IN THE
UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

NATURAL RESOURCES DEFENSE COUNCIL, INC., Petitioner, v. U.S. ENVIRONMENTAL PROTECTION AGENCY and LEE THOMAS, Administrator, U.S. Environmental Protection Agency, Respondents, and THE VINYL INSTITUTE, A Division of The Society of the Plastics Industry, Intervenor.	No. 85-1150

ON PETITION FOR REVIEW OF FINAL ACTION OF
THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

BRIEF OF AMICI CURIAE ALABAMA POWER COMPANY, ET AL., ON BEHALF OF RESPONDENTS

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Dated: April 13, 1987

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BRIEF OF AMICI CURIAE ALABAMA
POWER COMPANY, ET AL., ON BEHALF OF RESPONDENTS

This brief is submitted by amici curiae Alabama Power Company, et al. (collectively, "Electric Utilities"), on behalf of Respondents, U.S. Environmental Protection Agency ("EPA" or "the Agency") and Lee Thomas, Administrator of EPA. A motion to participate as amici curiae in this case is being submitted concurrently pursuant to Rules 27 and 29 of the Federal Rules of Appellate Procedure.

ISSUE PRESENTED FOR REVIEW

Whether the Clean Air Act[1/] prohibits the Administrator of EPA from considering costs and technological feasibility in making decisions regarding the setting of emission standards under § 112 of the Act.

STATEMENT OF RELATED CASES

This case has not previously been before this Court. The case was decided by a panel of the Court on November 4, 1986, Natural Resources Defense Council, Inc. v. EPA, 804 F.2d 710 (D.C. Cir. 1986), vacated upon grant of reh'g en banc, 810 F.2d 270 (D.C. Cir. 1987) (en banc).

Two other cases pending before this Court involve EPA actions under § 112 of the Clean Air Act and raise issues similar to those presented in this case. Those cases are Environmental Defense Fund, Inc. v. Thomas, Nos. 84-1524, et al., involving EPA decisions regarding § 112 regulation of radionuclides, and Natural Resources Defense Council, Inc. v. Thomas, Nos. 84-1387, et al., involving EPA decisions regarding § 112 regulation of benzene. Also pending before this Court are petitions for review of EPA decisions regarding § 112 regulation in two other proceedings, Natural Resources Defense Council, Inc. v. Thomas, No. 86-1532 (inorganic arsenic), and Environmental Defense Fund,

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1/ 42 U.S.C. § 7401, et seq. (1982). The Clean Air Act is sometimes referred to hereinafter as "CAA" or "the Act." All citations to the Act will be to sections of the Act rather than the United States Code; references to both appear in th Table of Authorities.

Inc. v. EPA, Nos. 86-1634, et al. (radon-222 emissions from licensed uranium mill tailings). All of these cases are being held in abeyance by this Court.[2/]

INTEREST OF AMICI

Alabama Power Company and the other 67 electric utility companies that join in this amici curiae brief generate most of the electricity produced in the United States. Amicus Edison Electric Institute ("EEI") is the trade association of investor-owned electric utilities. Amicus American Public Power Association ("APPA") is the national service organization that represents publicly owned electric utility systems in the United States. Amicus National Rural Electric Cooperative Association ("NRECA") represents the interests of rural electric cooperatives throughout the United States.

Electric Utilities operate, or represent operators of, coal-fired boilers and other electric generating plants that are subject to regulation under several provisions of the Clean Air Act. One of the principal Clean Air Act proceedings in which Electric Utilities have participated is a § 112 proceeding addressing emissions of radionuclides.[3/] As explained below, a legal issue of central importance in the radionuclides proceeding

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2/ See infra note 19.

3/ Section 112 of the Act authorizes EPA to regulate emissions of "hazardous air pollutants." See infra pp. 9-10.

is the same issue that is before this Court in the instant case involving EPA's § 112 decisions on vinyl chloride.

In the radionuclides proceeding, EPA investigated whether § 112 regulation of emissions of radionuclides from, inter alia, coal-fired power plants was needed.[4/] The Administrator concluded in 1984 that § 112 regulation of radionuclide emissions from these plants was unwarranted, and accordingly made a final decision not to promulgate a § 112 standard for this category of sources of radionuclide emissions.[5/]

In making this decision, the Administrator concluded that existing levels of radionuclide emissions from coal-fired boilers are consistent with the requirements of § 112 and of the Act generally, since existing regulation of particulate matter emissions adequately controls radionuclide emissions from this source category.[6/] In deciding not to impose additional controls

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4/ Radionuclides -- a large group of chemical isotopes that emit radiation in varying degrees -- occur naturally in very low concentrations in the coal that is found in the earth's crust. The combustion of coal in a power plant's boiler results in the release of these naturally occurring radionuclides in the form of "fly ash," or "particulate matter." Minute quantities of these radionuclides are emitted with the small portion of the fly ash not captured by the plant's particulate control equipment. See 49 Fed. Reg. 43,913 col. 2 (1984). (Excerpts from EPA's proposed decision, 48 Fed. Reg. 15,076 (1983), and final decision on radionuclide emissions from coal-fired boilers, 49 Fed. Reg. 43,906 (1984), are contained in Appendices A and B to this brief.)

5/ See 49 Fed. Reg. 43,907 col. 3 (1984).

6/ See id. at 43,907 col. 3, 43,913 cols. 1, 2.

on these sources under § 112, the Administrator considered the costs and technological feasibility of an emission standard,[7] but made clear that "the protection of public health was the primary consideration in reaching this decision."[8]

The Administrator's radionuclides decision was challenged in this Court by, among others, the petitioner in the present case, Natural Resources Defense Council, Inc. ("NRDC"),[9] and Electric Utilities intervened in support of the Administrator's decision. NRDC and its copetitioners claimed, inter alia, that the decision was unlawful because the Administrator considered costs and technological feasibility, factors that NRDC and the other environmental petitioners argued may never be taken into account, even as secondary factors, by EPA in making regulatory decisions under § 112.[10] Electric Utilities argued that "§ 112 does not prohibit the Agency from considering costs and feasibility as a secondary factor in choosing among regulatory options that satisfy the health protection goal of § 112."[11]

7/ See id. at 43,913 cols. 1, 2.

8/ Id. at 43,913 col. 3; see also id. at 43,909 col. 1.

9/ See Environmental Defense Fund, Inc., et al. v. Thomas, Nos. 84-1524, et al. (D.C. Cir. filed Oct. 23, 1984).

10/ See Brief of Petitioners Environmental Defense Fund, Natural Resources Defense Council, and Sierra Club ("Environmental Petitioners") at 52-54 (filed Oct. 9, 1985), Reply Brief of Environmental Petitioners at 1-27 (filed Feb. 25, 1986), Nos. 84-1524, et al. (D.C. Cir.).

11/ Brief for Respondent-Intervenors Alabama Power Co., et al., at 59, Nos. 84-1524, et al. (D.C. Cir. filed Jan. 13, 1986) (footnote omitted) (hereinafter "Initial Radionuclides Brief").

After a panel of this Court on November 4, 1986, rejected NRDC's arguments on costs and feasibility in the vinyl chloride case,[12] the Court invited the parties in the radionuclides case to submit supplemental briefs addressing the effect of its November 4 decision on that case.[13] In response, NRDC and its copetitioners in the radionuclides case filed briefs repeating their argument that EPA is wholly precluded from considering costs and feasibility in making regulatory decisions under § 112.[14] NRDC also argued that affirming EPA's action on vinyl chloride "will have broad consequences" for other § 112 cases, including the radionuclides case, pending before this Court.[15]

Electric Utilities filed a supplemental brief in the radionuclides case, arguing that the Court's November 4 decision properly recognized that the Act authorizes EPA to consider costs

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12/ See Natural Resources Defense Council, Inc. v. U.S. Environmental Protection Agency, 804 F.2d 710 (D.C. Cir. 1986), vacated upon grant of reh'g en banc, 810 F.2d 270 (D.C. Cir. 1987) (en banc).

13/ Order of Nov. 5, 1986, Nos. 84-1524, et al. (D.C. Cir.).

14/ See Supplemental Brief for NRDC on Generic Issues, Nos. 84-1387, et al. (D.C. Cir. filed Nov. 20, 1986) (hereinafter "NRDC Supplemental Brief"); Supplemental Brief of Petitioners Environmental Defense Fund, Sierra Club, State of Ohio and Manasota-88 on Issues Specific to Radionuclides Rulemaking, Nos. 84-1524, et al. (D.C. Cir. filed Nov. 19, 1986).

15/ NRDC Supplemental Brief at 3-4 & n.5. NRDC repeated this point in its petition for rehearing and suggestion for rehearing en banc in the present case. See Petition for Rehearing and Suggestion for Rehearing en Banc at 2 & n.2, No. 85-1150 (D.C. Cir. filed Dec. 15, 1986).

and feasibility in choosing among health-protective regulatory options under § 112.[16/] Electric Utilities also argued that this authority extends to any Agency decision not to set a § 112 standard where existing levels of emissions are consistent with the statutory requirements.[17/]

Following its January 28, 1987, order granting rehearing en banc in the present case on the cost and feasibility issue, the Court postponed oral argument in the radionuclides case pending further order.[18/]

Thus, the Court has (1) received briefs in the radionuclides case on the effect of its decision upholding EPA's consideration of costs and feasibility under § 112, (2) announced that it will address the cost and feasibility issue en banc in the present case, and (3) postponed indefinitely further proceedings in the radionuclides case. Given these developments, and given the Court's framing of the question on rehearing as a generic § 112 question rather than one confined to the facts of the present proceeding, the full Court's resolution of the present case may well control the resolution of NRDC's challenge to EPA's decision on radionuclide emissions from coal-fired

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16/ See Supplemental Brief of Respondent-Intervenors Alabama Power Company, et al., Nos. 84-1524, et al. (D.C. Cir. filed Nov. 20, 1986).

17/ Id. at 10-12; see also infra p. 18.

18/ See Order of Feb. 13, 1987, Nos. 84-1524, et al. (D.C. Cir.).

boilers.[19/] The way in which the Court disposes of that challenge is of immediate and direct concern to Electric Utilities.[20/] Consequently, Electric Utilities have a manifest interest in presenting their views to the Court in this case.

PRELIMINARY STATEMENT

EPA's § 112 proceeding on radionuclides was the most extensive and comprehensive § 112 proceeding that the Agency has conducted. In reaching its 1984 final decision on coal-fired power plants and other sources, EPA provided a fully developed explanation of its construction of the Clean Air Act as allowing consideration of costs and feasibility as secondary factors in § 112 rulemaking.[21/] This explanation of the Agency's

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19/ Aside from the now-vacated decision of the panel in the present case, no judicial opinion has expressly construed the scope of the Administrator's authority in making regulatory decisions under § 112. The Court is holding in abeyance the other § 112 cases before it pending rehearing en banc in the present case. See Order of Feb. 13, 1987, Nos. 84-1387, et al. (D.C. Cir.) (benzene); Order of Nov. 12, 1986, No. 86-1532 (D.C. Cir.) (inorganic arsenic); Order of March 18, 1987, Nos. 86-1634, et al. (D.C. Cir.) (radon-222 emissions from licensed uranium mill tailings). Therefore, the Court's en banc decision in the present case likely will be the first to address a central issue raised by NRDC's challenge to EPA's radionuclides decision regarding coal-fired boilers.

20/ EPA found that imposition of § 112 controls on coal-fired boilers to further reduce radionuclide emissions would, even if confined to older plants, cost the utility industry $13 billion (in 1982 dollars) in capital outlays and $3.4 billion in annual costs. See Initial Radionuclides Brief at 24.

21/ See 48 Fed. Reg. 15,078 col. 2-15,079 col. 3, 15,085 col. 3-15,086 col. 2 (1983); 49 Fed. Reg. 43,909 cols. 1-2, 43,913 cols. 2-3 (1984).

construction of the Act is more complete than that provided in its announcement of its 1985 decision to withdraw proposed revisions to the vinyl chloride § 112 standard, and this construction appears to have formed the basis for that decision.[22/] Therefore, the statement of the case and arguments in this brief will assist this Court's resolution of the issue in this case by providing additional insight into the Agency's interpretation of § 112 to permit consideration of costs and technological feasibility as secondary factors in the vinyl chloride case and in other § 112 cases, such as the radionuclides case, pending before panels of this Court.

STATEMENT OF THE CASE

Title I of the Clean Air Act provides for the development of a comprehensive regulatory program, to be administered by EPA, "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population."[23/] To implement this fundamental objective, Congress authorized EPA to make decisions regarding, inter alia, regulation of "hazardous" air pollution under § 112 of the Act.

22/ See 50 Fed. Reg. 1183 col. 3-1184 col. 1 (1985); see also 51 Fed. Reg. 34,907 col. 1 (1986).

23/ CAA § 101(b)(1).

After the Administrator lists a substance as a "hazardous air pollutant" under § 112,[24] he must "publish proposed regulations establishing emission standards for such pollutant," and then either find that the pollutant clearly is not a hazardous air pollutant or "prescribe an emission standard for such pollutant."[25] Section 112 directs the Administrator to "establish any such standard at the level which in his judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant."[26]

I. EPA'S RADIONUCLIDES PROCEEDING

The Administrator in 1979 added radionuclides to the § 112 list of hazardous air pollutants.[27] In 1983, EPA proposed § 112 standards governing radionuclide emissions from four categories of sources, and proposed not to adopt standards for coal-fired boilers and four other source categories.[28] The

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24/ To list a substance as a hazardous air pollutant, the Administrator must: (1) determine that the substance is "an air pollutant to which no ambient air quality standard is applicable [under §§ 108-110 of the Act] and which in the judgment of the Administrator causes, or contributes 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," see id. § 112(a)(1) (emphasis added); and (2) "intend[] to establish an emission standard" governing that pollutant under § 112, see id. § 112(b)(1)(A).

25/ Id. § 112(b)(1)(B).

26/ Id. (emphasis added).

27/ See 44 Fed. Reg. 76,738 (1979).

28/ See 48 Fed. Reg. 15,076 (1983).

Agency reasoned that existing controls on particulate matter, of which radionuclides form a small part,[29/] adequately control radionuclide emissions from coal-fired boilers, and that health risks from the small amount of radionuclides released from these sources are very low.[30/] EPA also found that reducing the already low level of risks would cost billions of dollars.[31/]

EPA in 1984 made final its proposed decision not to impose additional controls on coal-fired boilers' radionuclide emissions. EPA reported no evidence that radionuclide emissions from coal-fired boilers had been demonstrated to cause any cancers. Indeed, the Agency determined that the risk of any adverse health effects occurring as a result of these emissions was exceedingly small.

EPA estimated that the maximum individual lifetime risk of contracting fatal cancer as a result of exposure to radionuclide emissions from coal-fired power plants was one in one million[32/] -- a risk no greater than that posed by such activities as living two months in a stone or brick building (radiation from the stone or brick) or drinking a half liter of wine a year (cirrhosis of the liver).[33/] Indeed, EPA's estimated

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29/ See supra note 4.

30/ See 48 Fed. Reg. 15,085 col. 3-15,086 col. 2 (1983).

31/ See id. at 15,086 col. 1.

32/ 49 Fed. Reg. 43,913 col. 2 (1984).

33/ See Initial Radionuclides Brief at 48.

maximum individual radiation dose from coal-fired power plants is so small as to be literally immeasurable,[34] and is overwhelmed even by normal variations in background levels.[35]

EPA also found that the total projected risk from these emissions was "about two fatal cancers per year, spread over the entire U.S. population."[36] The health "risk" represented by this estimate is little more than a theoretical construct -- a mathematical summation of very small individual health risks across the relevant population. Indeed, EPA's population risk estimate of 2 incidents per year spread across the entire United States population is so small that at least 3.2 million years of direct observation of two such populations (one with, and one without, radionuclide emissions from coal-fired boilers) would be required to determine whether EPA's projection was correct.[37] Given these extraordinarily small and unproven risks, the Agency concluded that "existing regulations protect the public health

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34/ See id. at 26 n.79.

35/ Using a highly conservative methodology, EPA estimated that the **maximum** dose to any individual from coal-fired power plants is 1 millirem per year (mrem/yr). See 49 Fed. Reg. 43,913 col. 2 (1984). In contrast, most people typically are exposed to "background" radiation doses of 150 to 300 mrem/yr to the whole body and receive an additional 50 to 90 mrem/yr from medical sources. See Initial Radionuclides Brief at 10 & n.30; see also id. at 21 & n.65.

36/ 49 Fed. Reg. 43,913 col. 2 (1984).

37/ See Initial Radionuclides Brief at 51.

with an ample margin of safety as far as radionuclide emissions [from coal-fired power plants] are concerned."[38/]

EPA also considered, as an alternative to acceptance of these risks, § 112 regulation to require further reductions in emissions through application of available control technology.[39/] The Agency concluded that reducing these extremely small risks to even lower levels through such regulation would be extraordinarily expensive. As EPA found, additional controls at coal-fired power plants could prevent one theoretical predicted cancer death per year at a very real cost of $3.4 billion annually.[40/] This sum is over twice as much as the amount spent each year in the United States on hospital care for cancer patients, over four times the 1983 budget of the National Cancer Institute, and about four times the federal government's annual expenditures on cancer research.[41/] The Agency considered these facts in rejecting this

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38/ 49 Fed. Reg. 43,913 col. 3 (1984).

39/ See 48 Fed. Reg. 15,086 col. 1 (1983).

40/ See Initial Radionuclides Brief at 24-25.

41/ See id. at 25. Moreover, control expenditures of this magnitude could increase, not decrease, risks to public health (e.g., from accidents occurring during construction and installation of additional pollution control equipment and from reductions in consumers' disposable income due to higher energy costs). See id. & n.75; cf. Union Electric Co. v. EPA, 427 U.S. 246, 272 (1976) (Powell, J., concurring) (noting that stringent emission controls could be so costly or infeasible as to require utility generating plants to close, shutting off the supply of electricity and causing "an even more serious impact on the health of the public than that created by a decline in ambient air quality").

regulatory alternative of imposition of additional emission controls.[42/]

In sum, EPA in its radionuclides proceeding was confronted with no evidence of demonstrated adverse health effects from coal-fired boilers' radionuclide emissions, and found compelling evidence that any public health risk from those emissions was extremely small. The Agency also determined that controlling emissions to reduce this very small health risk would cost billions of dollars year after year. EPA gave primary consideration to the absence of any significant health risk, and secondary consideration to the enormous costs of control, in deciding not to impose further controls on this source category under § 112.

II. EPA'S INTERPRETATION OF § 112

EPA, in the radionuclides proceeding, made clear that it based its decision not to regulate under § 112 primarily on the exceedingly small projected health risk. The Administrator also explained, however, that he took into account, as a secondary consideration, the inordinately high costs of additional emission controls and the difficulty of achieving those additional controls, in rejecting the alternative of adopting § 112 regulations that would require further emission reductions.

42/ See 49 Fed. Reg. 43,913 col. 2 (1984); 48 Fed. Reg. 15,086 col. 1 (1984).

The Administrator first explained that "Congress did not describe the degree of protection that provides an ample margin of safety, nor did it describe [in § 112] what factors the Administrator should consider in making these judgments."[43/] Given this lack of explicit statutory direction, the Administrator stated, "EPA considers those factors it believes are necessary to make reasonable judgments on whether standards are needed and, if so, at what level they should be established."[44/] Among these factors are the costs of control and the feasibility of control (e.g., "the availability and practicality of control equipment").[45/] With respect specifically to coal-fired boilers, the Administrator explained that "it is not reasonable to avoid considering cost and practicality of control technology."[46/]

At the same time, EPA made clear that its consideration of costs and feasibility was consistent with the primary objective of § 112 -- protection of the public health with an ample margin of safety. The Administrator recognized that "Congress clearly intended that public health protection considerations be primary and that cost be secondary."[47/] As EPA

43/ 48 Fed. Reg. 15,078 col. 3 (1983) (emphasis added).

44/ Id. (emphasis added).

45/ 49 Fed. Reg. 43,909 col. 1 (1984).

46/ Id. at 43,913 col. 3.

47/ Id. at 43,909 col. 1. Thus, the Administrator stated that "giving equal weight to costs and benefits is inappropriate" in making § 112 regulatory decisions. Id.

explained, costs and feasibility constitute but one of several factors that the Agency takes into account in ensuring that its decisions for each source category "provide public health protection that is consistent with the intent of the . . . Clean Air Act."[48/] Specifically, in announcing his decision on coal-fired boilers, the Administrator made clear that "the protection of public health was the primary consideration in reaching this decision."[49/]

In short, the Administrator in the radionuclides proceeding construed § 112 and the Act as a whole to allow him to take the costs and feasibility of emission control into account when choosing among regulatory alternatives that satisfy the primary health-protection objective of § 112. Under this construction of the statute, costs and feasibility serve a distinctly "limited" function:[50/] they are among those factors that help the Administrator determine how to "make reasonable judgments"[51/] on which regulatory course to select among those that satisfy the primary health protection requirement of § 112,

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48/ 48 Fed. Reg. 15,079 col. 1 (1983). These factors also include: individual exposure and health risk; cumulative exposure and health risk to populations near sources; the likelihood of future increases in emissions and health risks; and "[t]he effect of current standards under the Act or other applicable legislative authorities." Id.

49/ 49 Fed. Reg. 43,913 col. 3 (1984).

50/ Id. at 43,909 col. 1.

51/ 48 Fed. Reg. 15,078 col. 3 (1983).

and ensure that the Agency's decision will be "consistent with the intent of the . . . Clean Air Act."[52/]

ARGUMENT

Section 112 does not tell the Administrator what specific substances must be listed as hazardous air pollutants. It does not tell him how many categories of sources must be made subject to emission standards, or how many emission standards must be established, for a listed pollutant. It does not tell him at what specific level emissions must be limited. And it does not tell him that he must prohibit or regulate emissions from a given source category under § 112 if he determines that prohibition or regulation is unnecessary to protect the public health with "an ample margin of safety."[53/]

52/ Id. at 15,079 col. 1. Although EPA found that the purposes of § 112 and the Act as a whole would be fulfilled by not adopting a § 112 standard for radionuclide emissions from coal-fired boilers, the Agency has promulgated § 112 standards for radionuclide emissions from other source categories. See, e.g., 40 C.F.R. §§ 61.20-.28 (1986) (standard for underground uranium mines); 51 Fed. Reg. 34,066 col. 1-34,067 col. 3 (1986) (to be codified at 40 C.F.R. §§ 61.250-.252) (standard for licensed uranium mill tailings). By establishing these standards, the Administrator has satisfied his duty to "prescribe an emission standard" for radionuclides once he listed them as hazardous air pollutants under § 112. See CAA § 112(b)(1)(B); supra p. 10.

53/ As EPA recognized in the radionuclides proceeding, § 112 "requires the Administrator to assure public health protection with an ample margin of safety. A negative determination of the need for standards [for a given source category] is permissible within the context of the Act, so long as this criterion is met." 49 Fed. Reg. 43,909 cols. 1-2 (1984).

Section 112 does tell the Administrator to set any emission standard that he decides is required "at the level which in his judgment provides an ample margin of safety to protect the public health from . . . [a listed] hazardous air pollutant."[54/] Given this statutory directive, where the Administrator judges that existing levels of emissions of the pollutant from a given source category are consistent with protection of the public health with an ample margin of safety, there is no need to establish an emission standard to satisfy the statutory requirement.[55/] Furthermore, where there is no need to establish an emission standard to satisfy § 112's health protection goal, the Act's general objectives may be best furthered by a decision not to impose additional controls.

54/ CAA § 112(b)(1)(B) (emphasis added).

55/ The Act calls on the Administrator to determine whether the existing level of emissions from a source category is consistent with the requirements of § 112. It is immaterial whether that level of emissions is due to an existing § 112 standard, existing emission controls under other statutory or regulatory authorities, or unregulated industry practice. As a result, an Agency decision whether to establish a § 112 standard for emissions of a given pollutant from a given source category (such as EPA's decision on radionuclide emissions from coal-fired boilers) is no different in substance from an Agency decision whether to revise, or to withdraw proposed revisions to, an existing § 112 standard (such as EPA's decision challenged in this case). In both circumstances, the Agency's decision must be consistent with the health protection objective of § 112. Thus, as long as EPA has established at least one emission standard for a listed pollutant, as it has for radionuclides, see supra note 52, it need not establish others if the statutory criteria are met.

I. THE ADMINISTRATOR MAY FIND THAT A RANGE OF RISK LEVELS IS CONSISTENT WITH § 112'S REQUIREMENT TO PROTECT THE PUBLIC HEALTH WITH AN AMPLE MARGIN OF SAFETY.

Section 112 does not mandate absolute protection of the public health from all risks that may be posed by emissions of a hazardous air pollutant. Section 112 requires EPA to make regulatory decisions that ensure that the public health is "safe[]" from harm caused by those emissions. As the Supreme Court has made clear in construing another health and safety statute, "'safe' is not the equivalent of 'risk-free.'"[56/]

Accordingly, an "ample margin of safety" cannot mean, and EPA has never interpreted the statute to require, the elimination

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56/ Industrial Union Dep't v. American Petroleum Inst., 448 U.S. 607, 642 (1980) (opinion of Stevens, J.); cf. Alabama Power Co. v. Costle, 636 F.2d 323, 360-61 (D.C. Cir. 1979), cited in 804 F.2d at 736 (Wright, J., concurring in part and dissenting in part) (recognizing that "it is well established that agencies have some limited discretion to refuse to regulate 'insignificant' harms"). As noted above, § 112 authorizes EPA to regulate only "hazardous air pollutants," defined as those substances that the Administrator determines cause or contribute to "air pollution" that "may reasonably be anticipated to result in an increase in mortality or an increase in serious . . . illness." CAA § 112(a)(1) (emphasis added). This cause-and-effect language ("result in") suggests that § 112 addresses those substances that produce serious, demonstrable harm to the public health. As described by Congress, § 112 regulation does not extend beyond that "limited number" of "extremely hazardous or toxic" substances that pose a "high risk" of very serious health effects, and does not apply to general combustion processes in which such substances "appear as pervasive but in almost immeasurably small quantities." The Environmental Policy Division of the Congressional Research Service of the Library of Congress, A Legislative History of the Clean Air Amendments of 1970 at 289 (1974) (hereinafter "1970 Legis. Hist.") (emphasis added).

of all risk. Rather, EPA has made § 112 regulatory decisions in a way that limits to an acceptable, or safe, level the risk that the public health will be subjected to serious harm.[57/] Thus, the Agency has concluded that it "may properly decline to regulate a category of sources that emit a pollutant listed under section 112 on the ground that the public health risk posed by emissions from sources in that category is not significant."[58/]

As the panel's opinion in this case recognizes, Congress' delegation to the Administrator to decide whether and how to regulate under § 112 is broad precisely because "[t]he statute nowhere defines 'ample margin of safety.'"[59/] The legislative history indicates only that the Administrator must ensure "'a reasonable degree of protection.'"[60/] The statute gives EPA no specific direction on how to ensure a reasonable degree of

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57/ See, e.g., 50 Fed. Reg. 1183 col. 3-1184 col. 1 (1985) (vinyl chloride); 49 Fed. Reg. 43,908 col. 2-43,909 col. 1 (1984) (radionuclides); 49 Fed. Reg. 23,559 cols. 1-3, 23,565 col. 2 (1984) (benzene); see also Memorandum from A. James Barnes, General Counsel, EPA, to the Administrator, Oct. 23, 1984 (filed as an attachment to EPA's Notice of Federal Register Filings, Sierra Club v. Ruckelshaus, No. C-84-0656-WHO (N.D. Cal. filed Oct. 23, 1984)), at 4 ("'Significance' [of risk] is a generally applicable legal standard endorsed by the Supreme Court in [Industrial Union Dep't, supra note 56] . . . and by the legislative history of the 1977 amendments of the [Clean Air] Act") (hereinafter "Barnes Memorandum") (Appendix C to this brief), cited in 49 Fed. Reg. 43,908 col. 2 n.1 (1984).

58/ Barnes Memorandum at 3.

59/ 804 F.2d at 716.

60/ Id. (quoting S. Rep. No. 1196, 91st Cong., 2d Sess. 10, reprinted in 1970 Legis. Hist. at 410) (emphasis by the Court).

protection from projected risks, but instead "brings the Administrator's discretion and judgment to bear on [the] scientific uncertainty" that is inherent in any estimate of public health risks.61/

Since, as EPA has recognized, § 112 does not demand absolute protection of the public health from all risks and does not "describe the degree of protection that provides an ample

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61/ Id. NRDC suggests that there is a distinction for purposes of § 112 regulation between "threshold" and "nonthreshold" pollutants, and asserts that all emissions of th latter must be banned. See, e.g., Brief for Petitioner at 14, 29-(filed June 17, 1985), Reply Brief for Petitioner at 18-19, 20-21 (filed Sept. 3, 1985), Brief for Petitioner on Rehearing at 4-5, 27-28 (filed March 16, 1987), No. 85-1150 (D.C. Cir.); Brief of Environmental Petitioners at 42 (filed Oct. 9, 1985), Reply Brief of Environmental Petitioners at 11-12 (filed Feb. 25, 1986), Nos. 84-1524, et al. (D.C. Cir.). Such a distinction is immaterial to resolution of the vinyl chloride and radionuclides cases, since both threshold and nonthreshold pollutants at very low ambient concentrations may not cause high or even significant public health risks. In any event, a substance can never definitively be said to be "nonthreshold," because smaller and smaller concentrations may always be tested in a search for a threshold. That is, whether a threshold in fact exists is, for most substances, probably unknowable.

For this reason, any suggestion that a meaningful distinction exists between a "nonthreshold pollutant" and an "apparent nonthreshold pollutant," see 804 F.2d at 722 n.7, is misguided. Cf. Industrial Union Dep't, 448 U.S. at 636 n.41 (observing that "[i]n light of the improbability of a person contracting cancer as a result of a single [exposure to one molecule of a carcinogen] . . ., a number of the scientists testifying on both sides of the issue agreed that every individual probably does have a threshold exposure limit below which he or she will not contract cancer"). Thus, even where "the Administrator may assume that some risk to health is probable at all concentrations, it is still up to him to decide what constitutes a reasonable degree of protection given that uncertainty does exist." 804 F.2d at 722 n.7 (emphasis added).

margin of safety,"[62] the Agency must assess what level of risk is acceptable within the terms of the statute. Thus, where the evidence does not demonstrate that the serious public health effects described in § 112[63] actually have occurred as a result of people's exposure to emissions of a substance from a source category, or that a "high risk" of such effects is posed by those emissions,[64] EPA may rationally find that public health would be protected with an ample margin of safety at existing emission levels.

In its § 112 proceedings, EPA has recognized that different regulatory alternatives may protect the public health with an ample margin of safety. For example, in the vinyl chloride proceeding, the Agency identified three emission limits that would be consistent with the "ample margin of safety" standard: (1) an emission limit of zero (i.e., a prohibition on emissions), which is "the only level of emissions which is known to be absolutely protective of health";[65] (2) an emission limit

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62/ 48 Fed. Reg. 15,078 col. 3 (1983).

63/ See supra note 24.

64/ See supra note 56.

65/ 42 Fed. Reg. 28,154 col. 3 (1977) (emphasis added); see 50 Fed. Reg. 1183 col. 3 (1985); 40 Fed. Reg. 59,534 col. 2 (1975).

of 5 parts per million (ppm);[66/] and (3) an emission limit of 10 ppm.[67/]

Similarly, in the radionuclides proceeding for coal-fired boilers, EPA identified a "zero emissions" strategy and a maximum control strategy as regulatory alternatives that could protect the public health with an ample margin of safety.[68/] In addition, the Agency determined that existing levels of radionuclide emissions from these sources are also consistent with the ample margin of safety standard and therefore that no § 112 regulation is necessary.[69/]

In short, § 112 is not a "single answer" statute. As EPA explained in the radionuclides proceeding, "Congress did not describe the degree of protection that provides an ample margin of safety."[70/] Determining that "degree of protection" is a legislative task that Congress in § 112 has delegated to EPA.[71/]

66/ See 50 Fed. Reg. 1184 col. 2 (1985); 42 Fed. Reg. 28,154 cols. 2, 3 (1977).

67/ See 50 Fed. Reg. 1184 col. 3 (1985); 41 Fed. Reg. 46,560 col. 1 (1976); 40 Fed. Reg. 59,536 cols. 1-2 (1975).

68/ See 48 Fed. Reg. 15,078 col. 3, 15,086 col. 1 (1983).

69/ See, e.g., 49 Fed. Reg. 43,908 col. 3, 43,913 col. 3 (1984).

70/ 48 Fed. Reg. 15,078 col. 3 (1983).

71/ As this Court has recognized, the Administrator necessarily has broad discretion under the Clean Air Act where, as here, his regulatory decisions "turn on choices of policy, on an assessment of risks, or on predictions dealing with matters on the frontiers of scientific knowledge." Amoco Oil Co. v. EPA, 501 F.2d 722, 741 (D.C. Cir. 1974).

Given the breadth of the Administrator's discretion under this delegation, he may well find that a range of risk levels will be consistent with the statutory objective of protection of the public health with an ample margin of safety. Accordingly, consistent with § 112, the Administrator may legitimately define -- as he did in the case of radionuclide emissions from coal-fired power plants -- a range of acceptable regulatory alternatives, one of which may be a decision not to impose additional emission controls on a given source category.

II. AN INTERPRETATION OF THE CLEAN AIR ACT TO ALLOW CONSIDERATION OF COSTS AND FEASIBILITY IN CHOOSING AMONG OTHERWISE ACCEPTABLE REGULATORY ALTERNATIVES IS REASONABLE AND CONSISTENT WITH THE ACT.

Congress directed EPA to make decisions regarding whether and to what extent to regulate sources of listed substances under § 112. Congress told the Agency to make decisions that are protective of the public health with an ample margin of safety. But there is no single answer as to what that decision should be -- only a range of permissible regulatory alternatives. Congress did not specify what factors EPA should consider in deciding among regulatory alternatives that are consistent with the health protective objective of § 112.

Where a specific statutory provision does not tell an agency how to choose among otherwise acceptable regulatory alternatives, the court should judge whether the agency's interpretation is reasonable in light of the statute's

objectives.[72] This is particularly true under the Clean Air Act, whose purposes section has been applied by this Court to fill in gaps in the statute.[73]

In § 101(b)(1) of the Act, Congress declared that the purposes of Title I of the Act, which includes § 112, are "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productve capacity of its population." EPA has construed this directive as calling for consideration of the economic and social costs, as well as the environmental benefits, of possible regulation; thus, an Agency decision requires a

> balancing of the social and economic considerations with the environmental implications . . . to fulfill the mandate of the Clean Air Act to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population."[74]

Consequently, as EPA has stated, any decision that severely restricts economic development would conflict with the Act's

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72/ See, e.g., Whirlpool Corp. v. Marshall, 445 U.S. 1, 11-13 (1980) (turning to the "purpose and policy" of the Occupational Safety and Health Act, as stated in that statute's preamble, to determine the validity of the agency's regulation where no specific provision of the Act expressly authorized or barred the regulation).

73/ See infra p. 26.

74/ 39 Fed. Reg. 31,000 col. 1 (1974) (emphasis added; emphasis within quotes added by EPA).

purposes because it would be "incompatible with protecting the 'productive capacity' of the Nation's population."[75/]

EPA's interpretation of the Act's purposes was affirmed by this Court in Sierra Club v. EPA,[76/] where the Court, in an opinion by Judge Wright, upheld as consistent with § 101(b)(1) the regulatory alternative chosen by EPA on the basis of "a qualitative balancing of clean air considerations against the competing demands of economic growth, population expansion, and development of alternative sources of energy."[77/] Moreover,

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75/ 38 Fed. Reg. 18,987 col. 3 (1973). EPA announced this construction of § 101(b)(1) in the course of the Agency's consideration in 1973 and 1974 of regulatory options to "prevent significant deterioration" (PSD) in "clean air" areas of the country. EPA undertook the PSD proceeding in response to a district court decision that § 101(b)(1) required "state implementation plans" adopted under § 110 of the Act to include PSD programs. Sierra Club v. Ruckelshaus, 344 F. Supp. 253, 255-56 (D.D.C.), aff'd per curiam, 4 Env't Rep. Cases (BNA) 1815 (D.C. Cir. 1972), aff'd per curiam by an equally divided Court sub. nom. Fri v. Sierra Club, 412 U.S. 541 (1973). Since § 110 gave EPA no guidance regarding the content of a PSD program, the Agency evaluated a number of regulatory options in light of the factors described in § 101(b)(1). See, e.g., 38 Fed. Reg. 18,990 col. 1-18,994 col. 2 (1973); 39 Fed. Reg. 31,000 cols. 2-3, 31,006 cols. 2-3 (1974). The PSD rules adopted by EPA at the conclusion of this proceeding were affirmed by this Court in Sierra Club v. EPA, 540 F.2d 1114 (D.C. Cir. 1976), vacated (in light of the 1977 Amendments to the Act) sub nom. Montana Power Co. v. EPA, 434 U.S. 809 (1977).

76/ Supra note 75.

77/ 540 F.2d at 1132; see id. at 1135. This Court recently reconfirmed the importance of § 101(b)(1) in reviewing an Agency action where a specific provision of the Act gives no explicit direction. See General Motors Corp. v. Ruckelshaus, 742 F.2d 1561, 1571 (D.C. Cir. 1984) (en banc), cert. denied, 471 U.S. 1074 (1985); cf. Reserve Mining Co. v. EPA, 514 F.2d 492, 535-37

(Footnot cont'd.)

Congress confirmed in the 1977 Amendments to the Act that this administrative and judicial construction of § 101(b)(1) as requiring a balancing of health and environmental, social, and economic considerations reflected a proper interpretation of the Act's purposes.[78/]

Consequently, to effect the Act's purposes, EPA must, wherever specific statutory criteria are lacking, fashion its

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(Footnote cont'd. from previous page)

(8th Cir. 1975) (en banc) (where industrial emissions posing a possible health threat are subject to judicial remedy, a court should balance economic benefits of the industrial activity against potential health risks), modified on other grounds, 529 F.2d 181 (1976) (en banc).

78/ Congress in the 1977 Amendments enacted a PSD program that "provides the statutory substance to the more general language in section 101(b) of the [A]ct." S. Rep. No. 127, 95th Cong., 1st Sess. 29 (1977), reprinted in The Environmental Policy Division of the Congressional Research Service of the Library of Congress, A Legislative History of the Clean Air Act Amendments of 1977 (1978) at 1403 (hereinafter "1977 Legis. Hist.") (emphasis added); see also id. at 31, 1977 Legis. Hist. at 1405. Congress' PSD provisions "implement[ed] the requirement of section 101(b) of the [A]ct" in a way that provides for "the reasoned weighing of environmental and economic goals and needs" and "reject[s] the arguments of those who would allow no further deterioration of our Nation's clean air resources" since that approach would "den[y] . . . the opportunity for substantial industrial development." H.R. Rep. No. 294, 95th Cong., 1st Sess. 146-47, 1977 Legis. Hist. at 2613-14 (emphasis added); see id. at 105, 1977 Legis. Hist. at 2572 (the "bases" of Congress' PSD provisions include "economic and employment considerations"); id. at 133, 150, 154-77, 1977 Legis. Hist. at 2600, 2617, 2621-44.

In addition, the legislative history of the Act as a whole confirms that EPA, in exercising discretion within the scope of specific statutory criteria, should implement the Act's purposes in a way that accounts for economic and social concerns. See Initial Radionuclides Brief at 63 n.181.

regulatory decisions in a way that reconciles the Act's three general objectives -- safeguarding public health, promoting social welfare, and fostering economic prosperity. To serve these objectives in making decisions under § 112, the Agency should avoid imposing unreasonable economic burdens where imposition of such burdens is not necessary to meet that section's primary health protection goal.

In the radionuclides proceeding, as in the vinyl chloride proceeding, EPA implemented § 112 in a way that fulfills the Act's purposes. Having identified regulatory options that are consistent with the primary health protection goal of § 112, the Agency concluded that it made little sense to adopt an alternative that would require utilities and the consuming public to spend $3.4 billion each year -- an amount more than twice the sum spent yearly on hospital care for all cancer patients in the United States -- for additional emission controls to avoid a risk of one theoretical predicted cancer per year in a population of over 200 million.[79/]

79/ See supra p. 13. Similarly, EPA rejected a regulatory alternative -- i.e., a "zero emissions" standard -- that would provide absolute protection of the public health from any risk of harm from coal-fired boilers' radionuclide emissions. The Agency recognized that the "only way to meet such a standard would be to close all facilities emitting radionuclides" -- i.e., discontinue the production of electricity in the United States -- "because it is impossible to reduce radionuclide emissions to zero through control technology." 48 Fed. Reg. 15,078 col. 3 (1983).

In sum, in its radionuclide and vinyl chloride decisions, EPA has complied with § 112's requirement that it make regulatory decisions that protect the public health with an ample margin of safety. In doing so, EPA has filled a "gap"[80/] in § 112 as to how it should choose among acceptable regulatory alternatives. It filled this gap by construing the statute as allowing limited consideration of costs and feasibility. EPA's construction is consistent with the objectives of § 112 and the guiding purposes of the Act in § 101(b)(1). It is not "arbitrary, capricious, or manifestly contrary to the statute," and therefore must be accorded "controlling weight."[81/]

80/ Chevron U.S.A. Inc. v. NRDC, 467 U.S. 837, 843 (1984).

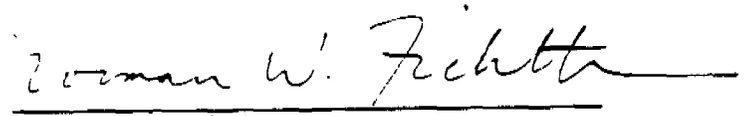
81/ Id. at 844; see Natural Fuel Gas Supply Corp. v. Federal Energy Regulatory Comm'n, Nos. 84-1246, 84-1285, slip op. at 12-15 (D.C. Cir. Feb. 20, 1987). Thus, in reviewing EPA actions to implement the Clean Air Act, "[s]o long as the main thrust of agency implementation appears to advance the congressional purpose, courts should be wary of interfering." If, as in this case, Congress has not specified how the Act's purposes are to be advanced, the court's "role is merely to ensure that the agency's means are reasonable ones." Natural Resources Defense Council v. Thomas, 805 F.2d 410, 438-39 (D.C. Cir. 1986).

Moreover, where EPA's decision not to impose additional emission controls under § 112 is an acceptable regulatory alternative (i.e., where it is consistent with the primary health protection goal of § 112), the decision not to regulate further should be given special deference. This is so because a decision not to regulate, if consistent with the goals of the governing statute, may be the product of factors not susceptible to judicial resolution -- including the setting of Agency priorities and allocation of Agency resources. See Natural Resources Defense Council, Inc. v. SEC, 606 F.2d 1031, 1046 (D.C. Cir. 1979); id. at 1052 (decisions not to regulate are given "special deference"); WWHT, Inc. v. FCC, 656 F.2d 807, 819 (D.C. Cir. 1981) (the scope of judicial review of an agency's decision whether to undertak rulemaking must be "extremely narrow") (emphasis in original).

CONCLUSION

For the foregoing reasons, this Court should hold that the Administrator may consider costs and technological feasibility as secondary factors in making decisions regarding the setting of emission standards under § 112 of the Clean Air Act.

Respectfully submitted,



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Dated: April 13, 1987

APPENDIX A

EXCERPTS FROM EPA'S PROPOSED DECISION ON
RADIONUCLIDE EMISSIONS FROM COAL-FIRED BOILERS

(48 Fed. Reg. 15,076 (1983))

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AH-FRL 2324-3]

National Emission Standards for Hazardous Air Pollutants; Standards for Radionuclides

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Announcement of Public Hearing.

SUMMARY: On November 8, 1979, EPA listed radionuclides as a hazardous air pollutant under the provisions of Section 112 of the Clean Air Act. Pursuant to Section 112, EPA is proposing standards (including appropriate reporting requirements) for sources of emissions of radionuclides in four categories: (1) Department of Energy (DOE) Facilities, (2) Nuclear Regulatory Commission licensed facilities and non-DOE Federal facilities, (3) underground uranium mines, and (4) elemental phosphorous plants.

The Environmental Protection Agency (EPA) has identified several additional source categories that emit radionuclides and has determined there are good reasons for not proposing standards at this time for these categories. They are the following: (1) coal-fired boilers, (2) the phosphate industry, (3) other extraction industries, (4) uranium fuel cycle facilities, uranium mill tailings, management of high level waste, and (5) low energy accelerators.

DATES: Comments may be received on or before May 30, 1983.

Public Hearings. An informal public hearing will be held on April 28, 29, and 30, 1983 in Washington, D.C. The exact time and location of the hearing can be obtained by calling the Office of Radiation Programs at (703) 557-0704. Requests to participate in the informal hearing should be made by April 20, 1983. Written statements may be entered into the record before, during, or within 30 days after the hearing.

ADDRESSES: All written comments should be submitted to the Central Docket Section (A-130), U.S. Environmental Protection Agency, Washington, D.C. 20460. Attention: Docket No. A-79-11. This docket, containing information used by EPA in developing the proposed standards, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday at EPA's Central Docket Section, West Tower Lobby, Gallery One, Waterside Mall, 401 M Street SW., Washington, D.C. 20460.

Separate sections of the docket have been established for each category of radionuclide emissions to air. Comments specific to a proposed action should be addressed to the following docket sections:

Section III A—Department of Energy Facilities
Section III B—Nuclear Regulatory Commission Licensed Facilities and non-DOE Federal Facilities
Section III C—Underground Uranium Mines
Section III D—Elemental Phosphorous Plants
Section III E—Coal-fired Boilers
Section III F—Phosphate Industry
Section III G—Other Extraction Industries
Section III H—Uranium Fuel Cycle Facilites, Uranium Mill Tailings, and Management of High Level Waste
Section III I—Low Energy Accelerators

Requests to participate in the informal hearing should be made in writing to Richard J. Guimond, Director, Criteria and Standards Division (ANR-460), U.S. Environmental Protection Agency, Washington, D.C. 20460. All requests for participation should include, at least, an outline of the topics to be addressed in the opening statements and the names of the participants. Presentations should be limited to 15 minutes each.

A Background Information Document has been prepared that contains, for each source category, projected doses and risks to nearby individuals and to populations, descriptions of current control technology, and descriptions and costs of emission control technologies. Single copies of the Background Information Document for the proposed standards may be requested in writing from the Program Management Office (ANR-458), U.S. Environmental Protection Agency, Washington, D.C. 20460, or by calling (703) 557-9351.

FOR FURTHER INFORMATION CONTACT: Terrence A. McLaughlin, Chief, Environmental Standards Branch (ANR-460), U.S. Environmental Protection Agency, Washington, D.C. 20460, (703) 557-8977.

SUPPLEMENTARY INFORMATION:

I. Overview of the Proposed Standards

A. Basic Terms Used in This Notice

All matter is made up of atoms; their nuclei contain protons and neutrons. The number of protons in an atom determines the identity of the element. For example, the element with 6 protons is called carbon. Atoms can contain different numbers of neutrons. The total number of protons and neutrons in an atom is called the atomic weight.

The nuclei of atoms of chemical elements with certain atomic weights are unstable by nature. Such nuclei can disintegrate spontaneously in predictable ways and are said to be radioactive. Atoms with nuclei that disintegrate are called radionuclides. For example, carbon atoms with 8 neutrons disintegrate, whereas carbon atoms with 6 neutrons are stable. The number of disintegrations which will occur in a given amount of time is termed activity; the unit of activity is the curie. One curie equals 37,000,000,000 disintegrations per second.

Some radionuclides are found in nature; others are made in reactors and accelerators. This notice concerns facilities which handle or produce all types of naturally occurring and manmade radionuclides in a manner that results in their being released into the air.

B. Background

In 1977, Congress amended the Clean Air Act (the Act) to address airborne emissions of radioactive materials. Before 1977, these emissions had been either regulated under the Atomic Energy Act or unregulated. Section 122 of the Act required the Administrator of EPA, after providing public notice and opportunity for public hearings (provided by 44 FR 21704, April 11, 1979), to determine whether emissions of radioactive pollutants cause or contribute to air pollution that may reasonably be anticipated to endanger public health. On December 27, 1979, EPA published a Federal Register Notice listing radionuclides as hazardous air pollutants under Section 112 of the Act (44 FR 76738, December 27, 1979). To support this determination, EPA published the report titled *Radiological Impact Caused By Emissions of Radionuclides into Air in the United States—Preliminary Report* [EPA 520/7-79-006], Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, D.C. (August 1979).

Section 122(c)(2) of the Act directed that, once EPA listed radionuclides to be regulated under the Act, EPA and the Nuclear Regulatory Commission (NRC) were to enter into an interagency agreement with respect to those facilities under NRC jurisdiction. Such a memorandum of understanding was effected on October 24, 1980, and was subsequently published in the Federal Register (45 FR 72980, November 3, 1980). When EPA began developing standards for Department of Energy (DOE) facilities, a similar memorandum of understanding was negotiated with DOE. This memorandum of understanding was signed in October 1982, and a copy has been placed in the Docket for public review.

On June 16, 1981, the Sierra Club filed suit in the U.S. District Court for the Northern District of California pursuant to the citizens' suit provision of the Act (Sierra Club v. Gorsuch, No. 81-2436 WTS). The suit alleged that EPA had a nondiscretionary duty to propose standards for radionuclides under Section 112 of the Act within 180 days after listing them. In March 1982, the Court granted the Sierra Club motion for partial summary judgment on the liability issue, and, on September 30, 1982, the Court ordered EPA to publish proposed regulations establishing emission standards for radionuclides, with a notice of hearing, within 180 days of the date of that order.

EPA is proposing standards for certain sources of radionuclide emissions to air and is proposing not to regulate other sources. To EPA's knowledge, these comprise all source categories that release potentially regulatable amounts of radionuclides to air. The deadline established by the Court for this rulmaking has required EPA to proceed with less information than it would like. As always, EPA invites comments and will consider them carefully to ensure that the Agency's decisions are the best possible ones.

C. Estimates of Health Risk

Agencies can never obtain perfect data but have to make regulatory decisions on the basis of the best information available. Although additional study may be suggested to clarify the health implications from exposure to radiation at relatively low levels, EPA is concerned about the potential detrimental effects to human health caused by radiation based on the best scientific information currently available. EPA believes its estimates of doses to humans and the potential human health risks constitute an adequate basis for decisionmaking.

The information used by the Agency in estimating the hazards to health due to exposure to radiation is summarized in the following reports: *The Effects on Populations of Exposure to Low Levels of Ionizing Radiation* (1972) and *Health Effects of Alpha Emitting Particles in the Respiratory Tract* (1976) by the BEIR Committee, the report of the United Nations Scientific Committee on the Effects of Atomic Radiation entitled *Sources and Effects of Ionizing Radiation* (1977), and *Publication 26* (1977) by the International Commission on Radiological Protection. These bodies agree that high levels of radiation cause cancer and mutations and that, when formulating radiation protection standards and guidance, it is reasonable to assume that the risks of cancer and mutations are proportional to radiation dose. Background information on the risk associated with radon emissions can be found in an EPA report titled *Indoor Radiation Exposure Due to Radium-226 in Florida Phosphate Lands*, [EPA 520/4-78-013] (1978).

In concert with the recommendations of these reports, even for relatively low doses, EPA has assumed a linear, nonthreshold, dose-effect relationship as a reasonable basis for estimating the public health hazards due to exposure to radiation. This means that any radiation dose is assumed to pose some risk of damage to health and that the risk associated with low doses is directly proportional to the risk that has been demonstrated at higher doses. EPA believes this assumption is reasonable for public health protection in light of presently available information. However, EPA recognizes that the data available preclude neither a threshold for some types of damage below which there are no harmful effects nor the possibility that low doses of gamma radiation may be less harmful to people than the linear model implies.

As used in this notice, the term "dose to an individual" means an estimate of the dose rate in units of dose equivalent per year (rem/y) to the whole body or to a specified body organ due to exposure to radiation at a given level for the person's lifetime (70 years). These dose rates are a measure of, although not directly proportional to, the individual's risk of fatal cancer. The term "lifetime risk to an individual" means an estimate of the potential probability of premature death due to cancer caused by radiation exposure at a given level for the person's lifetime. There are also risks of nonfatal cancer and serious genetic effects, depending on which organs receive the exposure to radiation. The risks of nonfatal cancer and genetic effects cannot be accurately estimated, but neither risk is larger than the fatal cancer risk. EPA considers all these risks when it makes regulatory decisions on limiting emissions by restricting dose rates or exposures to radionuclide concentrations.

As used in this notice, the term "dose to population" means an estimate of the summed dose received by all persons in a population living within a given distance of the source, typically within 80 kilometers, due to a one year release of radionuclides (person-rem per year of operations). A person-rem is a total amount of exposure received by a large group equivalent to one person receiving an exposure of one rem. The term "risk to population" means an estimate of the number of potential fatal cancers that might occur in the population living within a given distance of the emission source, typically within 80 kilometers. The risk is related to the amount of radionuclides that are emitted during a year of operation. Part of the population risk is likely to occur some time after the radionuclides are emitted because: (1) There is a delay between release and exposure as the radionuclides move through environmental pathways and (2) there is a latent period between exposure and the onset of the disease. The dose to populations for a specific organ is related to, although not directly proportional to, the risks of fatal cancer, nonfatal cancer, and serious genetic effects. EPA considers all fatal and nonfatal risks in making regulatory decisions on whether standards are needed to protect the general public. As used in this notice, the term "health effect" means potential fatal cancers. Additional information on risk can be found in the Draft Background Information Document.

EPA must make numerous assumptions when estimating the radiation dose to individuals and population groups and the likely risk this might present to health. The assumptions introduce uncertainties in the estimates of radiation doses and health risks. All individual risk calculations assume that individuals reside at a single location for a 70 year life and are exposed to a constant source of radionuclide emissions for the entire time. factors such as radionuclide uptake by vegetation, consumption of locally produced crops and milk, and meteorology are quite site specific and can influence the actual risk to any given individual. Individual characteristics such as age, physiology, physical activity level, amount of time spent indoors, and eating habits can influence the rate and amount of radionuclides affecting the individual and, thus, the risk of that person.

EPA's risk estimates are "best estimates" considering the above factors. EPA believes that the estimates are within a factor of ten of the actual health risks to individuals if the assumptions are valid for the particular situation under consideration.

D. Summary of the Proposed Standards

EPA is proposing specific standards for sources in four categories: (1) DOE facilities, (2) NRC-licensed facilities and non-DOE Federal facilities, (3) underground uranium mines and (4) elemental phosphorous plants.

An indirect emission standard is proposed for all DOE facilities that will restrict emissions from each site to the

amount that would cause an annual dose equivalent to 10 millirem (mrem) to the whole body and 30 mrem to any organ of any individual. This emission standard will keep the radiation doses relatively low both to nearby individuals and to populations living around the sites. In addition, EPA expects these facilities to continue to comply with the current Federal Guidance requirement that emissions be limited to as low as practicable levels and has proposed a reporting requirement to describe emission control technology.

An indirect emission standard is proposed for NRC licensees and non-DOE Federal facilities that will restrict emissions from each site to the amount that would cause an annual dose equivalent of 10 mrem to any organ of any individual. This emission standard will keep radiation doses relatively low to nearby individuals and populations in the vicinity of the site. The term "NRC licensees" includes those facilities licensed by the NRC and by States under agreement with the NRC.

An indirect emission standard is proposed for underground uranium mines that will restrict the increase in annual average concentration of radon-222 at places people can live to 0.2 picocurie per liter (pCi/1). A person living in a house for a long time in an area exposed to this concentration might still be subject to a significant estimated level of risk. However, neither control technology nor other methods to reduce radon emissions from these mines are available at reasonable cost; thus, more restrictive controls are not reasonable. The proposed standard will reduce risk to people living closest to the mines; protection of the health of regional and more distant populations is of less concern because most mines are located in remote areas.

An emission standard is proposed for elemental phosphorous plants that will limit annual emissions of polonium-210 from each site to 1 curie. While other radionuclides are emitted from these plants, polonium-210 is the major contributor to the maximum individual risk. Limiting polonium-210 will control the others. Such a standard will keep radiation doses relatively low to both individuals and populations.

While one of the above standards limits stack emissions directly, the other three limit stack emissions indirectly by specifying dose or concentration limits to be achieved. EPA believes this is e reasonable approach, given the extreme diversity of DOE facilities and NRC licensees and the fact that randon-222 emissions from uranium mines are not amenable to controls. The form of the proposed standards follows well developed and widely accepted practices in radiation protection. The use of procedures developed primarily to control chemicals would, in this context, be unworkable.

E. Basis for the Proposed Standards

In the **Federal Register** of May 18, 1960, President Eisenhower directed Federal agencies to follow the Radiation Protection Guidance of the Federal Radiation Council (FRC). When EPA was established, the Federal Radiation Council was abolished, and its responsibilities were transferred to EPA. EPA has considered this Guidance in establishing emission standards under Section 112 of the Clean Air Act, and the Agency's approach is compatible with it. For the purposes of this rulemaking, key elements of the Guidance are:

1. There should not be any man-made radiation exposure without the expectation of benefit resulting from such exposure.

2. The term "Radiation Protection Guide" should be adopted for Federal use. This term is defined as the radiation dose which should not be exceeded without careful consideration of the reasons for doing so; every effort should be made to encourage the maintenance of radiation doses as far below this guide as practicable.

3. For the individual in the population, the basic Radiation Protection Guide for annual whole body dose in 0.5 rem. This Guide applies when the individual whole body doses are known. As an operational technique, where the individual whole body doses are not known, a suitable sample of the exposed population should be developed whose Protection Guide for annual whole body dose will be 0.17 rem per capita per year.

4. There can be no single permissible or acceptable level of exposure without regard to the reason for permitting the exposure. It should be general practice to reduce exposure to radiation, and positive efforts should be carried out to fulfill the sense of these recommendations. It is basic that exposure to radiation should result from a real determination of its necessity.

5. There can be different Radiation Protection Guides with different numerical values, depending upon the circumstances.

6. The Federal agencies shall apply these Radiation Protection Guides with judgment and discretion to assure that reasonable probability is achieved in the attainment of the desired goal of protecting man from the undesirable effects of radiation. The Radiation Protection Guides provide a general framework for the radiation protection requirements. It is expected that each Federal agency, by virtue of its immediate knowledge of its operating problems, will use these Guides as a basis upon which to develop detailed standards tailored to meet its particular requirements.

EPA believes that the following points in these guides are of particular importance: (1) There should be benefits from exposure to radiation; (2) Exposures should be kept as low as practicable; and (3) It is appropriate to have different standards with different values, depending on the circumstances.

These Guides apply to Federal agencies to the extent that they are not imcompatible with more specific legislative directives. The Clean Air Act directs EPA to establish emission standards for hazardous pollutants and directs EPA to propose these standards at a level which, in the Administrator's judgment, will protect the public health with an ample margin of safety. Congress did not describe the degree of protection that provides an ample margin of safety, nor did it describe what factors the Administrator should consider in making these judgments. Therefore, EPA considers those factors it believes are necessary to make reasonable judgments on whether standards are needed and, if so, at what level they should be established.

If a hazardous pollutant under review has been shown to possess a threshold level below which no deterimental health effects are likely, it might be relatively easy to establish an emission standard. For example, the Agency might select an appropriate safety factor, divide the threshold level by this factor, and establish an emission standard that corresponds to the reduced level. This regulatory strategy would provide reasonable assurance that no detrimental effects would result from exposure to the hazardous pollutant.

This approach is not feasible or reasonable for radionuclides. This is because the risk of cancer from exposure to radiation has not been shown to have a threshold level. Consequently, if EPA applied the approach previously described, the Agency would likely conclude that the standard should be established at zero emissions. They only way to meet such a standard would be to close all facilities emitting radionuclides because it is impossible to reduce radionuclide emissions to zero through control technology. If this approach were adopted, society would be harmed greatly since it would have to forgo the

benefits of industries that emit radionuclides. Therefore, to allow society to continue to benefit from these activities, EPA must establish emission standards for radionuclides at a level that may present some human health risk. The Agency is not aware of any single level of risk that would be generally acceptable or constitute an ample margin of health protection. Some argue that an increase in cancer risk not exceeding one in 1000 due to a specific cause is acceptable, whereas others argue that an increase in risk of one in one million is unacceptable. EPA believes it should adopt an approach that will allow those various factors that influence society's health and well being to be weighed in assessing each source category. To accomplish this, EPA has decided to consider the following factors in making its judgments:

1. The radiation dose and risk to nearby individuals;
2. The cumulative radiation dose and risk to populations in the vicinity of the source;
3. The potential for radiation emissions and risk to increase in the future;
4. The availability, practicality, and cost of control technology to reduce emissions; and
5. The effect of current standards under the Act or other applicable legislative authorities.

By considering these factors, EPA will be able to provide public health protection that is consistent with the intent of the Federal Radiation Protection Guides and Clean Air Act.

The first three factors are used to assess the likely impact of emissions on the health of individuals and large populations and to estimate the potential for significant emissions in the future. The fourth factor enables EPA to assess whether state-of-the-art control technologies are currently in use and whether there are any practical means of reducing emissions through control technology or other control strategies. The last factor allows EPA to assess whether regulations or standards that have been established to control particulates or other pollutants are also minimizing releases of radionuclides.

The dose and risk to the individuals nearest a site are often the primary considerations when evaluating the need to control emissions of radionuclides. Controlling maximum individual dose assures that people living nearest a source are not subjected to unreasonably high risk. Further, protecting individuals usually provides an adequate level of protection to populations living further away from the source. Estimating the maximum individual dose and risk allows a comparison of the potential impact of one source to other sources.

EPA believes that cumulative population dose and risk also need to be examined. The cumulative radiation dose and risk to surrounding populations are determined by adding together all of the individual doses and risks that everyone within a certain radius (usually 80 km) of an emission source receives. This factor can sometimes be more important than the maximum individual risk in deciding whether controls are needed, particularly if an extremely large population may be exposed. The aggregate dose and population risk can be of such magnitude that it would be reasonable to require a reduction in the total risk even though, if the maximum individual dose were considered alone, one might conclude that no further controls are needed.

In addition, EPA believes that the potential for emissions and risk to increase in the future needs to be considered even though the current projected maximum individual and population risks are very low. An emission standard might be appropriate because the facilities now, or may in the future, handle large quantities of radionuclides that could escape into the air if improperly controlled. Alternatively, when the amount handled by a facility is small or is decreasing, and there is no potential for large releases now or in the future, standards may not be needed.

The availability and practicality of control technology are important in judging how much control of emissions is warranted. For this rulemaking, EPA believes that the standard should be established at a level that will require best available technology with allowance for variation in emissions, once a determination is made that additional controls are necessary. Additional actions, such as requiring development of new technology, closure of a facility, or other extreme measures may be considered if significant emissions remain after best available technology is in place or if there are significant emissions and there is no applicable control technology. EPA is defining best available technology as that which, in the judgment of the Administrator, is the most advanced level of controls adequately demonstrated, considering economic, energy, and environmental impacts. The technological and economic impacts associated with retrofits are considered when determining best available technology for existing sources.

Finally, EPA believes it is reasonable to consider whether other EPA standards are achieving approximately the same goal as the Act, i.e., protecting public health with an ample margin of safety. In cases where other standards are providing comparable control for radionuclides, EPA believes it is appropriate not to propose redundant standards under the Act. There would be no benefits because the public health would already be protected with an ample margin of safety, but there could be unnecessary costs associated with implementing an additional standard.

EPA considered each of the relevant factors in making determinations for each source category that was reviewed. These factors were not quantitatively balanced through the use of formulas to derive emission limits. Rather, they were qualitatively weighed before deciding whether a standard was needed and, if so, what level of control was suitable. The consideration of these factors as they apply to each source category is detailed in the portion of this preamble devoted to that source category.

EPA requests comments on the appropriateness of the factors it has selected for consideration. Should some factors be added or deleted? Should more emphasis be placed on some factors than others? How should the cost-effectiveness, cost-benefits, or affordability of controls be considered when establishing appropriate emission standards to provide an ample margin of safety? EPA also requests comments on whether the factors were appropriately applied to the nine source categories that were reviewed.

It is the intent of the Act that control technology or operational practices be used to control emissions. Buying land to expand the size of the site or building higher stacks to reduce exposure to nearby individuals may not be used where other emission control devices or operational procedures are reasonably available. However, there are radionuclides, principally radon, which present significant risks and for which emission controls may not always be reasonably available. As a last resort in such cases, EPA has decided to propose standards achievable through dispersion techniques.

II. Department of Energy Facilities (DOE)

A. General Description

DOE administers many facilities that emit radionuclides to air. These facilities are Government owned but are managed and operated for DOE by private contractors. Operations at these

mrem/y to the lung of the most exposed individual living near the plant. The lifetime risk to the maximally exposed individual associated with these doses is estimated to be about 1 in 10,000.

The risks to the populations living near elemental phosphorus plants are relatively low. EPA estimates that the potential health risk to the population living around a large plant is about 1 health effect per 100 years of plant operation and that the total risk from radionuclide emissions from all elemental phosphorus plants is about 1 health effect per 20 years of operation.

These estimates were developed using methods and assumptions discussed in Unit I.C. of this notice. It is important to recognize that the acutal risk to specific individuals may differ greatly from these estimates because the circumstances involving the exposure may differ significantly from the assumptions used to make the estimates.

C. Control Technology

Particulate emissions from calciner exhausts at elemental phosphorus plants are controlled through the use of wet scrubbers. Most plants use either spray towers or low-energy venturi scrubbers. Such systems are estimated to control particulate emissions to about 0.5 to 1.0 pound per ton of rock processed and are about 80 to 90 percent efficient for removal of polonium-210. One plant operates with two venturi-like scrubbers in series. Such a system should control particulate emissions to about 0.1 pound per ton of rock processed and is about 98 percent efficient for removal of polonium-210.

EPA has estimated the cost of installing high-energy venturi scrubbers on calciner stacks at large elemental phosphorus plants now operating with spray towers or low-energy scrubbers. The capital cost per plant for installing these scrubbers is about $3 million, and the annual operating cost is $1.5 million. A high-energy venturi scrubber is expected to be at least 98 percent efficient for polonium-210 removal and to reduce the emissions of this radionuclide for a large plant to less than 1 Ci/y. Lead-210 will be controlled at least as well because the scrubbers will remove lead with at least equal efficiency.

D. The Proposed Standard

EPA is proposing that the emissions of polonium-210 in the calciner off-gases at elemental phosphorus plants be limited to 1 Ci/y. EPA believes the use of best available technology at these facilities can achieve this standard. Limiting the polonium-210 emissions also effectively limits the lead-210 and other radionuclide emissions in the calciner off-gases. this standard will keep the radiation doses to individuals living near these plants to less than 10 mrem/y to the lung and to less than 15 mrem/y to the kidney. The lifetime risk associated with these doses is less than 3 in 100,000. EPA believes this will protect the individuals living nearby with an ample margin of safety. The assumptions and uncertainties associated with estimates of risk are discussed in Units I.C. and V.B. of this notice.

Complete information is not available on the polonium-210 emissions from all elemental phosphorous plants. Therefore, some uncertainty exists regarding the number of plants that would need to retrofit emission control systems. However, based on presently available information, EPA estimates that no more than two plants would need to install additional control systems to meet the proposed standard. These would be the large-capacity plants processing high-radionuclide-content phosphate rock. Installation of high-energy venturi scrubbers on the calciner exhausts of two plants would result in a capital expenditure of about $6 million and annual operating costs of $3 million per year.

Under the proposed standard, owners or operators of elemental phosphorus plants will be required to (a) measure the polonium-210 emissions from their calciner stacks and to report the results of these tests to EPA and (b) continuously monitor the pressure drop across their calciner scrubbers and to maintain records of these measurements for a minimum of two years.

EPA requests comments on the proposed values and the methodology used in arriving at them.

E. Alternatives to the Proposed Standard

The Agency considered proposing higher or lower values then 1 Ci/y. Higher values did not seem justified because they would either not significantly reduce the radiation doses to individuals living near these plants or would cost just as much to implement as the proposed standard. Lower values were also considered, but available information indicates that additional control technology is not feasible to meet lower levels.

The Agency also considered a standard expressed as curies/metric ton of phosphate rock processed. However, this type of standard may require emmission control retrofit by one or more additional plants even though their emissions of polonium-210 would be significantly less than 1 Ci/y. Since the primary purpose of the standard is to limit the annual radiation doses to the most exposed individual living near these plants, the Agency concluded that an annual emission limit, rather than an emission limit per unit of rack processed, is the more appropriate form of the standard.

VI. Sources for Which Standards Are Not Proposed

EPA has identified several source categories that emit radionuclides to air for which standards are not being proposed. These emissions comprise radionuclides that occur naturally in the environment but are released to air due to industrial processes. In addition to these sources, EPA is not proposing emission standards for uranium fuel cycle facilities, uranium mill tailings, management of high level radioactive wastes, and low energy accelerators. The reasons for these decisions are discussed in the following paragraphs. Additional supporting information may be found in the Docket and in the Background Information Document.

Estimates of risk used in this analysis were developed using methods and assumptions discussed in Unit I.C. of this notice. It is important to recognize that the actual risk to specific individuals may differ greatly from the estimates because the circumstances involving the actual exposure may differ greatly from the assumptions used to make the estimates.

A. Coal-Fired-Boilers

Large, coal-fired boilers are used by utilities and industry to generate electricity and by industry to make process steam and to heat water for space heaters and industrial processes. When these boilers are operating, trace amounts of uranium, radium, thorium, and decay products of these radionuclides that are present in coal become incorporated into the fly ash and are emitted along with the particulates into the air. Technology that removes particulates will, therefore, also limit radionuclide emissions.

Particulate emissions from new utility boilers are controlled under Section III of the Act (43 FR 42154, September 19, 1978, revised by 44 FR 33613, June 11, 1979). These New Source Performance Standards (NSPS) require utility boilers constructed after September 19, 1978, to have best available technology that limits particulate emissions to 13 nanograms per joule (ng/J) (0.03 pound/million Btu). To meet this emission standard, electrostatic precipitators (ESPs) or fabric filter systems are usually installed. Doses from utility

boiler radionuclide emissions under NSPS are low, less than 1 mrem/y to any organ, and there is no practical way to reduce them further since best available technology is already being used. Further reduction in emissions would require a second fabric filter or ESP in series with the first; this would be unreasonably expensive for the emission reduction achieved. Thus, radionuclide emission standards for new utility boilers would be either redundant or, if more restrictive, prohibitively expensive.

Particulate emissions from new large industrial boilers are controlled by NSPS that limit particulate matter to 43 ng/J (0.1 pound/million Btu). EPA plans to propose NSPS for smaller industrial boilers also; draft proposed limits have been circulated for comment. These standards should reduce particulate emissions to low levels and should correspondingly reduce doses to nearby individuals from radionuclide emissions to less than 1 mrem/y to any organ. With NSPS in place, radionuclide standards for industrial boilers would be redundant.

Existing utility and industrial boilers are regulated for particulate emissions by State Implementation Plans (SIPs) required by the Act. Limits vary for specific plants, but, in general, SIPs require large boilers located in populated areas to be well controlled with ESPs. Preliminary information indicates that retrofitting existing utility boilers to further reduce radionuclide emissions would cost approximately $15 billion for capital improvements and $3 billion a year to operate them. Total retrofitting of the industry with best available technology would reduce the estimated potential health effects by about 1 to 2 per year. For industrial boilers, the costs are about $3 billion for capital improvements and $0.7 billion to operate them. Total retrofitting of the industry with best available technology would reduce the estimated potential health effects by about 1 every three years. For both utility and industrial boilers, the costs are judged to be unreasonable in comparison to the reduction in dose and risk that would result.

The amount of radionuclides that could potentially be emitted by coal-fired boilers is strictly limited by the amount of uranium and thorium in the incoming coal. EPA has no reasons, therefore, to expect that massive releases of radionuclides will occur or that current emission rates will increase significantly. Under the current Federal and State regulatory programs, emissions should slowly decrease as old boilers are replaced.

In summary, EPA is not proposing standards for coal-fired boilers because existing emission controls that limit particulate releases also limit radionuclide releases. The risks to nearby individuals and the total risks to populations after application of controls already required are not large when compared to the cost of additional control technology. There is no potential for emissions to increase due to the limited amounts or radionuclides within the coal; rather, overall emissions will decrease with time as old plants are replaced with new ones with improved emission controls as required by the NSPS for particulate emissions.

EPA did consider the possibility that boilers may be using coal with radionuclide content that is significantly above average or that existing boilers may be operating in a manner that causes elevated emissions of radionuclides. If this is the case, there could be a subcategory of coal-fired boilers for which it would be appropriate to issue an emission standard. EPA requests comments and information on whether these situations do exist, their causes, their significance to public health, whether emission standards are needed, and what emission levels would be appropriate.

B. Phosphate Industry

The phosphate industry processes phosphate rock to produce fertilizers, detergents, animal feeds and other products. The production of fertilizer uses approximately 80 percent of the phosphate rock mined in the United States. Diammonium phosphate and triple superphosphate are the phosphate fertilizers produced in the largest quantities. Phosphate deposits contain large quantities of natural radioactivity, principally uranium-238 and members of its decay series. Uranium concentrations in phosphate deposits range from 10 to 100 times the concentration of uranium in other natural rocks and soils.

The processing of phosphate rock in dryers, grinders, and fertilizer plants results in the release of radionuclides into the air. As with coal-fired boilers, control techniques that remove particulates will also control radionuclide emissions and risks. Particulate emissions from the process exhausts of these plants are already well controlled, and the doses to individuals and populations from the radionuclides contained in the particulates are less than 15 mrem/y to any organ.

Particulate emissions from new or modified phosphate rock dryer and grinder facilities are already regulated by NSPS under Section 111 of the Act (47 FR 16582, April 16, 1982). To meet these standards, high-energy scrubbers of high-energy ESPs are usually installed on dryers, and fabric filters are installed on grinders. Particulate emissions from existing dryers and grinders are regulated under SIPs. About 20 percent ot the existing dryers already have controls equivalent to NSPS; the remaining dryers either employ low-energy or medium-energy scrubbers. About 75 percent of the existing grinders already have controls equivalent to NSPS; the remaining grinders use the equivalent of medium-energy scrubbers.

To retrofit all existing phosphate rock dryers with best available technology would require a capital expenditure of $44 million and an increase of $3 million in annual operating costs. This would reduce the maximum individual bone dose from 15 mrem/y to 3 mrem/y and avoid 1 health effect in 50 years of operations. To retrofit all existing phosphate grinders with best available technology would require a capital expenditure of $4 million but would not increase the annual operating cost. This would reduce the maximum individual bone dose from 1 mrem/y to 0.2 mrem/y and avoid 1 health effect in 500 years of operations.

Phosphate fertilizer plants use wet-scrubber systems on their process exhausts. These controls are needed to comply with NSPS (40 CFR Part 60, Subparts T through X) or SIPs for fluoride emissions. About 75 percent of the existing industry production capacity is controlled by both primary and secondary scrubbers. Scrubbers used to control fluoride emissions are also effective controls for particulate emissions.

To retrofit all existing fertilizer plants with secondary scrubbers on their diammonium phosphate and triple superphosphate process stacks would require capital costs of $14 million and would result in an increase of $1.5 million in annual operating costs. This would reduce the maximum individual bone dose from 2 mrem/y to 1 mrem/y and would avoid 1 health effect in 500 years of operations.

In summary, EPA is not proposing standards for phosphate rock dryers and grinders or phosphate fertilizer plants, because (1) the bone dose to individuals represent a small hazard to health compared to a similar dose to most other organs, (2) the potential for increased emissions is not present due to the limited amount of radionuclides in the phosphate rock, (3) other Clean Air Act standards require controls that also

APPENDIX B

EXCERPTS FROM EPA'S FINAL DECISION ON
RADIONUCLIDE EMISSIONS FROM COAL-FIRED BOILERS

(49 Fed. Reg. 43,906 (1984))

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL 2694-2]

National Emission Standards for Hazardous Air Pollutants; Regulation of Radionuclides

AGENCY: Environmental Protection Agency (EPA).

ACTION: Withdrawal of proposed standards.

SUMMARY: On April 6, 1983, the Environmental Protection Agency, pursuant to section 112 of the Clean Air Act, proposed standards for sources of emissions of radionuclides in four categories: (1) Elemental phosphorus plants; (2) Department of Energy (DOE) facilities; (3) Nuclear Regulatory Commission (NRC)-licensed facilities and non-DOE Federal facilities; and (4) underground uranium mines. In addition, the Agency decided not to propose standards for the following source categories of radionuclide emissions: (1) Coal-fired boilers; (2) the phosphate industry; (3) other extraction industries; (4) uranium fuel cycle facilities, uranium mill tailings, and management of high-level radioactive waste; and (5) low energy accelerators. The Agency is announcing the withdrawal of its four proposed standards for radionuclide emissions under Section 112 of the Clear Air Act and affirms its original decision not to regulate emissions from the other five source categories considered. The U.S. District Court for the Northern District of California has ordered EPA to take final action on its proposed standards by October 23, 1984.

DATE: This withdrawal is effective October 31, 1984.

ADDRESS: The rulemaking record is contained in Docket No. A-79-11. This docket is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery One, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: James M. Hardin, Environmental Standards Branch (ANR-460), Criteria and Standards Division, Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, D.C. 20460, (703) 557-8977.

SUPPLEMENTARY INFORMATION:

I. Supporting Documents

A final Background Information Document has been prepared and single copies may be obtained by writing the Program Management Office, Office of Radiation Programs (ANR-458), U.S. Environmental Protection Agency, Washington, D.C. 20460, or by calling (703) 557-9351. Please refer to "NESHAPS-Radionuclides: Background Information Document for Final Rules, Volumes 1 and 2 [EPA 520/1-84-022-1, EPA 520/1-84-022-2], October 1984. These documents comprise the integrated risk assessment performed to provide the scientific basis for this rulemaking. Volume 1 of the Background Information Document contains a complete description of the Agency's methodology used in its risk assessment of the hazards associated with airborne emissions of radionuclides. Volume 2 is devoted to a detailed description of how the Agency applied this methodology to each source category considered in this rulemaking. For each source category, this document describes the radionuclide emissions, estimated doses and risks to nearby individuals and to populations, description of current emission control technology, and descriptions and cost estimates of additional emission control technology.

The Agency's written responses to oral and written comments on the proposed standards have been placed in Docket No. A-79-11. Single copies of the Agency's responses may be obtained by writing the Program Management Office, Office of Radiation Programs (ANR-458), U.S. Environmental Protection Agency, Washington, D.C. 20460, or by calling (703) 557-9351. Please refer to "NESHAPS-Radionuclides: Response to Comments for Final Rules, Volumes 1 and 2" [EPA 520/1-84-023-1, EPA 520/1-84-023-2], October 1984.

II. History of Standards Development

In 1977, Congress amended the Clean Air Act (the Act) to adddress airborne emissions of radioactive materials. Before 1977, these emissions were either unregulated or were regulated under the Atomic Energy Act. Section 122 of the Act required the Administrator of EPA, after providing public notice and opportunity for public hearings (44 FR 21704, April 11, 1979), to determine whether emissions of radioactive pollutants "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health." On December 27, 1979, EPA published a notice in the Federal Register listing radionuclides as a hazardous air poilutant under section 112 of the Act (44 FR 76738). This action was based on the Agency's finding that studies of the biological effects of ionizing radiation indicated that exposure to radionuclides increases the risk of human cancer and genetic damage. In addition, the Agency found that emissions data indicated that radionuclides are released into air from many different sources with the result that millions of people are exposed. To support these findings, EPA issued a report entitled "Radiological Impact Caused By Emissions oof Radionuclides into Air in the United States, Preliminary Report," [EPA 520/7-79-006], Office of Radiation Programs, U.S. EPA, Washington, D.C., August 1979.

Section 122(c)(2) of the Act directed that, after having listed radionuclides as a hazardous air pollutant, EPA enter into an interagency agreement with the Nuclear Regulatory Commission with respect to those facilities under NRC jurisdiction. Such a memorandum of understanding was effected on October 24, 1980, and was subsequently published in the Federal Register (45 FR 72980, November 3, 1980). When EPA began developing standards for Department of Energy facilities, a similar memorandum of understanding was negotiated with DOE and signed in October 1982. Copies of both these memoranda have been placed in the Docket for public review.

On April 6, 1983, EPA announced its proposed standards for sources of emissions of radionuclides from four categories: (1) Elemental phosphorus plants; (2) DOE facilities; (3) NRC-licensed facilities and non-DOE Federal facilities; and (4) underground uranium mines. Several additional source categories emitting radionuclides were identified in the notice. However, the Agency concluded that good reasons existed to propose not to regulate these categories, which included: (1) Coal-fired boilers; (2) the phosphate industry; (3) other extraction industries; (4) uranium fuel cycle facilities, uranium mill tailings, and management of high-level radioactive waste; and (5) low energy accelerators (48 FR 15076, April 6, 1983). At the time of proposal, it was thought that these nine source categories were all that potentially released radionuclides to air at levels that could warrant regulatory attention. In support of these proposed standards and determinations, EPA published a draft report entitled "Background Information Document, Proposed Standards for Radionuclides," [EPA 520/1-83-001], Office of Radiation Programs, U.S. EPA, Washington, D.C., March 1983.

Following publication of the proposed standards, EPA conducted an informal public hearing in Washington, D.C., on April 28 and 29, 1983. The comment period was held open an additional 30 days to receive written comments. Subsequently, EPA received a number of

requests to extend the time for submission of public comments and to conduct a public hearing outside of Washington, D.C., on the proposed standards to accommodate those were unable to attend the first hearing. In response to these requests, EPA extended the comment period by an additional 45 days and held another informal public hearing in Denver, Colorado, on June 14, 1983 (48 FR 23665, May 26, 1983).

EPA has considered and responded to all written and oral comments; a copy of the Agency's responses is in the Docket. The Background Information Document has been revised and published in final form. In addition, a final economic analysis of the impact of the proposed standards for elemental phosphorus plants has been completed and placed in the Docket (Refer to "Regulatory Impact Analysis of Emission Standards for Elemental Phosphorus Plants," October 1984). The final report on control technology for radionuclide emissions to air at Department of Energy facilities has been published and a copy is available int he Docket. (Refer to "Control Technology for Radioactive Emissions to the Atmosphere at U.S. Department of Energy Facilities." [PNL-4621], October 1984).

In response to requests for wider scientific review of the Agency's risk assessment, the Administrator in December 1983, formed a Subcommittee on Risk Assessment for Radionuclides within the Agency's Science Advisory Board (SAB) to review the scientific basis for the proposed standards. This review is discussed in more detail in Section IV of this notice. On the basis of the Subcommittee's review, the final Background Information Document has been rewritten to incorporate recommendations made by the Subcommittee. The revised Background Information Document presents an integrated risk assessment following the format and methodology suggested by the Subcommittee, to the extent possible.

On February 17, 1984, the Sierra Club filed suit to compel final action in the U.S District Court for the Northern District of California, pursuant to the citizens' suit provision of the Act (Sierra Club v. Ruckelshaus, No. 84-0656 WHO). In August 1984, the Court granted the Sierra Club's summary judgment motion and ordered EPA to take final action on its proposed standards by October 23, 1984. On September 14, 1984, the Administrator requested that the Court delay its deadline until January 1985 to him enable him to personally evaluate the merits of the criticisms and suggestions presented by the Subcommittee. This request was denied.

On August 24, 1984, EPA announced in the Federal Register the availability of new technical information (49 FR 33695). The public was encouraged to comment on this new information which included the Final Report of the SAB Subcommittee, transcripts of all public meetings of the Subcommittee, information presented to the Subcommittee, and technical information relevant to elemental phosphorus plants and underground uranium mines. This new information was available in the Docket on September 7, 1984. The Agency's responses to these comments are included in Volume 2 of "NESHAPS-Radionuclides: Response to Comments for Final Rules."

III. Summary of the Final Actions.

On April 6, 1983, the Agency proposed standards for sources of emissions of radionuclides in four categories: (1) Elemental phosphorus plants: (2) DOE facilities; (3) NRC-licensed facilities and non-DOE Federal facilities; and (4) underground uranium mines. For DOE facilities, the Agency proposed an emission limit not to exceed an amount that causes a dose equivalent rate of 10 mrem/y to the whole body and 30 mrem/y to any organ of any individual living nearby. For NRC-licensees and non-DOE Federal facilities, the Agency proposed an emission limit not to exceed an amount that causes a dose equivalent rate of 10 mrem/y to any organ of any member of the public. The emission limit proposed for elemental phosphorus plants was 1 Ci/y of polonium-210.

For all three of these source categories, the Administrator has determined that current practice provides an ample margin of safety in protecting the public health from the hazards associated with exposure to airborne radionuclides, and has therefore decided to withdraw the proposed standards.

In the case of underground uranium mines, the Agency proposed a standard to limit the annual average radon-222 concentration in air due to emissions from an underground mine to 0.2 pCi/1 above background in any unrestricted area. The Agency is also withdrawing this proposed standard beacause it has concluded, for the reasons discussed below, that it did not meet the legal requirements of Section 112. The Agency has received additional technical information that suggests the possibility of using bulkheading and other techniques to control radon emissions. However, pursuing this course of action was not advocated or even suggested in the proposal. Indeed, the information available to EPA at the time of proposal indicated that these techniques were costly and "not very effective" and the Agency dismissed these techniques as the basis for an emission standard (48 FR 15083, col. 3). Since that time, new information suggests that conclusion may be erroneous. Technical information on which the base of final regulation or a proposal is not yet available; further work is needed to demonstrate how to set such a regulation at some future time. Therefore, the Agency is publishing, simultaneously with this notice, an Advance Notice of Proposed Rulemaking for Radon-222 Emissions from Underground Uranium Mines to solicit additional information on control methods, such as bulkheading and other forms of operational controls for radon-222 emissions from these mines. Such an approach could avoid many of the technical and legal difficulties pose by EPA's proposed standards.

In addition to the four source categories for which EPA did propose standards, the Agency has made a final determination not to regulate the following five source categories: (1) Coal-fired boilers; (2) the phosphate industry; (3) other extraction facilities; (4) uranium fuel cycle facilities, uranium mill tailings, and management of high-level radioactive waste; and (5) low energy accelerators. The Agency did not receive any new information during the public comment period that convinced it of a need for regulation of any of these five categories. Therefore, the Administrator affirms the original decision not to regulate these sources, believing that adequate public health protection exists to satisfy the requirements of the Clean Air Act.

When the Agency promulgated its standards for active uranium mill tailings (40 CFR 192, Subparts D and E), it decided that the control of the radon-222 emissions from the active uranium mill tailings piles could more appropriately be considered under the Clean Air Act, rather than the Uranium Mill Tailings Radiation Control Act. The preamble to the final uranium mill tailings standards noted that work practice standards were probably the most practical way to control radon emissions at active uranium mills. Consequently, EPA is issuing, simultaneously with this notice, an Advance Notice of Proposed Rulemaking for Radon-222 Emissions from Licensed Uranium Mills.

The withdrawal of the proposed standards for elemental phosphorus plants, Department of Energy facilities, Nuclear Regulatory Commission-licensed facilities and non-DOE Federal facilities, and underground uranium mines are final actions. Also, the decision not to establish radionuclide emission standards for coal-fired boilers; the phosphate industry, other extraction industries; uranium fuel cycle facilities, uranium mill tailings, and management of high-level radioactive waste; and low energy accelerators are final actions. Judicial review is available only by filing a petition for review in the United States Court of Appeals for the District of Columbia Circuit within 60 days of today's publication date.

III. Major Issues Raised in Public Comments

Many commenters expressed considerable dissatisfaction with the proposed standards. Operators of facilities for which standards were proposed objected vigorously to the stringency of the proposed standards; other groups objected on the grounds that the proposed actions were not sufficiently protective of public health. Both groups criticized the proposed standards for not meeting the intent of the Clean Air Act.

A number of comments were made which apply to all of the source categories considered and which address the bases of the standards-setting process. The following is a summary of the most significant comments and the Agency's responses:

Comment: Radionuclides should not be considered a hazardous air pollutant under section 112 of the Clean Air Act because ambient levels do not pose a significant risk to human health. One commenter petitioned for reconsideration of EPA's listing of radionuclides as a section 112 pollutant, on the basis that the Agency had not justified its conclusion that radionuclides are hazardous air pollutants within the meaning of section 112.

Responses: EPA has concluded that existing radionuclide emissions from some stationary sources can represent a significant risk of fatal and nonfatal cancers to exposed populations. There is no scientific doubt that radionuclides are carcinogens. This conclusion is based on extensive scientific evidence derived from studies of populations of humans and animals exposed to radiation at various levels ranging from very high doses to doses only slightly greater than environmental levels.

Both this conclusion and EPA's specific risk esitmates are based on the widely used assumption that there is no threshold below which exposure to radiation does not pose some risk to human health. Based on this premise, EPA concludes that exposure to radionuclides at low levels in the ambient air presents a risk of fatal and nonfatal cancers, as well as genetic damage.

In addition, section 112 requires not only a finding that the pollutant at issue is hazardous in the abstract, but also that it poses a public health risk in its form as an air pollutant. EPA has evaluated the air pollution risk of radionuclide emissions based on the magnitude of such emissions from stationary sources to the ambient air, on observed and estimated ambient concentrations of radionuclides, on the proximity of large populations to emitting sources, on estimates of health risks to exposed populations, and on considerations of uncertainties associated with risk estimates.

Based on this analysis, EPA has concluded that the present record does not support regulation of any of the source categories for which regulation was proposed. This conclusion, however, does not support delisting of radionuclides, because, in the case of uranium mines, the risks appear sufficient to warrant future regulatory action under section 112. It is only because regulation of the appropriate type is impossible at this time, due to the need for further work on the technical issues and the need to provide an opportunity for notice and comment on any proposed action, that no rules for uranium mines are being included in this decision.[1]

Therefore, with respect to the petition for reconsideration of the listing of radionuclides as a hazardous air pollutant, EPA has considered this option and has rejected it, believing that the original decision to list under section 112 is still appropriate.

Comment: The EPA standards are unnecessary because current administrative or regulatory standards of 500 mrem/y to the whole body and 1500 mrem/y to any organ (Federal Radiation Council guidance and NRC regulatory values), coupled with directives to keep emissions as low as practicable, are adequately protective of the public health. Other commenters felt that the proposed standards were too lax and that the Agency should set an emission limit of zero, with exceptions allowed only after a case-by-case examination.

Response: EPA does not believe that current Federal Radiation Council guidance and NRC policy of limiting exposure to individuals to 500 mrem/y to the whole body and 1500 mrem/y to any organ protects public health with an ample margin of safety, as required by the Clean Air Act. EPA estimates that a person receiving 500 mrem/y to the whole body over a lifetime would have an added potential risk of developing a fatal cancer of about one in one hundred due to the radiation exposure. In addition, that same person would face an approximately equal level of risk of nonfatal cancer and of passing on nonfatal genetic effects to succeeding generations.

However, EPA recognizes that the "as low as reasonably achievable" (ALARA) emissions policy had led to generally low emissions of radionuclides from most facilities. The Agency expects that this current policy will continue in the future and does not anticipate an increase in the emission level or the associated risks. Therefore, the Agency believes that in cases in which a vigorous and well-implemented ALARA program has achieved low emissions, such practice can provide an ample margin of safety for public health protection.

The Agency does not agree with the approach of establishing an emission limit of zero. The implementation of such a standard for the source categories considered would be extremely burdensome, and would result in little improvement in public health. More important, however, is the Administrator's determination that public health is currently protected to a degree which satisfies the requirement of Section 112 of the Act.

Comment: EPA is required to promulgate standards under all of its applicable authorities in order to fulfill the intent of its Congressional mandates. For example, the Agency must regulate air emissions from uranium fuel cycle facilities under the Clean Air Act, as well as under the Atomic Energy Act.

Response: The Agency believes that its primary objective is to provide reasonable public health protection, but that it was not the intent of Congress that the Agency issue duplicative regulations to achieve this goal. In light of the limited resources in both the

[1] The Administrator believes, based on an analysis by EPA's Office of General Counsel, that today's actions are consistent with the statute and the court order governing today's decision. EPA acknowledges, however, that an argument exists that the only proper way to procedurally express the substantive conclusions set forth in today's rulemaking is by delisting the particular pollutant involved. Though EPA does not presently accept that position, it stands ready to amend this package promptly along these lines if the Court should so direct.

public and private sector, it would be inefficient and unnecessarily complicated to require sources to comply with a standard they already meet, or alternatively, to meet several comparable standards set by one Agency under different statutory authorities.

Comment: Some commenters stated that the standards should be based on cost analyses, and if not cost-effective, they should not be promulated. Others felt that costs should not be considered at all.

Response: The Agency believes that giving equal weight to costs and benefits is inappropriate in developing standards under Section 112 of the Clean Air Act. Congress clearly intended that public health protection considerations be primary and that cost be secondary.

The Agency did consider, in developing these rules, the availability and practicality of control equipment. While this was not a primary consideration, knowledge of the availability of control technology is necessary when making judgments on the need for and level of emission standards. EPA believes these considerations are within the Administrator's discretion in determining what level of protection is adequate. The Agency considered costs to a limited degree consistent with this overall perspective in reaching its decisions on coal-fired boilers and elemental phosphorus plants, but otherwise today's action does not rest on cost considerations.

Comment: Some commenters stated that the Clean Air Act requires standards for all source categories releasing significant amounts of radionuclides into the air. Determinations that standards are not needed are not allowed for any reason. Others supported EPA's determinations that standards for some categories are unnecessary.

Response: The comment that every stack emitting radionuclides to air must be subject to an emission limit established under the Clean Air Act must be considered in light of the fact that every stack in the United States discharges at least minute quantities of radionuclides. These radionuclides include certain kinds of carbon and potassium atoms and other naturally-occurring radionuclides. Because these emissions are so small, the risk to nearby individuals and the total population group is minimal. To regulate these sources would not significantly improve the public health.

Section 112 of the Act requires the Administrator to assure public health protection with an ample margin of safety. A negative determination of the need for standards is permissible within the context of the Act, so long as this criterion is met. With respect to eight of the source categories considered in this rulemaking, the Agency has concluded that the public health is adequately protected under current practice, and therefore has met the requirements of the Act. For the uranium mines category, the Agency concludes that risks are significant; however, there is presently no feasible way to establish an emission standard. The Agency will consider such a standard, together with alternative design, equipment, work practice and operational standards, for future proposal.

Comment: There has not been sufficient review outside the Agency of EPA's methods and procedures for risk assessment. Specifically, EPA's Science Advisory Board should review the scientific basis of the proposed standards for radionuclides.

Response: The Agency agrees with this comment (see section V below).

Comment: The proposed standards should not be promulgated because they cannot be implemented with reasonable procedures. Compliance with indirect emission standards (dose or concentration limits at site boundary) must be determined by environmental measurements at the site boundary. Because the proposed standards are so restrictive, this is either very expensive or altogether impractical.

Response: Questions concerning the implementations of standards for airborne radionuclide emissions are moot in light of the Administrator's decision to withdraw the proposed rules.

Comment: Standards should be consistent with established international and national policies and regulations governing radiation protection, as well as among each source category.

Response: The Agency agrees with this comment and has based its decision to withdraw the proposed standards, in part, on the fact that current practices in radiation protection do provide adequate public health protection.

Comment: Standards should allow for greater operational flexibility in selecting control technology.

Response: Questions concerning the amount of operational flexibility necessary to comply with standards for airborne radionuclide emissions are moot in light of the Administrator's decision to withdraw the proposed rules.

V. Technical Review by the Science Advisory Board

In response to criticism that the Agency did not have sufficient outside review of its methods used to assess risk due to radionuclides, the Administrator formed a subcommittee of the Agency's Science Advisory Board to review the scientific basis of the proposed standards for radionuclides. The Subcommittee held three public meetings: the first on January 16, 1984, the second on February 21-22, 1984, and the third on March 22, 1984. At these meetings, the Subcommittee was briefed by Agency staff on the methods used in estimating risks caused by airborne radionuclides. The panel heard from members of the public on the Agency's risk assessments, as well. The Subcommittee also held executive sessions to consider the information presented by the Agency and the public.

Transcripts of the public meetings are available in the Docket. The Subcommittee's final report, entitled "Report on the Scientific Basis of EPA's Proposed National Emission Standards for Hazardous Air Pollutants for Radionuclides," was transmitted to the Administrator on August 17, 1984. A copy of this report and the Agency's response are available in the Docket.

In the Executive Summary of its report, the Subcommittee noted that its activities could be viewed as addressing two interrelated questions. First, did the Agency's staff collect the scientifically relevant data and use scientifically defensible approaches in modeling the transport of radionuclides through the environment from airborne releases, in calculating the doses received by persons inhaling or ingesting this radioactivity and in estimating the potential cancer and genetic risks of the calculated doses? Second, are the individual facts, calculational operations, scientific judgments, and estimates of uncertainty documented and integrated in a clear and logical manner to provide a risk assessment that can be used as a scientific basis for risk management purposes, i.e., standard-setting? With regard to the first question, the Subcommittee concluded that EPA had gathered the appropriate scientific information needed for a risk assessment in a technically proficient manner.

The Subcommittee made several technical suggestions on how EPA could improve its assumptions, models, and methods for estimating risks. Most of these technical suggestions have been incorporated into EPA's risk assessment procedures. The risk assessment for the final rule reflects these modifications. Some of these technical suggestions involve additonal research to improve future risk assessment methods. Those

meet the public health protection purposes of the Act.

Because radon-222 is a noble gas and the volume of air discharged through mine vents is very large, there is no practical method to remove radon-222 from the mine exhaust air. Adsorption onto activated charcoal is the most widely used method for removing noble gases from a low volume air stream. However, application of this method to the removal of radon-222 from mine ventilation air at the volumes of air which must be treated would require large, complex, unproven systems which would be extremely costly (i.e., at least $18–44/lb of U_3O_8 produced).

Since proposal, EPA has received additional technical information in a report prepared for the U.S. Bureau of Mines, indicating that work practices, such as bulkheading abandoned sections of mines to trap the radon before it is vented, may be more feasible and cost-effective than previously thought. This information, which is of a preliminary nature, suggests that bulkheading, even without the use of charcoal filters, could reduce emissions of radon-222 by 10–60% from typical mines at a cost ranging from $4–$60 per curie reduced or about $0.01–0.05/lb of U_3O_8 produced.

Uranium mines are widely diverse in their characteristics. They differ in configuration; for example, some mines have very few side tunnels and cross cuts whereas others may have many side areas. Consequently, they have a wide variety of surface areas where radon can be generated. In addition, mines differ in the geologic strata, mining techniques, and uranium and radium concentrations. All of these factors tend to decrease the number of common characteristics among mines that can be used to make general predictions of the effectiveness of specific control measures. Therefore, considerable additional work is needed to establish whether these results can be realized consistently for an appreciable segment of the industry, and to determine methods of bulkheading that might potentially produce any such consistently acceptable results. Only after these facts have been established would EPA be able to propose a standard based on these techniques. In any event, no such rule can be promulgated on the present record because the original proposal considered the use of this form of control and explicitly dismised it as a basis for the standard.

Because the Agency is convinced that the health risks posed by underground uranium mines are significant, EPA has decided to begin developing an emission, design, equipment, work practice, or operational standard to control radon releases from underground uranium mines. An Advance Notice of Proposed Rulemaking announcing this decision is being published simultaneously with this notice.

VIII. Final Determination for Sources EPA Proposed Not To Regulate

EPA previously identified several source categories that emit radionuclides to air but proposed not to regulate them. Final decisions on the need for emission standards for these categories, and the reasons for these decisions, are discussed in the following paragraphs.

A. Coal-Fired Boilers

Large coal-fired boilers are used by utilities and industry to generate electricity and to make process steam and hot water for space heaters and industrial processes. When operating, these boilers emit trace amounts of uranium, radium, thorium, and their decay products found in the feed coal. These radionuclides become incorporated into fly ash and are carried into the air along with the particulate matter these boilers emit. Technology that removes particulates will also limit radionuclide emissions.

Particulate emissions from new utility and new large industrial boilers are controlled by new source performance standards issued under Section 111 of the Clean Air Act reflecting best demonstrated technology. EPA has also proposed new source performance standards for smaller industrial boilers. Existing utility and industrial boilers are regulated for particulate emissions by State implementation plans as required by the Clean Air Act.

EPA proposed not to regulate coal-fired boilers because these existing particulate emission standards also limit radionuclide releases, and result in relatively insignificant risks to nearby individuals and to populations due to radionuclides. The highest dose resulting from this source category is 1 mrem/y to the lung. This is equivalent to an individual lifetime risk of fatal cancer of one in one million. Population risk is estimated to be about two fatal cancers per year, spread over the entire U.S. population. The cost to further reduce radionuclide emissions is greater in comparison to the additional public health protection achieved. In addition, radionuclide emissions will decrease as old plants are replaced with new ones having improved particulate emission controls as required by the Clean Air Act.

Many commenters, mostly industrial groups, strongly supported the determination not to propose regulations for this source category. Several commenters stated that the risks from coal-fired boilers were so low that this fact alone indicated that standards are not needed. The Agency's decision not to regulate is based on both a consideration of the level of risk and on a consideration of total cost and practicality of additional control equipment. Some commenters stated costs should not be considered under section 112 of the Clean Air Act. EPA believes it is not reasonable to avoid considering cost and practicality of control technology; however, the protection of public health was the primary consideration in reaching this decision.

Some commenters raised the question of whether there are some boilers that might burn coal with high uranium content, leading to emission levels far greater than those considered in making this determination. EPA asked for comment on this point and contracted with Los Alamos National Laboratory to investigate the existence of such boilers. The Agency was unable to find boilers with radionuclide emission rates significantly greater than the model facility we studied in detail. In fact, the majority of boilers can be demonstrated to have emissions much lower.

Some commenters stated that the requirements of the Clean Air Act dictate that EPA must propose an emission standard specifically for radionuclides, regardless of other Clean Air Act regulations limiting particulate emissions. EPA believes that to issue a standard that duplicates current regulations is unreasonable. As a practical matter, Clean Air Act regulations limiting particulate emissions from these boilers also limit radionuclide emissions. Hence, these existing regulations protect the public health with an ample margin of safety as far as radionuclide emissions are concerned.

After carefully considering all comments, EPA has decided not to regulate radionuclide emissions from coal-fired boilers at this time. This decision will be periodically reviewed as additional information on the total impact of all hazardous air pollutants from coal-fired boilers becomes available.

B. Phosphate Industry

The phosphate industry processes phosphate rock to produce fertilizers, detergents, animal feeds, and other products. The production of fertilizer

APPENDIX C

MEMORANDUM FROM A. JAMES BARNES,
GENERAL COUNSEL, EPA, TO THE ADMINISTRATOR

(October 23, 1984)

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 23 1984

OFFICE OF
GENERAL COUNSEL

MEMORANDUM

TO: The Administrator

FROM: A. James Barnes
General Counsel

SUBJECT: Final Action on Radionuclides Package

I. Introduction

EPA is under court order to take final action by October 23, 1984 on its proposal to regulate four source categories of radionuclides emitters under section 112 of the Clean Air Act. We propose to conclude that the risks presented by emissions from three of these source categories are not sufficient to warrant regulation. As to the fourth source category - uranium mines - we propose to conclude that the record is inadequate to permit setting any valid regulation at this time. We propose to continue to list radionuclides as a hazardous air pollutant under section 112 of the Clean Air Act because we continue to believe that emissions from uranium mines pose a potential danger to human health.

II. Question

You have asked for our opinion whether the course of action described above constitutes compliance with the governing statute and court order.* Both require the Administrator to "prescribe an emission standard for [radionuclides], unless he finds, on the basis of information presented at the [rulemaking] hearings, that [radionuclides] are clearly not a hazardous air pollutant."

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* At the latest hearing in this case, on September 14, Judge Orrick said he would modify his order to track the exact language of the statute, thus making it clear that compliance with the statute is compliance with his order. He did so three days later.

III. Answer

For the reasons discussed below, we believe the answer is "Yes." We believe that it is completely clear that a decision not to regulate a source category based on the insignificant risk involved constitutes adequate compliance with the court's deadline order. We believe that the decision not to regulate uranium mines because it is clear the record will not support a valid regulation also constitutes compliance.

An argument can be made, however, that the proper procedural approach for EPA to take when it is not regulating any of the source categories involved in a listing is to delist the pollutant, rather than to make separate negative determinations while leaving the pollutant listed. The question here in our view involves, not the substantive actions that are permitted under the court order, but the proper packaging of those actions to assure that they meet the order's terms. To make this point clear we recommend that any papers filed in future litigation - and possibly even the Federal Register notice announcing this action - express EPA's willingness to immediately restate the actions concerned as a delisting if the court so directs.

IV. Background

A. Substantive Provisions

1. The Language of the Statute

EPA listed radionuclides as a hazardous air pollutant under section 112 of the Clean Air Act in 1979. The statute provides that within six months after listing EPA shall propose "regulations establishing emission standards for such pollutant" and that within 180 days after proposal

> the Administrator shall prescribe an emission standard for such pollutant, unless he finds ... that such pollutant clearly is not a hazardous air pollutant. [Sec. 112(b)(1)(B).]

The statute allows the Administrator to list as hazardous any air pollutant

> which in the judgment of the Administrator causes, or contributes 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 [Sec. 112(a)(1).]

and therefore allows delisting of a pollutant that does not meet this test.

Any emission standards under section 112 must be set at the level "which in [the Administrator's] judgment provides an ample margin of safety to protect the public health from such hazardous air pollutant." Sec. 112(b)(1)(B).

The original listing of radionuclides under section 112 discharged the Agency's obligations regarding this substance under section 122 of the Clean Air Act. That section calls on EPA to determine, by mid-1979, "whether or not emissions of radioactive pollutants ... will cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health." If the Administrator makes an affirmative determination on this point, he is then directed to proceed to regulate radionuclides by an ambient standard, or by new source performance standards, or under section 112, or by some combination of these approaches.

If EPA were to delist radionuclides under section 112, the question of their standing under section 122 would therefore arise again.

2. Agency Interpretation

The various statutory provisions quoted above have never been interpreted by the courts. However, three separate positions on their meaning that EPA has taken are relevant to this case.

a. EPA may properly decline to regulate a category of sources that emit a pollutant listed under section 112 on the ground that the public health risk posed by emissions from sources in that category is not significant.

In setting standards under Section 112, EPA has invariably excluded source categories that, in EPA's judgment, presented threats to public health not warranting regulation. E.g., 40 Fed. Reg. 59421, 59534 col. 3, 59535 col. 1 (December 24, 1975) (proposed vinyl chloride standard excluded miscellaneous sources because they account for a small proportion of total vinyl chloride emissions); 38 Fed. Reg. 8820-8821 (April 6, 1973) (asbestos standard excluded non-"major" sources, including asbestos mines and asbestos dumps); 36 Fed. Reg. 23239, col. 2 (December 7, 1971) (proposed beryllium standard limited to "major" sources); 38 Fed. Reg. 8820, 8824 col. 2 (April 2, 1973) (mercury standard limited to the two source categories whose emissions might cause ambient concentrations above a certain level); 49 Fed. Reg. 23559 (June 6, 1984) (withdrawal of standards for benzene source categories posing risks the

Administrator found not to be significant); 44 Fed. Reg. 58642 ff. (October 10, 1979) (proposed cancer policy under Section 112 would limit regulation to source categories posing "significant risk"); see, 46 Fed. Reg. 33112, 33116-33121 (July 20, 1983) (proposed arsenic standards exclude most source categories because they are already well-controlled).

The logic of this position, as stated in these documents, is straightforward. "Significance" is a generally applicable legal standard endorsed by the Supreme Court in the OSHA benzene case, Industrial Union Dept. AFL-CIO v. American Petroleum Institute, 448 U.S. 607, 642 (1980), and by the legislative history of the 1977 amendments of the Act. It is particularly appropriate where carcinogenic pollutants with no known no-effects levels, such as radionuclides, are involved. Since most objects in the world emit small quantities of radionuclides, most objects in the world pose some small potential health risk due to radiation emissions. Without a significance threshhold below which regulation is not required, most objects in the world would therefore have to be regulated, regardless of the minimal risks or benefits involved.

Though this question has never been adjudicated, it went unchallenged when first announced and for ten years thereafter. Moreover, it has always been viewed as a matter reserved to the circuit courts to decide, and in fact, is now under review by the D.C. Circuit.

b. EPA may properly decline to regulate a source category under section 112 when it is impossible due to data limitations or for other reasons to set a valid standard.

Since an agency action that is based on a plainly insufficient record, or that is promulgated without opportunity for notice and comment, is subject to almost automatic reversal by the courts, it would seem clear that EPA itself may decline to issue regulations when it is plain in advance that they will flunk this test. To read the Clean Air Act to compel the promulgation of a regulation that the reviewing courts would clearly invalidate would be to read it to compel an empty and meaningless act. EPA has not adopted this reading. For example, in proposing arsenic standards, EPA declined to propose standards for fugitive emissions from cotton gins, "because available information does not allow determination of the effectiveness of possible fugitive emission control techniques." 48 Fed. Reg. 33112, 33119 col. 2 (July 20, 1983).

c. EPA may consider whether regulation of a pollutant is feasible in deciding whether to list it under section 122 (and therefore in deciding to list it under section 112).

In declining to list polycyclic organic matter (POMs) under section 122 of the Clean Air Act EPA considered not just the uncertain magnitude of the health risk, but the declining trend in POM emissions, the rudimentary development of the knowledge that would be needed to set regulations, and the possibility that action under the three Clean Air Act sections listed in section 122 would not be the wisest course of action in the end. The Federal Register notice summed up its argument by saying that

> EPA judges that the available information is insufficient to determine that POM threatens public health within the meaning of section 122, a determination which would include the immediate commencement of regulatory action. [49 Fed. Reg. 31682 col. 2 (August 8, 1984).]

The validity of this interpretation of section 122 is also presently under review in the D. C. Circuit.

B. Provisions on Judicial Review

1. Statutory Provisions

Section 304 of the Clean Air Act, the provision under which the present suit was brought, confers on the district courts authority to hear suits

> against the Administrator where there is alleged a failure of the Administrator to perform any act or duty under this chapter which is not discretionary with the Administrator. [Sec. 304(a)(2).]

The scope of this language, however, is restricted by the simultaneous presence in the Clean Air Act of section 307, which provides for review of "any final action" of the Administrator "only" in the Circuit Courts of Appeals, sec. 307(b)(1), and emphasizes that by stating at the end

> Nothing in this chapter shall be construed to authorize judicial review of regulations or orders of the Administrator under this chapter, except as provided in this section. [Sec. 307(e).]

2. Ninth Circuit Precedent

The question raised by this language is obviously where to draw the line between actions that are "final" and therefore may be reviewed only in the circuit courts under section 307, and the residual actions that are "nondiscretionary" and therefore may be heard in a district court under section 304.

The leading case on this point in the Ninth Circuit, whose law would govern here, is Kennecott Copper Corp. v. Costle, 572 F.2d. 1349 (9th Cir. 1978). There the court found that EPA could not be compelled under section 304 to approve a pending SIP revision, though it acknowledged that EPA could be compelled to take action of some sort within the statutorily prescribed period. Judge Sneed said that

> [t]he non-discretionary duty requirement imposed by sec. 304 must be read in light of the Congressional intent to use this phrase to limit the number of citizen suits which could be brought against the Administrator and to lessen the disruption of the Act's complex administrative processes. 572 F.2d at 1353.

In a footnote applying this logic he added

> Even the determination whether ambient air quality standards are being met is infused with discretion. The methodology is not precise, exact and beyond dispute. Id. at 1354 n. 1.

Judge Orrick made a similar statement in the case directing the present actions

> This Court has no jurisdiction to evaluate the health risks posed by radionuclides or to review the adequacy or even the need for regulation. Congress divided jurisdiction to review actions pursuant to the Clean Air Act between the district and appellate courts. The district court may enforce nondiscretionary agency actions ...; only the Court of Appeals for the District of Columbia may review the merits of regulations, the risks associated with the pollutant, or the adequacy of the data before the EPA when it promulgates regulations pursuant to the Act . . . The need for regulation of radionuclide emissions is simply not a matter that this court has the power to determine.

Sierra Club v. Ruckelshaus, N.D. Calif. No. C-84-0656 WHO (July 25, 1984), Slip Opinion at 7.

V. Discussion

A. Introduction

We believe the question whether EPA has discharged its obligations under Judge Orrick's order depends on whether it has terminated each of the four rulemakings that was subject to the court order by a "final" action reviewable in the Court of Appeals, or whether it has not. If EPA has done this, those actions can be reviewed by the circuit courts for abuse of discretion under section 307, but cannot be reviewed as nondiscretionary acts under section 304.

We anticipate that the petitioners in this case may argue that this has not happened because the Clean Air Act on its face gives EPA only two choices at the time of final action - to regulate or delist - that the four actions at issue are neither, and that we therefore are out of compliance both with the statute and with Judge Orrick's order.

This conclusion, however, assumes as given one of the factors in contention - what actions fall within the Administrator's discretion under section 112. We believe that the results EPA has reached are consistent with a proper interpretation of the Clean Air Act, a conclusion to which the courts must give substantial deference. Chevron v. NRDC, 104 S.Ct. 2778 (1984). To retain jurisdiction, the District Court must find, not just that it disagrees with EPA on these points, but that they do not involve the kind of discretionary judgments that Congress expected the circuit courts to review.

There are some basic obstacles to any such finding. The act of interpretation itself is one that requires the exercise of discretion and judgment. Indeed, one of the main reasons why courts are told to defer to administrative interpretations is to allow agencies to bring policy and experience to bear on the interpretive task. That in itself argues for review of agency statutory interpretations in the courts of appeals. The standards for judicial review in the courts of appeals underline that point by specifically directing these courts to reverse any action found to be "in excess of statutory jurisdiction, authority, or limitations, or short of statutory right." 5 U.S.C. 706(2)(C); Clean Air Act sec. 307(d)(9)(C).

B. Analysis

Section 307 plainly states that all "final" actions of EPA must be reviewed in the circuit courts. The Supreme Court has endorsed a literal reading of this provision. Harrison v. PPG Industries, 100 S. Ct. 1889 (1980).

The Supreme Court has interpreted "finality" pragmatically. Abbott Laboratories v. Gardner, 87 S. Ct. 1507, 1516-18 (1967). In Abbott, the Court found final agency action after noting that the challenged regulation was promulgated after announcement in the Federal Register and consideration of comments by interested parties. "There is no hint that this regulation is informal [citations omitted] or only the ruling of a subordinate official [citations omitted] or tentative." Id. at 1518. Accord, Western Oil and Gas Ass'n v. EPA, 633 F.2d. 803, 806-08 (9th Cir. 1980).

All four determinations at issue here unquestionably meet two of the Supreme Court's criteria for finality:

promulgation after formal rulemaking and ruling by the Administrator. As for the third criterion, definitiveness, there can be no doubt that the significance determinations meet this test. They represent EPA's final and considered policy judgment whether to regulate those source categories of radionuclide emissions. The determination on uranium mines is somewhat more complex, since it rests on a determination that the record is inadequate, rather than a policy determination. However, in our view it is "definitive" enough to pass the final action test. It does not find one or a few gaps in the knowledge needed to regulate, but an entire absence of the necessary technical information, together with an absence of the legally required notice and opportunity to comment. It represents EPA's final judgment on the record before it, a judgment presumably subject to challenge in the Court of Appeals under PPG Industries.

The fact that information may become available in the future is a situation continually faced in agency rulemaking. The potential future availability of new information does not affect the present validity, much less the final nature, of a rule supported by its present record; nor should it affect the validity or final nature of a decision not to regulate. In this case as in all others, if new information justifies new or different regulations, that will require an entire new rulemaking and a new proposal. The uranium mine determination is therefore not a "deferral". Rather it terminates rulemaking for as long a period as the administrative process admits -- until new information necessitates a new rule.

In Indiana & Michigan Electric Co. v. EPA, 733 F.2d 489 (7th Cir., 1984) (Posner, J.), the Seventh Circuit held that EPA's refusal to act on one element of a state SIP it otherwise approved was part of a final action reviewable only in the Court of Appeals. The Court noted that the petitioners' contention that the Administrator had a nondiscretionary duty to act was "within the literal reach of section 304," but nevertheless took jurisdiction. Id. at 490-91.

The Seventh Circuit gave three reasons for taking the case outside the reach of section 304, all of which apply to our facts and should compel a similar holding. First, the Agency's announcement was based on an administrative record, which eliminated any need to develop a record in the district court, the usual rationale stated for giving district courts jurisdiction over inaction cases. Given such circumstances, the court invoked a presumption in favor of court of appeals jurisdiction to avoid duplicative review. Obviously, the Agency's promulgation of the uranium mine determination will similarly yield a reviewable administrative record.

Second, "judicial economy would be disserved" if section 304 were interpreted to allow the Administrator's refusal to act to be reviewed in a district court while the rest of his order was reviewable only in an appellate court. Such an interpretation "would mean that in many Clean Air Act matters two judicial proceedings, proceeding simultaneously in different courts, would be necessary for complete review of one administrative order." Id. at 491.

Finally, the Court noted that the petitioners did not ask for a court order that EPA act but for a ruling setting aside the agency's approval of the revised SIP, which is section 307 relief.

Similarly here if the plaintiffs seek contempt based on a failure to issue positive regulations on October 23 they will be virtually compelled to argue that the Administrator should have reached a different result on the record before him, not that he should be put under a duty to compile a new record leading to a new decision.*

The second case on point is Center for Auto Safety v. EPA, 558 F. Supp. 103 (D.D.C. 1983). Under the relevant provisions of the Clean Air Act, the Administrator was arguably required to order a recall of vehicles whose emissions control equipment had been found to be defective. The agency instead allowed manufacturers to "offset" the excess emissions by producing vehicles with lower emissions in the future. The Court, in declining jurisdiction over a claim that the agency had failed to perform its nondiscretionary duty to order a

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* A case under the Clean Water Act has held that EPA "deferral" of action in connection with the promulgation of an effluent guideline was reviewable in a district court rather than the Court of Appeals. Commonwealth of Pennsylvania Dept. of Env. Resources v. EPA, 618 F.2d. 991 (1980). That action, however, was explicitly a "deferral" of the rulemaking, not a termination of it. The Pennsylvania case suggests that if the Administrator cast his decision as a final action excluding certain source categories it would be reviewable in a court of appeals. Id. at 996. Moreover, the "deferral" was challenged under the Clean Water Act, whose provisions for circuit court review are not as extensive as the Clean Air Act's. We believe that, particularly given the broad view of section 307 set out by the Supreme Court in PPG Industries, and the narrow view of section 304 set out in the Ninth Circuit cases, a different result would be reached here.

recall, relied on the presence of an administrative record and on the experience of the appellate court in deciding similar cases. Moreover, the District Court in rejecting the plaintiffs' point that a finding against them would render section 304 a nullity stated that "it is still the appropriate vehicle for challenges to the Administrator's 'nonfinal or informal refusal to perform a mandatory duty'". Id. at 104. Apparently the Court found that an agency's formal promulgation of a rule which merely addresses its nondiscretionary duty to act is sufficiently "final" to permit review only by the appellate court. Accord, EDF v. Costle, 448 F. Supp. 89 (D.D.C. 1978), aff'd sub nom Citizens to Save Spencer County v. EPA, 600 F.2d 844 (D.C. Cir. 1978). *

One might respond to this whole line of argument that to make finality pure and simple the test for reviewability would allow EPA to escape the jurisdiction of the district court at will by taking a "final" action that was simply a sham motivated only by the desire to escape from district court jurisdiction.

However, even if we assume for the sake of argument that such a "sham" test would be applied, EPA's actions here do not fall under it. A "significance" approach has been applied by EPA consistently throughout the history of the section 112 program, and has substantial support. Review of EPA's past use of this approach has centered exclusively and without question in the Court of Appeals.

As for uranium mines, EPA's conclusions go far beyond a statement that more information would allow a better decision. EPA has concluded that (1) the "emission standard" it originally proposed was not legally justified either as an "emission standard" or a "work practice standard" within the meaning of section 112, and thus could not validly be promulgated under section 112, (2) this original "emission standard" would result in only a trifling reduction in aggregate risk, and

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* See also EDF v. Gorsuch, 713 F.2d 802 (D.C. Cir. 1983). Here the Court held that absent a showing of bad faith EPA could not be found in violation of a district court order to "promulgate regulations" when the Agency suspended the rules shortly after their promulgation. The regulations involved in that case did set standards. But the practical result of the Agency's suspension of those rules in that case was in the end the same result presented here, and yet its decision to suspend was held reviewable only in the circuit court.

thus did not meet the purposes of section 112, (3) that although a new study suggested that it might be possible to reduce emissions from these mines by bulkheading abandoned galleries, the information available at present on that point is only suggestive and is completely inadequate to support a regulation, and (4) in any event no such rule can be promulgated on the present record because the original proposal was not simply silent on that course, but explicitly dismissed it. This is a far more definitive statement than that reviewed by the Seventh Circuit in the Indiana & Michigan case.

C. Conclusion

Accordingly, we believe that EPA can properly argue that EPA has taken, not just an action within its discretion, but the only action realistically open to it, in connection with the uranium mines rulemaking, that this action is final and subject to judicial review in the Court of Appeals, and that the District Court has no jurisdiction over it.

It is true, however, that by not delisting radionuclides as a hazardous air pollutant EPA remains arguably subject to a duty that it has not yet performed to promulgate at least one emission standard for radionuclides. There are three possible ways of dealing with this fact. First, EPA can stand ready to accept a schedule to generate a new record and reach a new final decision dealing with uranium mines. Such a schedule would be set by a district court in a schedule suit based on the state of affairs set out in the October 23 notice. Second, EPA can delist uranium mines, subject to possible relisting at some future time, and support this by an argument along the lines laid out in the POM decision. There are factual differences between radionuclides and POMs that make such an argument more difficult for radionuclides than for POMs. Third, EPA can argue that, based on information now available, no standards are appropriate to protect public health from radionuclides, and that EPA therefore has no further nondiscretionary duties. If the courts reject this argument, EPA would fall back on one of the first two options.