

Section 112(d)(4) was included in the 1990 ground up revisions to the air toxics requirements of the Clean Air Act. Prior to 1990, the CAA required individual HAP listing and standard setting, based on public health protection with "an ample margin of safety." CAA of 1970 §112(b)(1)(B), P. Law 91-604 (amended in 1990). The 1990 revisions, of course, included a list of HAPs to be regulated and required that EPA set technology-based standards for those HAPs for listed industries. Section 112(d)(4), as finalized, authorized the Agency to "consider" an "establish*ed* " health threshold[28] in setting such standards. By contrast, an earlier draft of the CAAA would have made the authority to set a health-based standard contingent on a finding that a threshold "*can be* established"[29] – a forward looking construct that would accommodate

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[28] In fact, the Senate Report describes the prerequisite as a "well-established" health threshold. See S. Rep. 101-228 at 171.

[29] 3 1990 Legislative History at 4425.

investigation and establishment of the threshold as part of the MACT standard setting exercise, in a way that the final enacted language of §112(d)(4) does not.

Moreover, the legislative history requires that any established health threshold that might form the basis for a health-based alternative standard must be based on the " 'no observable [adverse] effects level' (NOAEL) below which human exposure is presumably 'safe'." S. Rep. No. 101-228 at 171 (1990). As will be shown below, there is no such established health threshold currently for HCl, or for any of the other acid gases (non-metal inorganic HAPs) EPA identifies as emitted by industrial boilers. As a threshold matter, then, section 112(d)(4) authority to set an alternative, health-based standard for HCl is simply not available to the Agency here, because as shown below, there is no established accepted health threshold for HCl, or the other acid gases, as Congress intended that concept to be understood. In particular, as EPA has admitted, the agency does not know whether or not HCl causes cancer. 71 Fed. Reg. 76,542, 76,553 (Dec. 20, 2006) ("The data are inadequate to make a determination as to whether HCl is carcinogenic in either humans or animals, so EPA has not developed an assessment for the carcinogenicity of HCl."). Obviously, if EPA does not even know whether HCl causes cancer, the agency has not identified an established health threshold below which HCl does not cause cancer. For this reason alone, EPA cannot invoke § 112(d)(4) with respect to HCl.

B. EPA Is Not Authorized to Set §112(d)(4) Standards Based on A Surrogate Pollutant.

Because EPA must base any §112(d)(4) health based standard on the "no observable adverse effects level, it may not rely on a surrogate in evaluating or setting risk based standards under §112(d)(4). EPA agrees it would not be an appropriate surrogate for a health-based standard. It is well established that when setting §112(d) MACT-based standards, EPA must set standards for each HAP emitted by a category or subcategory of sources. *National Lime Ass'n v. EPA*, 233 F.3d 625, 633-34 (D.C. Cir. 2000). Similarly, if the Agency invokes §112(d)(4) authority to consider setting a health-based alternative standard, the Agency must conduct that evaluation on a pollutant-specific basis "with respect to pollutants" for which a health threshold is established. See 75 Fed. Reg. 32,030 at n. 16.

Even if HCl could reasonably serve as a surrogate for the other acid gases under a technology-based MACT standard (a point which we do not concede), it cannot be a surrogate in health based standard setting. As shown in Table VI-1 below, for HCl, CL_2, and HF, the primary health endpoint is respiratory irritation. For HCN, however, the primary health endpoint is neurological. Indeed, EPA notes that "[t]hese gases (for example HCN) can act on biological organisms in a different manner than HCl, and each of the acid gases affects human health with a different dose-response relationship." Id. It is inappropriate to select one acid gas (HCl) with one health endpoint to serve as a surrogate for another acid gas (HCN) with a different health endpoint.

That is also true, as a technical matter, because health effects are based both on exposure and toxicity, and these factors vary significantly between HAPs. The California standards for the acid gases EPA seeks information on -- chlorine, HF and HCN – show that these pollutants are more toxic on a weight/volume basis than HCl (considering the respiration/inhalation pathway of exposure). And chlorine, HCN and HF are approximately 10 times more toxic than HCl for short-term exposures. Therefore, unless chlorine, HF, and HCN are *always* present at concentrations that are ten-fold lower than HCl, even for short durations (and EPA does not have such information), only separate health-based thresholds could ever be technically justified.

C. The requirement that §112(d)(4) standards must incorporate "an ample margin of safety" prohibits EPA from acting under this section where it lacks evidence on certain dimensions of health risk

The "ample margin of safety" language in section 112(d)(4) means at the very least that any standard that is set under this authority must be sufficient to protect against significant unforeseen consequences, particularly where the Agency is aware that those consequences may occur, but simply does not have enough evidence about them. *See, e.g. EDF v. EPA*, 598 F.2d 62, 81 (D.C.Cir. 1978)(holding that the phrase 'ample margin of safety' in the Clean Water Act's toxic provisions required EPA to protect against as yet unidentified risks to human health, including those "which research has not yet identified."). The fact that EPA has in previous rulemakings, asserted that it was appropriate to exercise § 112(d)(4) discretion in the absence of evidence of carcinogenic risk, and on the limited understanding of the health risks it did have[30], does not make that interpretation correct. The absence of evidence of risk is not sufficient to demonstrate that an "ample margin of safety" exists. In fact, EPA's prior view turns the statutory requirement, as interpreted by the D.C. Circuit, on its head. Because the 'ample margin of safety' requirement is meant to protect against risks that have not yet been identified in research , a section 112(d)(4) standard simply cannot be justified on grounds that EPA does not have sufficient evidence about the health risks posed by a HAP.

Additionally, the Administrator must evaluate the potential for environmental impacts when considering whether to exercise her discretion under § 112(d)(4). As the legislative history indicates, and EPA correctly notes, "employing a §112(d)(4) standard rather than a conventional MACT standard '*shall not* result in adverse environmental effect which would otherwise be reduced or eliminated.' " 75 Fed. Reg. 32,031 (emphasis added) (quoting S. Rep. No. 228, 101st Cong., 1st Sess. (1989) at 171). It is therefore not only "*appropriate* to consider potential adverse environmental effects in addition to adverse health effects when setting an emission standard . . . under 112(d)(4)," Id. 32,031(emphasis added), EPA *must* do so, and must show that any resulting health threshold based standard does not cause adverse environmental effects in excess of those that would result from a MACT standard.

D. Existing RfCs for the acid gases are insufficient to form the basis for a § 112(d)(4) standard for ICIBPH emissions of these pollutants.

EPA asserts that in previous rulemakings it has relied on the RfC for HCl as the basis for establishing an alternative approach to regulating HCl or other acid gases for which it has been designated a surrogate. 75 Fed. Reg. at 32,030-32,031. EPA acted unlawfully in doing so in those rules, and it is equally incorrect here to suggest that the existing RfC is an "established health threshold" that could offer sufficient support for an alternative regulatory approach for HCl, whether as a surrogate or not. Nor can the existing RfCs for other acid gases (where they exist) be used in this way.

An inhalation RfC represents the air-related toxicity value for a noncancer health endpoint associated with exposure to an air toxic, and is expressed in weight of the toxic per

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[30] See 75 Fed. Reg. 32,020 (citing statements made in EPA's 1998 Pulp and Paper MACT, 63 Fed. Reg. at 18,765 (April 15, 1998) and Lime Manufacturing MACT, 67 Fed. Reg. at 78,054 (Dec. 20, 2002)).

volume of air (mg/m^3).[31] The inhalation RfC provides a continuous inhalation exposure estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The inhalation RfC considers toxic effects for both the respiratory system (a portal of entry) and effects peripheral to the respiratory system (extra-respiratory or systemic effects). An RfC can be derived from a 'no observed adverse effect level' (NOAEL), 'lowest observed adverse effect level' (LOAEL), or benchmark dose, with uncertainty factors generally applied to reflect limitations of the data used.[32] Reference values may also be derived for acute (≤24 hours), short-term (>24 hours, up to 30 days), and subchronic (>30 days, up to approximately 10% of the life span) exposure durations, all of which are derived based on an assumption of continuous exposure throughout the duration specified. RfDs and RfCs are generally used in noncancer health assessments.

Table VI-1 summarizes U.S. EPA (via the Integrated Risk Information System, IRIS[33]) and California Environmental Protection Agency (Cal EPA) toxicity values[34] for the acid gases hydrogen chloride (HCl), chlorine (Cl_2), hydrogen fluoride (HF), and hydrogen cyanide (HCN). IRIS is a human health assessment program that provides high-quality science-based human health assessments to support EPA's regulatory activities. IRIS is prepared and maintained by the EPA's National Center for Environmental Assessment within the Office of Research and Development.[35] IRIS contains toxicity values for noncancer and cancer endpoints. In addition,

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[31] See U.S. EPA, "A Review of the Reference Dose and Reference Concentration Processes. Risk Assessment Forum, Washington, DC" (2002). EPA/630/P-02/002F. Available at: http://www.epa.gov/ncea/iris/RFD_FINAL1.pdf.

[32] *Id.*

[33] Available at http://www.epa.gov/ncea/iris/index.html.

[34] Available at http://www.oehha.ca.gov/air/allrels.html.

[35] Animal studies can form the basis for these thresholds, as is clear from Table VI-1. To account for the fact that humans may be more or less sensitive than the test animal, a 10-fold uncertainty factor is usually applied to the NOAEL. This uncertainty factor is called the "interspecies uncertainty factor." An additional 10-fold uncertainty factor, the "intraspecies uncertainty factor," is usually applied to account for the fact that some humans may be substantially more sensitive to the effects of substances than others. Additional uncertainty factors may also be applied. If studies using human subjects are the basis of a RfC, then the interspecies uncertainty factor can be reduced to as low as 1, but generally the 10-fold intraspecies uncertainty factor is retained.

Table VI-1 contains Cal EPA toxicity values, which are promulgated for use in California by the state's environmental agency, but which are not necessarily endorsed or adopted ("established") by U.S. EPA. Thus, while Cal EPA values are presented here to indicate the acid gases for which one well-regarded governmental agency has determined that enough toxicity information is available to set an exposure threshold, that fact does not mean that the Cal EPA values are "established" for the purposes of § 112(d)(4).

Table VI-1: Regulatory toxicity values from IRIS and Cal EPA.

Acid Gas	Regulatory Agency	Type of Inhalation Toxicity Value	Value	NOAEL/LOAEL basis? Confidence?	Study Population/ Exposure Type	Target Organ	References
HCl	U.S. EPA	Chronic Reference Concentration	0.02 mg/m^3	LOAEL: 15.0 mg/m^3 (10 ppm) Low confidence in RfC.	Rats/ Chronic	Respiratory tract	Sellakumar et al., 1985; Albert et al., 1982
	U.S. EPA	Carcinogenicity	This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.				
	Cal EPA	Chronic Reference Exposure Level	0.009 mg/m^3		Rats/ Chronic	respiratory tract	Sellakumar, et al., 1985
	Cal EPA	Acute 1-hour Reference Exposure Level	2.1 mg/m^3		Asthmatics aged 18-25/ Acute (45 minutes)	respiratory system, eyes	Stevens et al., 1992
	Cal EPA	Carcinogenicity	No cancer potency value listed.				
Cl_2	U.S. EPA	Chronic Reference Concentration	No chronic inhalation value determined at this time.				
	U.S. EPA	Carcinogenicity	Not available at this time.				
	Cal EPA	Chronic Reference Exposure Level	0.0002 mg/m^3		Rats/ Chronic	upper respiratory epithelial lesions	Wolf et al., 1995
	Cal EPA	Acute 1-hour Reference Exposure Level	0.21 mg/m^3		Adult volunteers/ Acute (30 minutes)	itching or burning of throat	Anglen, 1981
	Cal EPA	Carcinogenicity	No cancer potency value listed.				

HF	U.S. EPA	Substance not listed					
	CalEPA	Chronic Reference Exposure Level	0.014 mg/m^3		Adult occupational/ Chronic (5 to 26 yrs)	Bone density effects	Derryberry et al., 1963
	CalEPA	Acute 1-hour Reference Exposure Level	0.24 mg/m^3		Adult volunteers/ Acute (1 hour)	Upper respiratory tract irritation	Lund et al., 1997
	Cal EPA	Carcinogenicity	No cancer potency value listed.				
HCN	U.S. EPA	Chronic reference concentration	0.003 mg/m^3	LOAEL: 7.07 mg/m^3 (6.4 ppm). Low confidence in RfC.	Adult occupational/ Chronic	CNS and thyroid	El Ghawabi et al., 1975
	U.S. EPA	Carcinogenicity	This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.				
	Cal EPA	Chronic Reference Exposure Level	0.009 mg/m^3		Adult occupational/ Chronic	CNS and thyroid	El Ghawabi et al., 1975
	Cal EPA	Acute 1-hour Reference Exposure Level	0.34 mg/m^3		Monkeys/ Acute (30 minutes)	CNS depression	Purser, 1984; Purser et al., 1984
	Cal EPA	Carcinogenicity	No cancer potency value listed.				

ppm=parts per million

As noted above, the "established health threshold" must be based on a NOAEL, in order to be sufficient under §112(d)(4). A NOAEL is the highest concentration where no adverse effect is observed in the most sensitive health endpoint among all studies examined. The fact that there is a NOAEL for a set for a particular health endpoint for a pollutant does not mean that there are no other health endpoints affected by exposure to that pollutant, just that other health endpoints do not occur at the concentration seen for the NOAEL of the most sensitive endpoint. If effects are observed at all dose levels tested, then the smallest dose tested, the Lowest Observed Adverse Effect Level (LOAEL) is used to calculate the RfC. An additional uncertainty factor usually is applied in these cases, since the NOAEL, by definition, would be lower than the LOAEL had it been observed.

As table VI-1 demonstrates, however, the existing RfCs for both HCN and HCl are based on studies providing 'LOAEL values, as no appropriate studies providing NOAEL values are available. These RfCs also are "inhalation RfCs" – that is they represent the health risk and toxicity associated with the inhalation pathway of exposure only. But for these pollutants, there are other exposure pathways (the skin and eyes for example) by which health effects can occur. So, even if these RfCs were set on the basis of a NOAEL (which they are not), they would be an inadequate basis for §112(d)(4) standard setting. Additionally, no RfC is available for Cl_2 at all, and HF is not among the 540 substances listed within IRIS, so no RfC is available for that acid gas. Furthermore, in evaluating the evidence that is available, for HCl and HCN, EPA states that they have "low confidence" in the RfC values.

Indeed, EPA has acknowledged that exposure to HCl does damage people's health by conceding that it causes "corrosive tissue damage." 71 Fed. Reg. 76,542. Although EPA has claimed in the past that such damage does not constitute "adverse effects" because the tissue damage "does not exceed an organism's ability to repair it" — *i.e.*, is not permanent or fatal, *id.* — that argument was preposterous, and commenters hope that EPA no longer even entertains it. Damage to an "organism's" tissue — *e.g.* the lung tissue of a child — *is* an adverse health effect. Congress did not intend EPA to invoke § 112(d)(4) unless it was established that there would be no adverse health effects and, *a fortiori*, did not intend the agency to do so when it knew that there would be adverse health effects.

As noted above, in evaluating human health risk for noncancer endpoints, it is equally important to consider short-term exposures as well as long-term/chronic exposure to these emissions. Moreover, health effects depend upon both exposure and toxicity, and for acute effects, HF and HCN are more toxic on a weight/volume basis than HCl. The Cal EPA sets an acute reference exposure level (1 hour exposure) (REL) as 2.1 mg/m^3 for HCl, 0.21 mg/m^3 for Cl_2, 0.24 mg/m^3 for HF, and 0.34 mg/m^3 for HCN. Therefore, Cl_2, HF, and HCN are approximately 10-fold more toxic than HCl on a weight-standardized basis for short-term exposures. For these reasons, as well, unless Cl_2, HF, and HCN are *always* present at concentrations that are at least 10-fold lower than HCl, even for short (1-hour) durations (a point on which EPA does not have information in the record for this rulemaking), only separate health-based thresholds, established for each acid gas, could ever be justified.

Respiratory effects (the endpoint of most concern for HCl, Cl_2, and HF but not HCN) are likely after short-term exposures to high concentrations of acid gases. EPA asserts that it has little information on the peak short-term emissions of HCl from boilers, however. Were the existing RfCs used as the basis for a 112(d)(4) alternative standard, compliance with the health-based threshold would therefore be based on long-term average exposures. Because boilers are not run constantly, and because there are a wide variety of fuels burned (even at the same boiler), it is likely that intermittent peak exposures that greatly exceed the long-term average exposures for the (fuel-dependent) acid gases could occur. Lack of data on exactly what these intermittent peak exposures might be, however, is not sufficient reason to adapt a threshold based solely on chronic exposures. As discussed above, inhalation RfCs exist only for two of the acid gases emitted by ICIBPH, HCl and HCN, and both of these RfCs reflect only studies of chronic exposures.

EPA's IRIS evaluates cancer risks through a two-step process, which first evaluates whether a pollutant is carcinogenic, and then, if so further describes its toxicity. The first step uses a cancer weight-of-evidence descriptor to describe a substance's potential to cause cancer in humans, and the conditions under which the carcinogenic effects may be expressed. Under the EPA's 2005 guidelines for carcinogen risk assessment, a narrative approach is used to characterize carcinogenicity.[36] Five standard weight-of-evidence descriptors (*Carcinogenic to Humans*, *Likely to Be Carcinogenic to Humans*, *Suggestive Evidence of Carcinogenic Potential*, *Inadequate Information to Assess Carcinogenic Potential*, and *Not Likely to Be Carcinogenic to Humans*) are used as part of the narrative.

In the second IRIS step, for pollutants found to be carcinogenic at step 1, cancer slope factors (for oral exposures) and unit risks (for inhalation exposures) are used to estimate the risk of cancer associated with exposure to a carcinogenic or even a potentially carcinogenic substance. A unit risk is defined as the upper-bound, approximating a 95% confidence limit, of excess lifetime cancer risk estimated to result from continuous exposure to an agent at a

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[36] U.S. EPA (2005). Guidelines for Carcinogen Risk Assessment. U.S. Environmental Protection Agency, Washington, DC, EPA/630/P-03/001F, 2005. Available at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=116283.

concentration 1 mg/m^3 in air. The interpretation of unit risk for a substance in air would be as follows: if unit risk = 2×10^{-6} per mg/m^3, one might expect, as an upper bound estimate of risk, that based on a lifetime daily exposure to 1 mg/m^3 of the substance in air, up to 2 excess cancer cases may develop per 1,000,000 exposed individuals.

It is notable that none of the four acid gases examined, HCl, CL_2, HF, or HCN, has undergone a complete evaluation and determination of human carcinogenic potential under the IRIS program. As described above, this absence of information does not provide evidence that there is an absence of risk. Because § 112(d)(4) requires any alternative to a MACT standard to be based on both "no adverse effects" and an "ample margin of safety," the incomplete nature of this evaluation makes a §112(d)(4) standard unavailable for these pollutants.

The California EPA, under its Office of Environmental Health Hazard Assessment (OEHHA), conducts health risk assessments of chemical contaminants found in air, including those identified as toxic air contaminants under California's Air Toxics Hot Spots Act. Assessments can include development of Cancer Potency Factors[37] to assess the cancer risk from carcinogens in air, and development of Reference Exposure Levels (RELs) to assess noncancer health impacts. Cal EPA has set both chronic RELs and acute RELs for the four acid gases considered in this rulemaking (see Table VI-1). These limits are not U.S. EPA limits, however, and just as for the EPA RfCs, they do not include cancer risk assessments for these pollutants.

E. Section 112(d)(4)'s Requirement to Set Any Health-Based Standards With "An Ample Margin of Safety" Requires Evaluation of Synergistic Health Effects, and From all HAP Emissions From the Industrial Facility, not the Boiler Alone.

EPA seeks comment on questions about whether there would be additive effects if individual section 112(d)(4) standards are established for each acid gas, and if so, how that effect could be simulated. 75 Fed. Reg. 32,032. The agency asserts that "[i]ndividual acid gas standards under section 112(d)(4) would likely be established using the hazard quotient (HQ) approach, under which we would develop the ratio of the maximum ambient level to the chronic threshold. However, this approach would not by itself account for potential toxicologic

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[37] Available at http://www.oehha.ca.gov/air/hot_spots/tsd052909.html.

interactions. Since all of the acid gases are respiratory irritants, one way to account for potential toxicologic interactions of these pollutants would be the use of the hazard index (HI) approach, as described in EPA's ''Guideline for the Health Risk Assessment of Chemical Mixtures."[38] Id. EPA requests comment on that approach, and on whether there are any other approaches to address such additive issues.

We assert that EPA's assumption that it can properly "address additive issues" in this way is not justified. Based on its Hazard Index approach,[39] and in the absence of studies explicitly addressing the toxicity of mixtures of HCl with other respiratory irritants, EPA is taking the position that *if* the different acid gases affect health through the same health endpoint, they can be assumed to interact additively. However, this fundamental assumption is not correct. At least one of the acid gases emitted by boilers, HCN, is a known neurotoxin. Its health effects therefore must not be considered additive with the health effects of other acid gases for which the health endpoint is different. Additionally, although Table VI-1 shows the effects for the target organs and pathways studied, there are other pathways of exposure affecting other target organs, and the combined effects are not additive just as the effects of HCN are not additive with HCl. For these reasons, the Agency should not assume an additive effects among these HAP.

In addition, and as acknowledged by the Agency, 75 Fed. Reg. 32,032, industrial and commercial boilers are often located at sites with significant additional sources of HAPs and other pollutants. These pollutants can have synergistic effects with the HAPs emitted by the ICIBPH. For example among the pollutants that may be emitted by other emissions units onsite is particulate matter (PM), including PM in the respirable size range, PM_{10} (PM that are less than or equal to 10 micrometers [µm] in aerodynamic diameter). Health effects associated with PM are stronger for fine ($PM_{2.5}$) and ultrafine particles ($PM_{0.1}$) because they can penetrate deeper into the airways of the respiratory tract and can reach the alveoli in which 50% are retained in the lung parenchyma. Under atmospheric conditions volatile HAPs that are emitted by boilers can

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[38] US EPA 2000. Supplementary Guidance for Conducting Health Risk Assessment of Chemical Mixtures. U.S. Environmental Protection Agency, Washington DC. EPA/630/R-00/002. Available at: http://www.epa.gov/nceawww1/pdfs/chem_mix/chem_mix_08_2001.pdf. This guidance replaced previous U.S. EPA "Guidelines for the Health Risk Assessment of Chemical Mixtures," 51 Fed. Reg. 34,014 (Sept. 24, 1986), available at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=22567.

[39] 75 Fed. Reg. at 32032 referencing "Guidance for the Health Risk Assessment of Chemical Mixtures" (no citation given), but see previous note.

condense onto the surface of these PM, allowing the HAPs to travel along with the particles. Such particles can serve as "carriers" to bring the adhered HAPS deep within the lung, where the HAPS can interact with the respiratory system directly or be leached off of the particle surface and become available systemically. Other HAPS and criteria pollutants may also be present on PM, including transition metals, ions (sulfate, nitrate), organic compound, quinoid stable radicals of carbonaceous material, minerals, reactive gases, and materials of biologic origin.[40]

PM are just one of the additional pollutants that will be emitted from boilers; the fact that boilers can be located among a wide variety of industrial facilities makes predicting and assessing all possible mixtures of HCl and other emitted air pollutants difficult, if not impossible. Because the statute requires standard setting with an "ample margin of safety" when §112(d)(4) is invoked, as discussed above, these synergies make this kind of standard setting practicably impossible to do lawfully for this industrial category.

F. Section 112(d)(4)'s Requirement to Set Any Health-Based Standards With "An Ample Margin of Safety" Requires Evaluation of Health Effects Beyond the Fenceline. Environmental Justice Concerns Mitigate Against Anything Other than MACT-based Standards for this Reason.

EPA also requests comment on whether HAP emissions from neighboring facilities must be evaluated in setting §112(d)(4) standards, and, if so, what the geographic scope of such consideration should be. 75 Fed. Reg. 32,032. EPA properly notes that consideration of emissions from nearby facilities is a far more difficult task to undertake in national standard setting than consideration of facility-wide emissions, since it requires information on all potential HAP emissions near all of the locations with the almost 15,500 boilers affected by the rule. The Agency asks, however, whether such standards could be based on ‘‘ ‘average' or 'high- end' ambient levels of respiratory irritants seen in recent monitoring data or modeled estimates, since site-specific data might not be available on all respiratory irritants." 75 Fed. Reg. 32,032. EPA further solicits comment on whether or not it can, and how it should "appropriately "simulate all reasonable facility/exposure situations (e.g., using worst-case facility emissions coupled with

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[40] *See, e.g.*, U.S. EPA, "Review of the National Ambient Air Quality Standards for Particulate Matter: Policy Assessment of Scientific and Technical Information. OAQPS Staff Paper" (2006). EPA-452/R-05-005a., available at: http://www.epa.gov/ttnnaaqs/standards/pm/data/pmstaffpaper_20051221.pdf (discussing these effects).

worst-case population proximity, average emissions and population, or 90th percentile emissions and population)." *Id.*

As an initial matter, this question by the Agency in fact illustrates why MACT standard setting is and should be the default requirement in the 1990 Clean Air Act, rather than "health-based" standard-setting under section 112(d)(4). The fact that industrial sources of air toxics are often located in areas with other sources of HAPs, including point sources, area sources, and mobile sources, is a major (although not the only) reason that the former, exclusively health-based scheme for standard setting, was so unworkable. Not only are the physical interrelationships between the HAPs synergistic, making the health effects very difficult to predict, but each situation will involve HAPs with different characteristics with respect to spatial distributions, and health endpoints. Defining the geographic scope will not be possible on a nationwide basis for this reason. At the very least, a "high end" ambient level of respiratory irritants as seen in central site monitors or as modeled will have to be used in order to even begin to satisfy the Act's requirement of an "ample margin of safety."

These issues implicate questions related to environmental justice concerns as well. As EPA reports, its own "demographic analysis showed that major source boilers are located in areas where minorities' share of the population living within a 3-mile buffer is higher than the national average. For these same areas, the percent of the population below the poverty line is also higher than the national average." 75 Fed. Reg. 32,048 (citing U.S. EPA, Preliminary Review of Environmental Justice Impacts (April 2010) (EPA-HQ- OAR-2002-0058-0835]).

We encourage the Agency to continue to collect facility-based emissions information, including related to high-emitting boilers as well as short-term assessments of peak emissions during abnormal operating conditions, and in areas where many industrial boilers and other HAP emissions points are located. These should be followed up with dispersion modeling to better understand human exposure at the site of the closest individual (fence-line). Information gathering and better understanding the cumulative health impacts in areas where many sources of HAP are located together (for example, near refineries) would be beneficial. But we assert that the issues EPA raises here amply demonstrate that it is impossible to set a national health-based standard for these air toxics that incorporates an "adequate margin of safety."

Finally, EPA notes that it "considered that setting conventional MACT standards for HCl as well as PM (as a surrogate for metals including manganese) would result in significant reductions in emissions of other pollutants, most notably SO_2, non-condensable PM, and other non-HAP acid gases (e.g., hydrogen bromide) and would likely also result in additional reductions in emissions of mercury and other HAP metals (e.g., selenium). The additional reductions of SO_2 alone attributable to the proposed MACT standard for HCl are estimated to be 340,000 tons per year in the third year following promulgation of the proposed HCl standard. These are substantial reductions with substantial public health benefits. Although MACT standards may directly address only HAPs, not criteria pollutants, Congress did recognize, in the legislative history to section 112(d)(4), that MACT standards would have the collateral benefit of controlling criteria pollutants as well and viewed this as an important benefit of the air toxics program." 75 Fed. Reg. 32,032. EPA asserts that even where there is an "established health threshold" for a HAP, the Agency "may consider such benefits as a factor in determining whether to exercise its discretion under section 112(d)(4)." *Id.*

As a threshold matter, as commenters describe above, there is no "established health threshold" for HCl or for any of the acid gases emitted by ICIBPH, such that a §112(d)(4) standard could be set with an "ample margin of safety." But even if there were, the Agency would be required to consider – indeed to compare -- the environmental and other impacts and benefits of a MACT standard and a section 112(d)(4) alternative. EPA knows this – the Agency points out, 75 Fed. Reg. at 32,031, that "employing a §112(d)(4) standard rather than a conventional MACT standard '*shall not* result in adverse environmental effect which would otherwise be reduced or eliminated.' " *Id.* (emphasis added) (quoting S. Rep. No. 228, 101st Cong., 1st Sess. (1989) at 171). It is impossible to make this assessment without evaluating the collateral benefits of a MACT standard. And , as described in the recently finalized cement kiln MACT rule,[41] setting technology-based standards for HCl will result in significant reductions in the emissions of other pollutants, including SO_2, mercury, and PM. These reductions will provide enormous health and environmental benefits, that would not be experienced if section 112(d)(4) standards had been finalized.

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[41] Available at http://www.epa.gov/ttn/oarpg/t1/fr_notices/portland_cement_fr_080910.pdf.

VII. EPA's Proposed Compliance Requirements Are Unlawful.

It is clear that when EPA sets MACT-based emissions limits for an industrial category, those standards must be met on a continuous basis. *Sierra Club v. EPA*, 551 F.3d 1019, 1027-1028 (D.C. Cir. 2008)("when sections 112 and 302(k) are read together, … Congress has required that there must be continuous *section 112-compliant* standards." (emphasis in original)). The monitoring and reporting requirements established as part of standard setting, at a minimum also must be sufficient to assure continuous compliance. See 42 U.S.C. §7602(k) (defining emission standard as "including any requirement relating to the operation or maintenance of a source to *assure continuous emission reduction….*").

For major source boilers and process heaters, EPA requires continuous emissions monitoring (CEMs) only for PM from sources larger than 250 MMBtu heat input, and CO for sources greater than 100 MMBtu heat input. 75 Fed. Reg. at 32,033-32,035. For all other sources subject to MACT-based standards, EPA requires compliance with the PM, HCl, mercury, CO and dioxin/furans standards to be demonstrated through an "initial performance test" and that the PM, mercury, and HCL limits would also require "continuous parameter monitoring" of control devices, as well as annual control device performance testing . 75 Fed. Reg. at 32,033. EPA proposes that mercury and HCl performance can as well be assessed through fuel analyses. *Id.* While EPA explains why it believes CEMs are "reasonable" for larger boilers and process heaters for PM and CO, the Agency does not explain why it would not be reasonable to require continuous emissions monitoring devices for all pollutants on units that must comply with MACT-based standards. In its recent final MACT rulemaking for the Portland cement industry, EPA requires CEMS to demonstrate compliance with the standards set for mercury, HCl, THC, and PM emissions. EPA nowhere explains in the boilers proposal why it does not similarly propose CEMS for all boilers and process heaters subject to MACT-based standards.

Moreover, although EPA asserts that it has taken into account periods of start-up and shut-down in establishing MACT floors, 75 Fed. Reg. at 32,012, the Agency's failure to include a universal CEMs requirement means that it will not be possible to assess whether sources are indeed continuously meeting the MACT floors. That is because parameter testing, by its nature is intermittent – as EPA points out, these are stack tests taken periodically, or fuel analysis, undertaken periodically, or a combination of both – not “continuous” monitoring. *Id.* 32,033. Assuming “continuous compliance” on the basis of such testing assumes there is no variability between one sampling period and the next. EPA’s own data show the falseness of that assumption.

RESPECTFULLY SUBMITTED,
August 23, 2010.

DECLARATION OF JOHN P. ROSSI

I, John P. Rossi, declare as follows:

1. I am a member of the Clean Air Council and have just recently joined. I joined because I am worried about air pollution in my community and want to protect my health and the health of my family.
2. I am 57 years old. I live in Erie with my wife and two children. I have resided in my current home for 14 years.
3. Clean Air Council is a non-profit environmental organization headquartered in Philadelphia, Pennsylvania. For more than 40 years, the Council has fought to improve the air quality across Pennsylvania. The Council works through advocacy, regulatory oversight and legal action to protect the environment and public health from the harmful effects of air pollution.
4. I live in a community close to air pollution sources with industrial, commercial, and institutional major boilers and process heaters that are subject to United States Environmental Protection Agency (EPA) regulation.
5. I am aware that at least two boilers in my neighborhood are subject to EPA's issued regulation titled: National Emission Standards for Hazardous Air Pollutants for Majoı Sources: Industrial, Commercial, and Institutional Boilers; Final rule; Notice of final action on reconsideration. General Electric Transportation Systems' Erie Plant has at least three major boilers subject to this rule. My home is 3.5 miles from this facility.
6. I am aware that the boilers at this facility emit hazardous air pollutants and particulate matter that can cause asthma, cancer, and many other health problems. I suffer from asthma and my wife suffers from asthmatic bronchitis. We both require constant

medical treatment. I am particularly concerned that this facility has contributed to or aggravated the respiratory illnesses that my wife and I suffer from. I am also worried that my children may develop asthma as a result of this facility's emissions.

7. I spend a lot of time outdoors. I enjoy fishing on the Lake Erie riverfront and yard-work. When I am outside, I use my inhaler more often than when I am inside. If this facility were better regulated and emitted less pollution, I would not have to use my inhaler as often. My enjoyment of fishing and yard-work is diminished because of air pollution from this facility and others like it.

8. I have incurred substantial monetary costs due to air pollution. My wife and I spend approximately $500 a year in prescription costs for asthma inhalers. I had a very mild case of asthma prior to moving to Erie. It has become much, much worse over the course of our residence here. My wife also developed asthmatic bronchitis while living in Erie. We recently purchased and installed a new heating and air conditioning system with the most protective air pollution filtering system we could find. This cost approximately $6,500. If this facility emitted less pollution, we would not have incurred nor would we continue to incur these costs.

9. I am concerned the air pollution from this facility is affecting my relationship with my family. Because my wife's respiratory illness is more serious, she goes outside less often. When my wife stays inside our home, our children often do as well. Because I spend more time outside, I socialize and interact less with my family. If this facility emitted less pollution, I would socialize and interact with my family more.

10. I am aware that EPA has finalized standards for Industrial, Commercial, and Institutional Boilers at major sources that include less protective pollution prevention measures than the Clean Air Act requires. In this rule, EPA increased emission limits for some pollutants, allowing more pollution from major source boilers. EPA also failed to require proper testing for some categories of major source boilers. If the standards are remanded to EPA, Clean Air Council will have an opportunity to obtain a stronger rule.
11. I am aware that industry groups are suing EPA to stop or weaken the rules protecting against air pollution from boilers at major source facilities. If the lawsuit on behalf of these industry groups succeeds, I will be injured for a longer period of time and more greatly.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed this 28 day of April, 2013.

John P. Rossi

DECLARATION OF CYNTHIA PURVIS

I, Cynthia Purvis, declare as follows:

1. I am a member of the Clean Air Council and have just recently joined. I decided to join after attending a three-day conference sponsored by the Clean Air Council at the Jefferson Education Society and other events. I joined because I am concerned about the air I and my loved ones breathe.
2. I am 61 years old. I live in Erie with my husband and my mother-in-law. I have lived at this location for 15 years. Prior to this I lived in another residence in Erie for 25 years.
3. Clean Air Council is a non-profit environmental organization headquartered in Philadelphia, Pennsylvania. For more than 40 years, the Council has fought to improve the air quality across Pennsylvania. The Council works through advocacy, regulatory oversight and legal action to protect the environment and public health from the harmful effects of air pollution.
4. I live in a community close to air pollution sources with industrial, commercial, and institutional major boilers and process heaters that are subject to United States Environmental Protection Agency (EPA) regulation.
5. I am aware that at least two boilers in my neighborhood are subject to EPA's issued regulation titled: National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers; Final rule; Notice of final action on reconsideration. Erie Coke Corporation has a location in Erie about 2.5 miles from my current house. My former residence was about 4,800 feet from this facility. This facility produces coke, a by-product of coal often burned to create steel. This facility has two major boilers.
6. I am aware that these boilers emit hazardous air pollutants that can cause asthma, cancer, immune disorders, heart attacks, and strokes. I am especially worried that these pollutants may cause autism in children. I am very concerned about what conditions and health disorders are caused by the pollution emitted by these boilers. My brother in law worked at this particular Erie Coke

Corporation facility. My brother in law is deceased and suffered cancer. My mother, a lifetime non-smoker, suffered from lung cancer. I have had skin cancer, have high blood pressure, and had tuberculosis. I am worried about air pollution from this facility creating health problems for myself, given my medical history, my husband, my mother-in-law, and people throughout Erie.

7. My husband and I walk and will continue to walk in the future at Presque Isle because of its scenic beauty and wildlife. Presque Isle is approximately 1.2 miles from the boilers mentioned above. Presque Isle is popular because of its scenic beauty and wildlife. I am worried about the impacts this facility and others like it have on the environment. I am aware that air pollution contributes to haze, kills fish and other wildlife, and affects plant growth. I am concerned air pollution from these boilers will reduce my enjoyment of Presque Isle and Lake Erie.

8. I enjoy gardening. I have a very large garden that I tend in the spring and summer seasons. I am aware that air pollution negatively impacts plant growth. As such, I spend a lot of time outdoors in my garden. I am exposed to more air pollution during that time. I am worried about the impacts that this facility and others like it will have on my health and my garden. If this facility were better regulated, I would not breathe as much air pollution when gardening and my garden would be healthier.

9. I am concerned that the city of Erie increases property taxes as people move away. I am aware that people move away, in part, because of air pollution. As people see visible air pollution, they are driven away and wish to live in suburban communities much farther away from air pollution sources like the boilers at Erie Coke Corporation's facility near my home. My property taxes would be lower if air pollution from this facility and others like it did not drive people to move away from Erie.

10. I am aware that EPA has finalized standards for Industrial, Commercial, and Institutional Boilers at major sources that include less protective pollution prevention measures than the Clean Air Act requires. In this rule, EPA increased emission limits for some pollutants, allowing more pollution from major source boilers. EPA also failed to require proper testing for some categories of major

source boilers. If the standards are remanded to EPA, Clean Air Council will have an opportunity to obtain a stronger rule.

11. I am aware that industry groups are suing EPA to stop or weaken the rules protecting against air pollution from boilers at major source facilities. If the lawsuit on behalf of these industry groups succeeds, I will be injured for a longer period of time and more greatly.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed this 28 day of April, 2013.

Cynthia Purvis

Cynthia Purvis

DECLARATION OF KARLA LAND

I, Karla Land, declare as follows:

1. I am a member of the Sierra Club and have been a member since 2007.
2. I reside at 16923 Avenue B, Channelview, Texas, 77530, with my husband and several pets. I have lived at my present address since 1992. I have lived in the greater Houston area since 1979.
3. My husband and I work at our motorcycle parts and service shop, located at 204 Bayou Drive, Channelview, Texas, 77530.
4. I live and work in an area surrounded by industrial facilities, many of which are area or major sources with industrial, commercial and institutional boilers and process heaters that are subject to EPA regulation.
5. I am aware that at least two boilers in the Channelview are subject to EPA's issued regulation titled: National Emission Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers; Final rule; Notice of final action on reconsideration. Cletex Trucking Incorporated has a location in Channelview, approximately 2 miles from my home and work. Cletex is a trucking company that transports dry and bulk liquids. Additionally, Houston Marine Services, Inc. operates a facility in Baytown, approximately 2 miles from my home

and work. The company is a fuel, lubricant, and service provider to the marine industry. Each of these facilities has a source boiler located on site.

6. I am aware that at least twenty major sources with boilers in the area are subject to EPA's recently issued regulation titled: National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers; Final rule; Notice of final action on reconsideration. For example, Lyondell Chemical Company's Channelview facility manufactures ethylene, propylene, butadiene, and benzene, which are used to produce derivatives and gasoline blending products on site. Chevron Phillips Chemical Company operates the Cedar Bayou Chemical Plant in nearby Baytown. It is also a petrochemical plant that produces polyethylene resins and alpha olefins. ExxonMobil operates the Baytown Olefins Plant, also in Baytown. This facility produces ethylene, propylene, and butadiene. All these facilities are major sources of hazardous air pollution and have boilers onsite.

7. I am aware that these boilers emit hazardous air pollutants. I am very concerned about the health risks that these emissions pose to me, my family, and my community. The air pollutants in my community are known to cause cancer, asthma, allergies, and other respiratory conditions.

8. Before moving to the Channelview area, I did not have any breathing problems. After moving to the area, I developed severe allergies. My husband also suffers severe allergies when in Channelview.

9. I have often observed poor air quality days when it is difficult to breath, my allergies get worse, and I experience headaches. On these days, I restrict my activities and stay inside. I have noticed that my symptoms subside after being inside.

10. I enjoy relaxing in my backyard, camping nearby, riding my motorcycle, and being outside with my pets and neighbors. I am aware that area source boilers contribute to pollution in Channelview. The air pollution in my community diminishes my enjoyment of and ability to participate in outdoor activities. Air pollution often makes it difficult to breath and prevents me from going outside. If it were not for the poor air quality in my community, I would spend more time in my backyard and going for walks in my neighborhood.

11. Due to our concerns about the pollution in my neighborhood, my husband and I purchased property in West Texas. Because air pollution limits our ability to enjoy the outdoors in Channelview, we visit this property to spend time outside and enjoy our favorite outdoor activities, including fishing and four wheeling.

12. My husband and I both love to spend time on the water. For example, we both are divers and love fishing. We reside and work three blocks from the San Jacinto River, but we will not touch the water nor eat anything from it because it is too polluted. I have read news articles saying that there are chemicals in the water, including dioxin, toluene, PCBs, and mercury, as a result of air and water emissions from nearby industrial facilities. If the river were not so polluted, I would love to boat and fish near my house and fish from the San Jacinto River.

13. My daughter has chosen to raise her son outside of Channelview are in part because of our concerns about the harmful effects of air pollution from these boilers.

14. I have friends and neighbors who suffer from sinus infections, allergies, and asthma. Many of my neighbors have small children and there are many schools in the area. I am worried these children will develop similar or more severe health conditions due to harmful pollutants emitted from these boilers in our region.

15. I own a number of pets and am concerned for their health because they are also exposed to these harmful air pollutants. I have observed many animals in Channelview that suffer from “hot spots” or sores on their bodies that I believe are related to exposure to hazardous pollutants emitted by nearby

facilities. I have to treat some of my pets with monthly shots to prevent and treat these sores.

16. In the past, I have noticed strong foul odors in the air and have reported it to pollution control. I have experienced odors that smelled like rotten eggs, cat litter, ammonia, and musty socks, among others.

17. I am aware that EPA has finalized standards for Industrial, Commercial, and Institutional Boilers at major and area sources that are weaker than the Clean Air Act allows. It has failed to require adequate monitoring and allowed these sources to escape liability for exceeding the standards if the exceedance happens during a malfunction. If the standards are remanded to EPA, Sierra Club will have an opportunity to ask the agency to fix these problems, which would enable more effective enforcement of the standards, inform me and my neighbors about what pollutants we are exposed to, and reduce our exposure to pollution.

18. I am aware that industry groups are suing to eliminate or weaken the protections from pollution from boilers at major and area sources that EPA has established. If the industry petitioners' suit to weaken the protections in EPA's rules were successful, the injuries described above that result from these sources would be prolonged and increased and would be detrimental to my health and the health of my family, friends, and neighbors.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Executed this 25 day of April, 2013.

Karla Land