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United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued October 10, 2003

Decided January 13, 2004

No. 02-1253

SIERRA CLUB,
PETITIONER

v.

ENVIRONMENTAL PROTECTION AGENCY AND
CHRISTINE TODD WHITMAN, ADMINISTRATOR,
US ENVIRONMENTAL PROTECTION AGENCY,
RESPONDENTS

On Petition for Review of an Order of the
Environmental Protection Agency

James S. Pew argued the cause for petitioner. With him on the briefs was *David S. Baron*.

David J. Kaplan, Attorney, U.S. Department of Justice, argued the cause for respondents. With him on the brief was *Michael W. Thrift*, Counsel, U.S. Environmental Protection Agency.

Bills of costs must be filed within 14 days after entry of judgment. The court looks with disfavor upon motions to file bills of costs out of time.

Before: HENDERSON, TATEL, and ROBERTS, *Circuit Judges*.

ROBERTS, *Circuit Judge*: Petitioner Sierra Club challenges the Environmental Protection Agency’s promulgation, pursuant to Section 112 of the Clean Air Act, of regulations governing the emission of hazardous air pollutants from primary copper smelters. This is the latest in a series of challenges to rulemakings establishing emission standards for hazardous air pollutants in various industries under the Clean Air Act, *see, e.g., Cement Kiln Recycling Coalition v. EPA*, 255 F.3d 855 (D.C. Cir. 2001) (hazardous waste combustors); *National Lime Ass’n v. EPA*, 233 F.3d 625 (D.C. Cir. 2000) (portland cement manufacturing facilities); *Sierra Club v. EPA*, 167 F.3d 658 (D.C. Cir. 1999) (medical waste incinerators); *Appalachian Power Co. v. EPA*, 135 F.3d 791 (D.C. Cir. 1998) (electric utility boilers). We review such challenges under a familiar test and may set aside the standards only if we find them to be “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.” 42 U.S.C. § 7607(d)(9)(A); *see Motor Vehicle Mfrs. Ass’n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 41 (1982). “The ‘arbitrary and capricious’ standard deems the agency action presumptively valid provided the action meets a minimum rationality standard.” *Natural Res. Def. Council, Inc. v. EPA*, 194 F.3d 130, 136 (D.C. Cir. 1999). After considering Sierra Club’s arguments and reviewing the record, we reject its challenges to the rulemaking in this case and conclude that EPA’s emission standards are not arbitrary, capricious, an abuse of discretion, or contrary to law. We therefore deny the petition for review.

I. Background

A. Statutory Background

In 1970, Congress enacted Section 112 of the Clean Air Act (CAA), Pub. L. No. 91-604, § 112, 84 Stat. 1676, 1685 (1970), in an effort to reduce hazardous air pollutants (HAPs). *See Natural Res. Def. Council, Inc. v. EPA*, 824 F.2d 1146, 1148 (D.C. Cir. 1987); H.R. Rep. No. 101-490, pt. 1, at 150 (1990) (House Report). The statute defined HAPs as “air pollu-

tant[s] . . . which in the judgment of the Administrator cause[], or contribute[] to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.” Clean Air Act Amendments of 1977, Pub. L. No. 95-95, § 401(c), 91 Stat. 685, 791 (1977). Section 112 required EPA to publish a list containing “each hazardous air pollutant for which [it] intends to establish an emission standard,” and then — within a specified period — either to promulgate an emission standard or to explain why the particular HAP is in fact not hazardous. § 112(b)(1)(A)–(B), 84 Stat. at 1685. EPA followed a *risk-based* analysis to set emission standards under the statute, meaning that EPA considered levels of HAPs at which health effects are observed, factored in an “ample margin of safety to protect the public health,” and set emission restrictions accordingly. § 112(b)(1)(B), 84 Stat. at 1685; see *Cement Kiln Recycling Coalition*, 255 F.3d at 857 (CKRC).

This approach proved to be disappointing. See S. Rep. No. 101-228, at 3 (1989) (Senate Report) (“Very little has been done since the passage of the 1970 [CAA] to identify and control hazardous air pollutants.”). In part because of uncertainty over appropriate levels of protection under a risk-based regime, and “unrealistic” time frames mandating proposed standards 180 days after listing a pollutant as hazardous, little progress was made. *Id.* at 132. From 1970 to 1990, EPA listed only eight HAPs, establishing emission standards for seven of them. *Id.* at 131; House Report, at 322. As the House Committee on Energy and Commerce summarized the progress of limiting HAP emissions under Section 112: “Listing decisions have been few and far between. . . . No decision — is the history of this program.” House Report, at 151 (quoting a Nov. 7, 1983 Committee hearing). The Senate counterpart was more understated but the verdict was essentially the same: “Attainment of the health-based air quality standards has proven more difficult than anticipated. . . .” Senate Report, at 3.

The ineffectiveness of the risk-based approach created a “broad consensus that the program to regulate [HAPs] under section 112 of the Clean Air Act should be restructured to provide EPA with authority to regulate . . . with *technology-based* standards.” *Id.* at 133 (emphasis added). In response, Congress passed the Clean Air Act Amendments of 1990, Pub. L. No. 101-549, 104 Stat. 2531 (1990) (1990 Amendments or Amendments), to “strengthen and expand the Clean Air Act” through a “technology-based . . . program.” House Report, at 144. The 1990 Amendments made two “fundamental changes” to Section 112 in order to implement the technology-based approach. Senate Report, at 133. First, rather than look to EPA to identify and list HAPs, Congress did it itself, establishing a list of 191 HAPs requiring emission standards. *See* 42 U.S.C. § 7412(b). Second, the Amendments established an emission standards implementation process “based on the maximum reduction in emissions which can be achieved by application of best available control technology.” Senate Report, at 133; *see CKRC*, 255 F.3d at 857.

Congress established a two-phase approach for setting HAP emission standards under the 1990 Amendments. *See National Lime*, 233 F.3d at 629. During the first phase, EPA must promulgate technology-based emission standards for categories of sources that emit HAPs. 42 U.S.C. § 7412(d); Senate Report, at 148. These emission standards are to be based not on an assessment of the risks posed by HAPs, but instead on the maximum achievable control technology (MACT) for sources in each category. Senate Report, at 148 (“The MACT standards are based on the performance of technology, and not on the health and environmental effects of hazardous air pollutants.”). The standards, at a minimum, must reflect the emissions limitation achieved by the best-performing sources in a particular category (here, primary copper smelters). The 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. *See* 42 U.S.C. § 7412(d)(3); National Emission Standards for Hazardous Air Pollutants for Primary Copper Smelting; Final Rule, 67 Fed.

Reg. 40,478, 40,479 (June 12, 2002) (codified at 40 C.F.R. pt. 63) (Final Rule).

The second phase then returns to a risk-based analysis. That phase — which occurs within eight years after Section 7412(d) MACT standards are promulgated — requires EPA to consider whether residual risks remain that warrant more stringent standards than achieved through MACT. 42 U.S.C. § 7412(f). EPA must determine whether such standards are required “in order to provide an ample margin of safety to protect public health . . . or to prevent . . . an adverse environmental effect.” *Id.* § 7412(f)(2)(A); *see also* Senate Report, at 155 (“[The Amendments] require[] [EPA] to protect against all significant environmental effects when setting residual risk standards in the second phase.”).

The issues in this case focus on the first phase of emission standards promulgation. Within that phase, there are two steps. Step one requires EPA to establish what has come to be known as the MACT floor — the minimum level of reduction required by statute. For existing sources, EPA sets the MACT floor at “the average emission limitation achieved by the best performing 5 sources” in a category “with fewer than 30 sources.” 42 U.S.C. § 7412(d)(3)(B). Once EPA has set the MACT floor, it may then impose stricter standards — so-called “beyond-the-floor” limits — if the Administrator determines them to be achievable after “taking into consideration the cost . . . and any non-air quality health and environmental impacts and energy requirements.” *Id.* § 7412(d)(2); *see CKRC*, 255 F.3d at 858. These “beyond-the-floor” limits in phase one under Section 7412(d)(2) are distinct from the risk-based limits to be set eight years later under Section 7412(f)(2) during phase two.

B. Regulatory Background

In 1998, EPA announced proposed emission standards for primary copper smelters and initiated notice-and-comment procedures. *See* National Emission Standards for Hazardous Air Pollutants for Source Categories: National Emission Standards for Primary Copper Smelters, 63 Fed. Reg. 19,582 (Apr. 20, 1998) (Proposed Rule). When EPA presented the

Proposed Rule, six primary copper smelters operated in the United States. *Id.* at 19,583/3. During the public comment period, four of them suspended operations. Final Rule, 67 Fed. Reg. at 40,479/3. The rulemaking only concerned those primary copper smelters that use “batch copper converters.” *Id.*

Such smelters produce copper from raw copper ore, which typically contains less than one percent copper. Proposed Rule, 63 Fed. Reg. at 19,583. At the mine site, copper sulfide ore is processed into copper concentrate — a form of copper ore with a higher copper content. After shipping to the primary copper smelter, the copper concentrate is further processed into a slurry and mixed with “fluxes” — materials that facilitate the formation of a slag containing impurities from the ore. The further refined concentrate is placed in a copper concentrate dryer to remove some of the moisture content, and the copper concentrate then moves to the flash smelting furnace, where it is heated (at almost 1,830 degrees Fahrenheit) until molten.

In the molten state, most of the remaining impurities form into a slag. The slag is lighter than the molten copper, so it rises to the surface and is removed to a slag cleaning vessel or a slag pile (depending on the primary smelter). The molten copper then moves to the batch converter, which removes any remaining impurities by blowing oxygen through the molten copper, forming additional slag that is skimmed off. That process of blowing and skimming is repeated until the copper is 96 to 98 percent pure.

Melting rocks and minerals at nearly 2,000 degrees Fahrenheit not surprisingly produces exhaust gas, which EPA refers to as “off-gases.” There are two types of off-gases generated by the smelting process: (1) process emissions and (2) fugitive emissions. Process emissions are the primary exhaust gas streams generated by copper dryers, smelting furnaces, slag cleaning vessels, and batch converters. These gas streams are captured and routed to control devices before being emitted into the atmosphere. Fugitive emissions are off-gases that escape from the primary exhaust gas streams,

entering the atmosphere without going through emissions control. The off-gases from smelting copper sulfide ore contain concentrated sulfur dioxide — so much that some off-gases are routed to an adjacent plant producing sulfuric acid. The off-gases also contain metallic impurities — including lead and arsenic — that had been trapped in the ore but are released during smelting in the form of particulate matter (PM) in the off-gases. These metallic impurities released during the smelting process are the HAPs that are the focus of the subject rulemaking. *See id.* at 19,584–85.

Copper smelters use several different methods of PM control to regulate process emissions. Exhaust streams from copper dryers are vented to either a baghouse or an electrostatic precipitator (ESP) to reduce PM emissions. *Id.* at 19,593. Smelting furnaces vent primary exhaust gases to adjacent sulfuric acid plants that remove PM by routing the gas stream first through an ESP and then through a wet scrubber. *Id.* at 19,594. Two of the smelters involved in this rulemaking operate slag cleaning vessels, venting the exhaust gases to wet scrubbers to reduce PM emissions. *Id.* at 19,595. Batch converters route emissions to adjacent plants, baghouses, and ESPs for PM control. *Id.* at 19,597.

After surveying the technology used at the various locations, EPA determined that copper smelters used PM control devices to reduce HAP emissions. EPA accordingly set standards for HAP emissions in terms of PM, rather than setting individual limits for each HAP. Because the control devices operate by reducing PM as a whole, EPA set numerical limits in terms of PM for each type of primary gas stream. To control fugitive emissions, EPA set an opacity-based standard — a standard that limited emissions by measuring the amount of light passing through emissions vented from certain smelter exhaust points other than a primary exhaust stack. The idea was that HAPs contained in process emissions would be regulated through limits on PM, while fugitive HAPs — the ones that “leaked out” through ceiling exhaust fans and the like — would be regulated through opacity-based limits, which would also help ensure that emissions went through the control devices. EPA’s Final Rule also mandat-

ed the use of parameter monitoring to ensure the proper functioning of the required PM control devices. Such monitoring tests whether PM control devices operate as they are supposed to under a specific parameter previously determined to ensure compliance with emission standards. EPA estimated that the regulatory regime set forth in its Final Rule would reduce HAP emissions from copper smelters nationwide by 23 percent. Final Rule, 67 Fed. Reg. at 40,478.

Sierra Club did not comment on the proposed emission standards, and none of the entities that did have challenged the Final Rule. Sierra Club nonetheless challenges the Final Rule on several grounds: (1) EPA's MACT determination is unlawful and arbitrary and capricious; (2) EPA's decision to use PM as a surrogate for HAPs is not reasonable; (3) EPA failed adequately to explain its decision to use PM as a surrogate; and (4) the opacity-based standard is not a proper emission standard. Sierra Club also challenges EPA's refusal to impose beyond-the-floor limits and the agency's alleged failure to take into account non-air quality health and environmental impacts. In addition, Sierra Club challenges the monitoring requirement as inadequate and claims that EPA violated the Endangered Species Act by issuing the Final Rule without undertaking the inter-agency consultations required by that Act.

II. Challenges to EPA's MACT Determinations

A. PM as a Surrogate

In *National Lime*, this court confirmed that "EPA may use a surrogate to regulate pollutants if it is 'reasonable' to do so." 233 F.3d at 637. Sierra Club does not dispute this proposition as a general matter, *see* Reply Br. at 4 n.2, but raises two broad objections to the use of PM as a surrogate for HAPs in this particular rulemaking. First, Sierra Club contends that EPA has set standards on the basis of what PM control can achieve, violating the statutory requirement that the minimum standards be based on what the best performing sources actually achieve. Second, Sierra Club contends that using PM as a surrogate is not "reasonable" under the

criteria set forth in *National Lime*. We address each contention in turn.

1. Lawfulness of PM as a Surrogate

During the notice-and-comment period, EPA responded to an objection to the use of PM as a surrogate by stating that the CAA “does not prohibit us from using an appropriate surrogate pollutant for individual HAP species to confirm the proper use of MACT.” EPA, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Primary Copper Smelters — Background Information for Promulgated Standards 2-2 (2001) (EPA Background Document). Sierra Club seizes upon that explanation to argue that EPA has violated Section 7412(d)(3) by setting surrogate emission standards to confirm the proper use of a chosen technology, instead of basing standards on what the best sources achieve with respect to HAP emissions control. Reply Br. at 2. Sierra Club contends that copper smelters achieve HAP emission reductions not just through PM control, but by altering ore inputs as well. Because EPA promulgated the emission standards based only on PM control without considering ore inputs, Sierra Club argues, the standards fail to reflect what the best-performing sources achieve: “setting standards . . . that reflect only what is achievable through the use of a particular control technology contravenes the Act.” *Id.*

Sierra Club relies heavily on this court’s decision in *CKRC*, but EPA avoided the problems that infected its analysis in that case. The statute requires EPA to set minimum emission standards at the level achieved by the best-performing sources. *See* 42 U.S.C. § 7412(d)(3). In *CKRC*, EPA established a “MACT pool” comprised of the best-performing sources, “identified the *primary* emission control technology used by the sources in the MACT pool,” selected that technology as the “MACT control,” and set the final emission standard at the level of the *worst*-achieving source using the MACT control. 255 F.3d at 859 (emphasis added). EPA defended that approach as a means of ensuring achievability,

arguing that Section 7412(d)(3) imported Section 7412(d)(2)'s achievability standard. We disagreed. *Id.* at 861.

EPA advanced an alternative argument, to the effect that adopting emission standards based on what the worst-achieving sources using MACT achieved *did* reflect what the best-achieving sources actually achieved. *See id.* at 862. We were having none of that: The worst-performing sources using MACT technology could not be representative of the best-performing sources, because evidence showed that (1) some of the best-performing sources used other control devices in combination with the MACT technology, (2) the performance of different models of the same technology varied based on certain features, and (3) other factors such as feed rate and material composition affected emission outputs. *Id.* at 862–64.

The instant case is quite different. EPA did not violate Section 7412(d)(3) by setting emission standards based on the worst-performing sources using MACT. Nor did EPA use the worst-performing sources to estimate the performance of the best-performing sources. Sierra Club challenges *only* the type of emission standard — PM as a surrogate for HAPs — not, as in *CKRC*, the numerical limitation set by the standard.

In this case, EPA promulgated standards that accurately reflect the control achieved by the best-performing sources. EPA established emission standards for the various copper smelting processes based upon the actual PM emissions of the relevant units from performance tests, *e.g.*, Final Rule, 67 Fed. Reg. at 40,482–83 (smelting process emissions, batch converters, slag cleaning vessels), or based upon established regulatory limits, *e.g.*, Proposed Rule, 63 Fed. Reg. at 19,593–94; EPA Background Document, at 2-10-2-11 (copper concentrate dryers). Contrary to Sierra Club's assertion that EPA established an equipment standard, EPA started down that road but pulled back:

After careful review and evaluation of comments received objecting to our use of an equipment standard rather than a numerical emission limit and new emissions data obtained since proposal, we concluded that a change

in the proposed standards for process off-gas emissions was warranted. As a result, we issued a supplement to the proposed rule . . . in which we proposed a numerical emission standard that would limit the concentration of total particulate matter in the off-gases discharged.

Final Rule, 67 Fed. Reg. at 40,482/3 (referring to emission standards for smelting furnaces, slag cleaning vessels, and batch converters and citing National Emissions Standards for Hazardous Air Pollutants for Source Categories: National Emissions Standards for Primary Copper Smelters, 65 Fed. Reg. 39,326 (June 26, 2000) (Supplement)). EPA complied with Section 7412(d)(3) by setting emission limits on the basis of the PM control that the best sources actually achieved, not on the basis of what any source using PM control achieved. EPA did not repeat its *CKRC* missteps. We now turn to Sierra Club's contention that use of PM as a surrogate for metal HAPs was unreasonable under *National Lime*.

2. Reasonableness of PM as a Surrogate

In *National Lime*, this court established a three-part analysis for determining whether the use of PM as a surrogate for HAPs is reasonable: PM is a reasonable surrogate for HAPs if (1) "HAP metals are invariably present in . . . PM;" (2) "PM control technology indiscriminately captures HAP metals along with other particulates;" and (3) "PM control is the only means by which facilities 'achieve' reductions in HAP metal emissions." 233 F.3d at 639. If these criteria are satisfied and the PM emission standards reflect what the best sources achieve — complying with Section 7412(d)(3) — "EPA is under no obligation to achieve a particular numerical reduction in HAP metal emissions." *Id.*

The use of PM as a surrogate in this case is reasonable. First, it is undisputed that HAPs are invariably present in PM. Second, EPA determined that the PM control technologies used by primary copper smelters inevitably removed HAPs as part of PM. *See* Proposed Rule, 63 Fed. Reg. at 19,592/3 ("The control technologies used for the control of PM

emissions achieve equivalent levels of performance on metallic HAP emissions.”). There is some dispute, however, whether copper smelters use other control technologies besides PM control to limit HAPs.

Sierra Club claims that the record shows that two copper smelters use ore-switching to control PM. A 1995 EPA report cites 1992 impurity data to conclude that the Phelps Dodge–Chino smelter had “no control of secondary hood or matte and slag tapping gases” but “achieves low HAP emissions through low-input-impurity feeds.” EPA, A-96-22 No. II-A-1, Final Summary Report: Primary Copper Smelters National Emission Standard for Hazardous Air Pollutants 5 (July 1995) (Final Report). The report further stated that the “Phelps Dodge–Hidalgo smelter also has very low levels of HAPs in ore concentrate feeds . . .” *Id.*

The record, however, shows that between the 1995 report and the proposed rulemaking, both of these smelters installed PM controls to regulate their emissions. In 1996, the Hidalgo smelter installed a baghouse to control matte and slag tapping hood emissions. EPA, A-96-22 No. II-E-8, File Memorandum from E. Crumpler, Office of Air Quality Planning and Standards (July 28, 1997). During EPA emissions testing at the Chino smelter in April 1997, EPA reported that the smelter used a secondary hood system to route off-gases to a baghouse prior to discharge to the atmosphere. EPA A-96-22 No. II-I-2, Emissions Test Report: Primary Copper Smelter Converter Aisle Fugitive Emissions; Phelps Dodge Hurley, New Mexico ¶ 2.1 (Chino smelter). When it came time to address the instant question, EPA consequently found that PM control was the only control technology used by the industry. *See Proposed Rule*, 63 Fed. Reg. at 19,585/3. We have no basis for rejecting that finding as arbitrary or capricious. *See Ethyl Corp. v. EPA*, 51 F.3d 1053, 1064 (D.C. Cir. 1995) (“If EPA acted within its delegated statutory authority, considered all of the relevant factors, and demonstrated a reasonable connection between the facts on the record and its decision, we will uphold its determination.”).

Sierra Club uses *National Lime*'s statement that "EPA must consider the potential impact upon emissions of changes in inputs," 233 F.3d at 639, as a basis to argue that "PM is not a reasonable surrogate where other factors (in the instant case, the HAP content of the ore used) affect HAP metal emissions." Reply Br. at 5. The requirement in *National Lime* was that other inputs must "affect HAP metal emissions in the same fashion that they affect the other components of PM." 233 F.3d at 639. Put another way, "PM might not be an appropriate surrogate for HAP metals if switching fuels would decrease HAP metal emissions without causing a corresponding reduction in total PM emissions." *Id.* The reason is clear: if EPA looks only to PM, but HAPs are reduced by altering inputs in a way that does not reduce PM, the best achieving sources, and what they can achieve with respect to HAPs, might not be properly identified.

Nothing in the record, however, supports the proposition that switching to cleaner ore will decrease HAPs without a reduction in PM. HAP metals are a component of PM, *see* Proposed Rule, 63 Fed. Reg. at 19,585/1 ("metallic impurities in the copper ore can be released into the atmosphere in the form of particulate matter (PM) during certain smelting operations"), so any reduction in HAPs would in turn reduce PM. As EPA explained:

During the smelting process . . . HAP metal species either are eliminated in the molten slag tapped from the process vessels or are vaporized and discharged in the process vessel off-gases. Upon cooling of the process off-gases, the volatilized HAP metal species condense, form aerosols, and *behave as particulate matter*. . . . An emission characteristic common to all primary copper smelters and similar source categories is the fact that the *metal HAP are a component of the particulate matter contained in the process off-gases* discharged from smelting and converting operations.

Supplement, 65 Fed Reg. at 39,329/1-2 (emphases added); *see* EPA Background Document, at 3-2 ("metal HAP emissions from copper converters behave as particulate matter").

Sierra Club argues that the use of PM as a surrogate is not reasonable because the HAP content of PM will vary according to the feedrate. But as we explained in *National Lime*, “even if the ratio of metals to PM is small *and variable*, or simply unknown, PM is a reasonable surrogate for the metals — assuming . . . that PM control technology indiscriminately captures HAP metals along with other particulates.” 233 F.3d at 639 (emphasis added). On the record before us, EPA concluded that “[s]trong direct correlations exist between the emissions of total particulate matter and metal HAP compounds. Emission limits established to achieve good control of total particulate matter will also achieve good control of metal HAP.” Supplement, 65 Fed. Reg. at 39,329/1–2. As EPA explained, “[t]he control technologies used for the control of PM emissions achieve equivalent levels of performance on metallic HAP emissions.” Proposed Rule, 63 Fed. Reg. at 19,592/3. On this record, the use of PM as a surrogate is reasonable, even in light of the potential variability of impurities in copper ore.

B. EPA’s Consideration of Alternatives to the PM Standard

Sierra Club argues that using PM as a surrogate is arbitrary and capricious in light of standards promulgated for other industries, under which PM was not similarly used as a surrogate. Sierra Club directs the court to EPA’s failure to explain (1) why PM was a proper surrogate for HAP metals here when it was not in the hazardous waste combustor (HWC) rulemaking, and (2) why EPA did not use other surrogates, as, for example, it used lead as a surrogate in the secondary lead smelter rulemaking. Pet. Br. at 29.

Without specific reference to the HWC and secondary lead smelter regulations, EPA reasonably articulated its decision to use PM as a surrogate in response to public comments. EPA explained that a surrogate was needed in light of the impracticality of setting individual standards for each metal, due to the variability of HAPs in copper ore stocks:

Th[e] inherent variability and unpredictability of the metal HAP compositions and amounts in copper ore concentrates affect the composition and amount of HAP metals in the process off-gas emissions. As a result, prescribing individual numerical emission limits for each HAP species (e.g., a specific emission limit for arsenic, a specific emission limit for lead, etc.) is impracticable, if not impossible, to do.

Given that prescribing individual numerical emission limits for HAP metal is not a practicable approach in this case, an alternative approach is to use particulate matter as a surrogate pollutant for the metal HAP emitted from primary copper smelters.

EPA Background Document, at 2-2-2-3.

EPA then explained its decision to use PM as the surrogate:

- “metal HAP compounds are a component of the [PM] contained in the process off-gases,”
- “[s]trong direct correlations exist between the emissions of [PM] and metal HAP compounds,” and
- “[e]mission limits established to achieve good control of [PM] will also achieve good control of metal HAP.”

Id. at 2-3.

Based on this response to public comments, we conclude that EPA adequately considered alternatives to the PM standard. EPA was not required to give an affirmative justification for differences with regulations governing other industries. “The failure to respond to comments is significant only insofar as it demonstrates that the agency’s decision was not based on a consideration of the relevant factors.” *Thompson v. Clark*, 741 F.2d 401, 409 (D.C. Cir. 1984) (internal quotation marks and citation omitted); *accord American Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1005 (D.C. Cir. 1997) (finding comment response sufficient if it “demonstrates that the agency considered the ‘relevant factors’ raised by the suggested alternatives”); *Texas Mun. Power Agency v. EPA*, 89

F.3d 858, 876 (D.C. Cir. 1996). EPA’s explanation makes it evident that it did consider the relevant factors.

This court has adopted an “every tub on its own bottom” approach to EPA’s setting of standards pursuant to the CAA, under which the adequacy of the underlying justification offered by the agency is the pertinent factor — not what the agency did on a different record concerning a different industry. *See Portland Cement Ass’n v. Ruckelshaus*, 486 F.2d 375, 389 (D.C. Cir. 1973). The question of whether EPA reasonably considered alternatives “can typically be decided on the basis of information concerning that industry alone.” *Id.* The record in this case demonstrates that EPA reasonably explained its decision based on the specifics of primary copper smelters. EPA could have noted where the bases for its decision in this case differed from those with respect to other decisions in other cases, as was done in EPA’s brief to this court, *see, e.g.*, Resp. Br. at 23 (PM control inadequate in the HWC context because feedrate control was also used to reduce HAP emissions, unlike in copper smelter context), but such explanations are not required given the different contexts of the various rulemakings. *See Portland Cement*, 486 F.2d at 389 (“the Administrator is not required to present affirmative justifications for different standards in different industries”); *National Lime Ass’n v. EPA*, 627 F.2d 416, 447 n.108 (D.C. Cir. 1980) (“That different industries may be subject to different standards and that the Administrator need not bear the burden of explaining those differences is clear.”).

C. Opacity-Based Emission Standard

During the copper smelting process, some HAP emissions evade the capture systems and are released into the atmosphere through roof-top vents spanning the length of the converter building or through exhaust fans. EPA addressed these emissions — the “fugitive” HAP emissions — by imposing a four percent opacity limit at building vents. Sierra Club objects that (1) opacity is not a surrogate for HAPs, and therefore EPA has failed to establish an emission standard for roof vents and exhaust fans, and (2) the opacity standard

cannot be defended as a work practice or operational standard under 42 U.S.C. § 7412(h)(1), because EPA has failed to meet the statutory prerequisites for imposing such a standard in lieu of an emission standard.

EPA's decision to use an opacity-based standard for fugitive HAP emissions is reasonable. Sierra Club focuses on a portion of EPA's response to public comment on the opacity-based standard — “we are using the opacity . . . as an indicator of converter capture system performance,” EPA Background Document, at 3-1 — to argue that EPA itself regarded the opacity limit as an operational standard, not an emission standard. Reading the entirety of the response, EPA's reasoning is clear:

Given that opacity is an indicator of the level of particulate matter emitted, designing and operating a copper converter capture system to minimize the visible emissions from the building will increase the amount of particulate matter captured and vented to a control device. Given that metal HAP emissions from copper converters behave as particulate matter, increasing the level of particulate matter emissions control will increase the level of metal HAP emissions control.

Id. at 3-2. Opacity measures PM and limiting PM reduces HAP emissions. In addition, limiting fugitive HAP emissions through opacity-based standards further controls HAP emissions by ensuring that the converter capture system is working well enough to make the PM standard meaningful — there is no sense focusing on the primary exhaust streams if most of the emissions go out the roof. *See id.* at 3-1. We have already accepted EPA's contention in another case, in response to an objection by Sierra Club, that “opacity monitoring promotes good operation and maintenance, which in turn reasonably ensure compliance with the PM standard.” *National Lime*, 233 F.3d at 635. We have no reason to question it here.

EPA established the opacity-based standard according to the approach mandated by statute, basing it “on the average of the test data for the five best performing sources.” Final

Rule, 67 Fed. Reg. at 40,485. EPA’s opacity-based standard is an emission standard that is accordingly both reasonable and lawful.

III. Challenges to Final Standards

A. EPA’s Rejection of Beyond-the-Floor Standards

The CAA requires — as a second step in the technology-based analysis — that EPA consider whether beyond-the-floor standards are necessary under Section 7412(d)(2) to augment the minimum standard set under Section 7412(d)(3). When considering whether to implement any such additional measures, EPA must “tak[e] into consideration the cost of achieving such emission reduction, and any non-air quality health and environmental impacts and energy requirements.” 42 U.S.C. § 7412(d)(2).

1. Sierra Club challenges EPA’s rejection of ore selection as a basis for imposing a beyond-the-floor standard. It argues that EPA should require primary copper smelters to use cleaner copper ore in order to achieve “the maximum degree of reduction in HAPs” under Section 7412(d)(2). Pet. Br. at 32. EPA argued that it properly rejected ore-switching as a beyond-the-floor measure because (1) it is not permitted to consider ore-switching as a control strategy, and (2) substitution of cleaner ore stocks is not feasible. Resp. Br. at 28–29.

The CAA specifically includes “substitution of materials” as one of the means of reducing pollution, 42 U.S.C. § 7412(d)(2)(A), lending support to Sierra Club’s view that EPA should have considered ore-switching. Legislative history, however, may be consulted to “shed new light on congressional intent, notwithstanding statutory language that appears superficially clear.” *National Rifle Ass’n v. Reno*, 216 F.3d 122, 127 (D.C. Cir. 2000) (internal quotation marks omitted). EPA directs the court to the 1990 Amendments “Conference Committee Report” to support its contention

that it is not permitted to consider ore-switching. *See* Resp. Br. at 28.¹ The Joint Explanatory Statement provides:

For categories and subcategories of sources of [HAPs] engaged in mining, extraction, beneficiation, and processing of nonferrous ores, concentrates, minerals, metals, and related in-process materials, the Administrator shall not consider the substitution of, or other changes in, metal- or mineral-bearing raw materials that are used as feedstocks or material inputs . . . in setting emission standards, work practice standards, operating standards or other prohibitions or requirements or limitations under this section for such categories and subcategories.

Joint Explanatory Statement of the Committee of Conference, H.R. Rep. No. 101-952, at 339 (1990).

We need not resolve the statutory question, however, because EPA explained that the substitution of cleaner ore stocks was not, in any event, a feasible basis on which to set emission standards. Metallic impurity levels are variable and unpredictable both from mine to mine and within specific ore deposits, Proposed Rule, 63 Fed. Reg. at 19,592/2-3, thereby precluding ore-switching as a predictable and consistent control strategy. EPA also determined that “there are no commercial-scale pretreatment processes available for removing or reducing the metallic HAP contained in the copper concentrate.” *Id.* at 19,601. We conclude that EPA reasonably refused to set beyond-the-floor standards that were based on a requirement that smelters switch ore supplies.

2. Sierra Club also challenges EPA’s refusal to set beyond-the-floor PM limits for fugitive HAP emissions at the 1986 national emission standard for HAPs (NESHAP) level

¹ EPA actually cites to the “Joint Explanatory Statement” that accompanied the Conference Committee Report. The Joint Explanatory Statement describes how the differences between the Senate and House were resolved in the Conference Committee. *See Roeder v. Islamic Republic of Iran*, 333 F.3d 228, 236 (D.C. Cir. 2003). The Joint Explanatory Statement may be helpful in determining Congress’s intent, but does not carry the same weight as the Conference Committee Report itself. *See id.* at 236-37.

for copper smelters. According to Sierra Club, EPA's refusal was arbitrary and capricious, because the 1986 NESHAP is "an achievable standard" under Section 7412(d)(2). *See* Pet. Br. at 33.

The 1986 NESHAP level reflects emission standards promulgated under a risk-based methodology — the methodology used prior to the 1990 Amendments' switch to technology-based standards. The CAA now requires that beyond-the-floor standards be achievable and provides a framework for analyzing achievability, including consideration of cost, energy requirements, and other factors. 42 U.S.C. § 7412(d)(2). The 1986 NESHAP standard did not go through that process. When the 1986 NESHAP standard was proposed, only one smelter was actually subject to it, and that smelter ceased operations in 1985, before the standard took effect. National Emissions Standards for Hazardous Air Pollutants: Standards for Inorganic Arsenic, 51 Fed. Reg. 27,956, 27,957 (Aug. 4, 1986) (codified at 40 C.F.R. pt. 61).² EPA acted reasonably in not adopting a beyond-the-floor standard promulgated under a totally different risk-based regime with very limited evidence of achievability.

3. Sierra Club also argues that the final regulation is arbitrary and capricious because EPA failed to respond to a commenter's contention that a beyond-the-floor standard of 23 mg/dscm should be set for copper concentrate dryers. The commenter argued that "one state air permit limits dryer PM emissions to 23 mg/dscm," so the limit was "evidently achievable." Arizona Center for Law in the Public Interest, A-96-22 Item No. IV-D-8, Comments on Proposed National Emissions Standards for Primary Copper Smelters 7 (July 20, 1998). EPA specifically noted the commenter's contention. EPA Background Document, at 2-9. Indeed, EPA factored the 23 mg/dscm limit in to its determination of the 50

² The emission standard provided by the 1986 NESHAP only applies if specific arsenic feed rates are exceeded. 40 C.F.R. § 61.172. No existing copper smelters reach that threshold and none are subject to that standard. Proposed Rule, 63 Fed. Reg. at 19,586.

mg/dscm limit achieved by the five best-performing sources. *Id.* at 2-11. EPA then went on to explain that “there are no reasonable alternatives beyond the MACT floor for control of process particulate emissions from existing copper concentrate dryers.” *Id.* Simply asserting, as the commenter did, that the state permit limit was “evidently achievable” did not compel any additional rejoinder from EPA. As we recently explained in rejecting another effort to fault EPA for not considering beyond-the-floor measures:

There . . . doesn’t appear to be any evidence in the record about the costs of the pollution prevention measures the Sierra Club advocates. In the absence of any type of quantification of benefits or costs, the Administrator had no basis for finding that, “taking into account the cost,” emissions reductions from pollution prevention programs were “achievable” as the statute uses the word.

Sierra Club, 167 F.3d at 666. Accordingly, we reject Sierra Club’s challenge to the adequacy of EPA’s response to this particular comment.

B. Non-Air Quality Environmental Effects

Sierra Club alleges that EPA refused to consider “non-air quality health and environmental impacts,” as required under Section 7412(d)(2). Sierra Club interprets this provision to require EPA to consider the “impacts of deposition, persistence, toxicity and bioaccumulation of metal HAP emissions on people, wildlife and the environment.” Pet. Br. at 36. In other words, “non-air quality . . . impacts” are just like air quality impacts, except that the impact is not delivered directly through the air but instead, for example, by “deposition” — the eventual settling of HAPs on the ground. EPA takes a different view — that “‘non-air quality . . . impacts’ refers to any health and environmental impacts . . . that may result directly or indirectly from measures that will achieve the emission reductions.” Resp. Br. at 31. In other words, “non-air quality . . . impacts” are those that result from the required efforts to *control* the air quality impacts of the underlying manufacturing process.

Congress did not define “non-air quality . . . impacts,” so we will defer to EPA’s construction of the ambiguous statutory language, so long as it is reasonable. *Chevron U.S.A., Inc. v. NRDC*, 467 U.S. 837, 842–43 (1984). It is. The statute groups consideration of “non-air quality . . . impacts” with consideration of “the cost of achieving such emission reduction” and “energy requirements.” 42 U.S.C. § 7412(d)(2). This context strongly supports EPA’s interpretation of “non-air quality . . . impacts” to mean the by-products of the control technology — just as additional cost or energy needs are by-products of controlling air quality impacts. *See Washington State Dep’t of Soc. & Health Servs. v. Guardianship Estate of Keffeler*, 537 U.S. 371, 384–85 (2003).

Second, there is no apparent reason to suppose that Congress would have required immediate consideration of health and environmental impacts caused by, say, deposition of HAPs, while postponing consideration of the more direct health and environmental impacts caused by emission of HAPs into the air until the second stage of standard promulgation under the CAA. As discussed, the 1990 Amendments established a two-phase approach to promulgating emission standards. The first phase — at issue in this case — requires a technology-based approach. *See* 42 U.S.C. § 7412(d). The second phase occurs eight years later and involves a risk-based approach. *See id.* § 7412(f)(2)(A) (“Emissions standards promulgated under this subsection shall provide an ample margin of safety to protect public health . . .”). That risk-based analysis requires EPA to consider, *inter alia*, public health and adverse environmental effects, *id.* — precisely what Sierra Club contends EPA must consider *now* with respect to non-air quality impacts. Sierra Club’s interpretation would collapse the technology-based/risk-based distinction at the heart of the Act, undermining the central purpose of the 1990 Amendments — to facilitate the near-term implementation of emission standards through technology-based solutions. In doing so, that interpretation would reintroduce the very problem Congress sought to exorcise — that the pursuit of the perfect (risk-

based standards) had defeated timely achievement of the good (technology-based standards). EPA's reading of the statute is reasonable.

IV. Monitoring

EPA's monitoring requirements must "provide a reasonable assurance of compliance with emissions standards." *Natural Res. Def. Council, Inc. v. EPA*, 194 F.3d 130, 136 (D.C. Cir. 1999) (*NRDC*). Sierra Club argues that the parameter monitoring required by EPA can provide such assurance only if the monitored control device is the only factor affecting emissions — in contrast to this case, where strength, temperature, and content of gas streams allegedly also affect emissions. Pet. Br. at 43. That argument is waived because it was not raised below: the record sections cited by Sierra Club in its brief, *see id.*, refer only to pre-proposal letters — not public comments on the Proposed Rule — and are therefore inadequate to preserve the argument for consideration here. *See* 42 U.S.C. § 7607(d)(7)(B) ("Only an objection to a rule or procedure which was raised . . . during the period for public comment . . . may be raised during judicial review.").

Sierra Club also argues that EPA's failure to require continuous monitoring violates Section 7414(a)(3), which provides that EPA, with respect to major stationary sources — and copper smelters are certainly those — "shall . . . require enhanced monitoring." *Id.* § 7414(a)(3). But the CAA itself provides that "continuous emissions monitoring need not be required if alternative methods are available that provide sufficiently reliable and timely information for determining compliance," *id.* § 7661c(b), and this court has already rejected claims that Section 7414(a)(3) requires continuous monitoring. *See NRDC*, 194 F.3d at 135 ("Nothing in the phrase 'enhanced monitoring' supports [the] view that only continuous or direct emissions monitoring can be regarded as 'enhanced' . . .").

To ensure "sufficiently reliable and timely information for determining compliance," EPA imposed monitoring requirements in this case: smelters must (1) demonstrate initial

compliance through performance testing, proving achievement of emission standards; (2) continuously monitor operating parameters, and show that the facility operates within those parameters; (3) repeat performance tests at least annually; (4) comply with inspection and maintenance requirements for the control devices; and (5) maintain monitoring data and submit compliance reports. *See* 40 C.F.R. §§ 63.1450–.1455. EPA determined that such a regime of parameter monitoring would assure compliance with the standards it was imposing. “[B]ecause analysis of this issue requires a high level of technical expertise, we must defer to the informed discretion of the Agency.” *National Lime*, 233 F.3d at 635 (internal quotation marks omitted).

Sierra Club also objects that EPA failed to *explain* adequately its decision not to require continuous emissions monitoring (CEMS) or continuous opacity monitoring (COMS) in light of its usual preference for continuous monitoring. As noted, EPA has broad discretion in selecting a monitoring regime that ensures compliance. *See id.* There is no presumption in favor of any particular type of monitoring, *see NRDC*, 194 F.3d at 136–37, and EPA has imposed different monitoring requirements in different situations. EPA reasonably articulated the basis for its decision, explaining that “we are using control device operating parameter monitoring to verify that the control device continues to operate at the same set of conditions as the device was operating when the required emissions testing was performed to demonstrate compliance with the applicable limit.” EPA Background Document, at 5-4. The use of parameter monitoring verifies compliance with the required standard by showing that the control device continues to operate at the level achieved during emissions testing. We have no basis for second-guessing EPA’s judgment that the regime it imposed would meet the statutory standard of “sufficiently reliable and timely information for determining compliance.” 42 U.S.C. § 7661c(b); *see Consumer Elec. Ass’n v. FCC*, 347 F.3d 291, 304 (D.C. Cir. 2003) (“We will not . . . second-guess the [agency’s] weighing of costs and benefits.”).

V. Endangered Species Act

Finally, Sierra Club claims that EPA violated the Endangered Species Act (ESA), 16 U.S.C. §§ 1531–1544. Noting that the ESA requires government agencies to consult with the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) before taking action that could affect endangered species, *see id.* § 1536(a)(2), Sierra Club argues that EPA should have consulted FWS and NMFS before promulgating the primary copper smelter emission regulations.

As explained above, the CAA requires EPA to undertake a two-phase process for promulgating regulations to reduce HAP emissions. EPA considers “adverse environmental effect[s]” only during the second, risk-based phase. 42 U.S.C. § 7412(f)(2)(A). The statute specifically defines the term “adverse environmental effect” to include “any significant and widespread adverse effect, which may reasonably be anticipated, . . . on populations of endangered or threatened species.” *Id.* § 7412(a)(7).

Congress, therefore, expressly channeled consideration of endangered species to the second phase of CAA standard promulgation. The rulemaking in this case involves the first phase. Once again, Sierra Club would collapse the separate technology-based/risk-based phases of the statute into a single analysis. We reject that effort, which would undo what the 1990 Amendments sought to accomplish. EPA’s determination to postpone consultation under the ESA to the second stage of regulation under the CAA was a reasonable one and not contrary to law.

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The petition for review is denied.