

**QUIVIRA MINING COMPANY, KERR-McGEE CHEMICAL CORPORATION,  
HOMESTAKE MINING COMPANY OF CALIFORNIA, and UNITED  
NUCLEAR CORPORATION, Petitioners, v. UNITED STATES NUCLEAR  
REGULATORY COMMISSION and UNITED STATES OF AMERICA,  
Respondents, NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION,  
Intervenor**

No. 85-2853

**UNITED STATES COURT OF APPEALS FOR THE TENTH CIRCUIT**

*866 F.2d 1246; 1989 U.S. App. LEXIS 649; 29 ERC (BNA) 1055; 19 ELR 20778*

January 27, 1989, Filed

**PRIOR HISTORY:**

[\*\*1]

Petition for Review of Regulations Promulgated by United States Nuclear Regulatory Commission (NRC Docket No. PR-40).

**CORE TERMS:** cost-benefit, site, regulation, tailings, criterion, mill, thorium, uranium, rationalization, promulgated, environmental, emission, rulemaking, byproduct, disposal, promulgating, slope, radon, monitoring, hazards, conference report, reasonable relationship, long-term, revised, flexibility, legislative history, promulgation, licensee, pile, public health

**COUNSEL:**

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E. Neil Jensen, Attorney, U.S. Nuclear Commission, Washington, District of Columbia (William C. Parler, General Counsel, William H. Briggs, Jr., Solicitor, and E. Leo Slaggie, Deputy Solicitor, United States Nuclear Regulatory Commission, Washington, District of Columbia, Peter R. Steenland, Jr., Chief, Appellate Section and J. Carol Williams, Attorney, Land & Natural Resources Division, U.S. Department of Justice, Washington, District of Columbia, with him on the briefs) for Respondents United States Nuclear Regulatory Commission and United States of America.

**JUDGES:**

Logan, McWilliams, and Tacha, Circuit Judges.

**OPINION BY:**

LOGAN [\*\*2]

**OPINION:**

[\*1247] LOGAN, Circuit Judge.

This case constitutes another chapter in the litigious saga of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), Pub. L. No. 95-604, 92 Stat. 3021 (codified as amended in scattered sections of 42 U.S.C.)<sup>1</sup>. Here, industry petitioners Quivira [\*1248] Mining Company, Kerr-McGee Chemical Corporation, Homestake Mining Company of California and United Nuclear Corporation challenge regulations promulgated in 1985 by the United States Nuclear Regulatory Commission (NRC) pursuant to UMTRCA. These regulations, consisting of an introduction and twelve criteria (the 1985 Criteria), establish standards for the NRC to follow in licensing and relicensing uranium mills and uranium mill tailings sites. *50 Fed. Reg. 41,852 (1985)* (codified at 10 C.F.R. pt. 40, app. A).

Petitioners contend that [\*\*3] (1) the 1985 Criteria are not supported by the cost-benefit analysis which the

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<sup>1</sup> Title II of UMTRCA amended § § 83, 84, 161, 274 and 275 of the Atomic Energy Act of 1954 (AEA), *42 U.S.C. § 2011 et seq.*

amended UMTRCA requires; (2) the criteria do not allow sufficient site-specific flexibility; (3) application of the criteria to thorium tailings is arbitrary and capricious and violates due process; and (4) the financial criteria are arbitrary and capricious and violate UMTRCA.

## I

Mill tailings are the principal byproduct of the process of milling ore to extract uranium. These tailings contain radioactive material, most significantly radium. Radium decays to produce radon, an inert gas. The radon gas that escapes from tailings piles degrades into a series of short half-life decay products which are hazardous if inhaled. If the radon does not escape the tailings piles, its decay products remain in the piles and produce gamma radiation that may be harmful to creatures living near them. Uranium mill tailings also contain potentially dangerous nonradioactive material such as arsenic and selenium. These toxic and radioactive materials may be ingested with food or water. *See American Mining Congress v. Thomas*, 772 F.2d 617, 621 (10th Cir. 1985), *cert. denied*, 476 U.S. 1158, 106 S. Ct. 2275, 90 L. Ed. 2d 718 (1986); [\*\*4] 48 Fed. Reg. 45,927-28 (1983).

Congress enacted UMTRCA in 1978 to address hazards presented by uranium and thorium mill tailings. UMTRCA assigned regulatory responsibilities to the Department of Energy, the Environmental Protection Agency (EPA) and the NRC. The EPA was directed first to promulgate "standards of general application ... for the protection of the public health, safety and the environment from radiological and nonradiological hazards associated with [uranium mill tailings]." 42 U.S.C. § 2022. The NRC, in accordance with its "management function," *id.* § 2114, promulgated specific regulations, conforming with the EPA general standards, to control mill tailings at "active" sites (those currently under NRC license) and at new sites to be licensed in the future.<sup>2</sup>

### [\*\*5]

When the EPA did not promulgate its standards within the time originally set by Congress, the NRC published its own regulations (the 1980 Criteria) in advance of any EPA general standards. *See Uranium Mill Licensing*

<sup>2</sup> UMTRCA also requires the Department of Energy to provide for the decommissioning of all "inactive" sites, again in accordance with EPA standards. 42 U.S.C. § 7918(a)(1). This aspect of UMTRCA is not at issue in this case.

Requirements, 45 Fed. Reg. 65,521, 65,533-36 (1980) (codified at 10 C.F.R. pt. 40, app. A (1981)). Like the aforementioned 1985 Criteria, the 1980 Criteria took the form of an introduction and thirteen criteria covering various aspects of mill tailings control.<sup>3</sup> In 1983, Congress amended UMTRCA, Act of Jan. 4, 1983, Pub. L. No. 97-415, 96 Stat. 2067, and pursuant to those amendments the EPA promulgated final regulations dealing with active [\*1249] sites. 48 Fed. Reg. 45,946 (1983) (codified at 40 C.F.R. § 192.30-.43). In *American Mining Congress v. Thomas*, 772 F.2d 640 (10th Cir. 1985) (AMC II), *cert. denied*, 476 U.S. 1158, 106 S. Ct. 2275, 90 L. Ed. 2d 718 (1986), we upheld these regulations against numerous challenges from environmental and industry petitioners. *See also American Mining Congress v. Thomas*, 772 F.2d 617 (10th Cir. 1985) (AMC I) (reviewing EPA inactive [\*\*6] site regulations), *cert. denied*, 476 U.S. 1158, 106 S. Ct. 2275, 90 L. Ed. 2d 718 (1986).

### [\*\*7]

The NRC then initiated rulemaking proceedings to bring its 1980 Criteria into conformity with EPA active site regulations. These proceedings resulted in the 1985 Criteria, the regulations now under review. Although many of these criteria are identical to their 1980 counterparts, others were changed significantly.

## II

Before turning to the issues raised by petitioners, we enunciate our standard of review. As we noted in *AMC I*, 772 F.2d at 625, UMTRCA specifies that the standards set

<sup>3</sup> Although a panel of our court initially upheld the promulgation of these criteria against several challenges, our court later vacated that judgment. *Kerr-McGee Nuclear Corp. v. NRC*, 17 Env't Rep. Cas. (BNA) 1537 (10th Cir. 1982), *judgment vacated and en banc rehearing granted*, Nos. 80-2043, 80-2229, 80-2269, 80-2271 (10th Cir. Oct. 6, 1982), *en banc setting vacated sub nom. Quivira Mining Co. v. NRC*, (10th Cir. Sept. 22, 1986). Because the *Kerr-McGee* judgment was vacated, it has no effect on our disposition of this case. To alleviate concerns over any res judicata effect of the *Kerr-McGee* opinion, our September 22, 1986 order and judgment explicitly stated that "our earlier order vacating our panel opinion and judgment, which we have not reinstated, eliminates any res judicata effect of the [Kerr-McGee] litigation of the issues involved." Slip op. at 3. Thus, we address anew all the issues raised by petitioners.

out in the Administrative Procedure Act (APA), 5 U.S.C. §§ 701-706, govern review under it. 42 U.S.C. § 2022(c)(2). For the type of informal notice-and-comment rulemaking at issue here, the APA specifies that agency action may be set aside if found to be "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). Review under this standard is deferential; an agency rule is arbitrary and capricious only

"if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered [\*\*8] an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."

*Motor Vehicle Mfrs. Ass'n v. State Farm Mutual Auto. Ins. Co.*, 463 U.S. 29, 43, 77 L. Ed. 2d 443, 103 S. Ct. 2856 (1983).

In determining whether an administrative regulation permissibly construes the statute that an agency is charged with enforcing, our inquiry is shaped by the specificity of the congressional enactment:

"First, always, is the question whether Congress has directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress. If, however, the court determines Congress has not directly addressed the precise question at issue, the court does not simply impose its own construction on the statute, as would be necessary in the absence of an administrative interpretation. Rather, if the statute is silent or ambiguous with respect to the specific issue, the question for the court is whether [\*\*9] the agency's answer is based on a permissible construction of the statute."

*Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 842-43, 81 L. Ed. 2d 694, 104 S. Ct. 2778 (1984) (footnotes omitted); see also *INS v. Cardoza-Fonseca*, 480 U.S. 421, 445 n.29, 447-48, 94 L. Ed. 2d 434, 107 S. Ct. 1207 (1987); *United States v. Riverside Bayview Homes, Inc.*, 474 U.S. 121, 131, 88 L. Ed. 2d 419, 106 S. Ct. 455 (1985); *Chemical Mfrs. Ass'n v. Natural Resources Defense Council, Inc.*, 470 U.S. 116, 125, 84 L. Ed. 2d 90, 105 S. Ct. 1102 (1985).

### III

Petitioners primarily argue that the 1985 Criteria are not supported by the cost-benefit analysis they assert UMTRCA requires. The NRC candidly admits that when it promulgated the 1985 Criteria it did not then analyze the costs and benefits of the requirements that the criteria imposed, and it advances alternative arguments why this is not error. First, the NRC contends that Congress did not require it to perform cost-benefit analysis before promulgating the criteria, but instead required only that "the NRC give 'due consideration' to the [\*\*10] costs of its mill tailings program." Brief of Respondents at 22. Second, it argues that [\*1250] even if Congress required cost-benefit analysis, previous analysis by the NRC and/or the EPA satisfies this requirement.

#### A

Courts and Congress often use the phrase "cost-benefit analysis" imprecisely, with the result that it is difficult to discern just what type of analysis is intended. As we noted in *AMC I*,

"the label 'cost-benefit analysis' encompasses everything from a strict mathematical balancing formula to a less strict standard that merely requires the agency to recognize both the costs and benefits of specific proposed alternatives and consider the differences in choosing an appropriate alternative. Labels are neither important nor determinative."

772 F.2d at 631 (quoting *American Petroleum Inst. v. EPA*, 540 F.2d 1023, 1037 (10th Cir. 1976), cert. denied, 430 U.S. 922, 97 S. Ct. 1340, 51 L. Ed. 2d 601 (1977)).

In *AMC I*, we distinguished between two strands of cost-benefit analysis, see 772 F.2d at 630-32, to which we will refer here as "cost-benefit optimization" and "cost-benefit [\*\*11] rationalization." Cost-benefit optimization, the strictest type of cost-benefit analysis, requires quantification of costs and benefits and a mathematical balancing of the two to determine the optimum result. See *id.* at 631. Cost-benefit rationalization, a considerably looser cost-benefit approach, requires the agency merely to consider and compare the costs and benefits of various approaches, and to choose an approach in which costs and benefits are reasonably related in light of Congress' intent. See *id.* at 632; see also Roberts & Kossek, *Implementation of Economic Impact Analysis: The Lessons of OSHA*, 83 W. Va. L. Rev. 449, 466-70 (1981) (advocating, under the Occupational Safety and Health Act, approximate

weighing of costs and benefits whereby agency shows it has considered relevant factors and made reasoned choice among alternative regulatory options).<sup>4</sup>

[\*\*12]

After reviewing the language and legislative history of AEA § 84(a)(1), 42 U.S.C. § 2114(a)(1), we believe that Congress did not intend to free the NRC altogether from cost-benefit analysis; rather it intended the NRC to perform cost-benefit rationalization for the 1985 Criteria. Section 2114(a)(1), as amended in 1983, Pub. L. No. 97-415, § 22(a), 96 Stat. 2067, 2080, requires the NRC to ensure the management of tailings in such a manner as

"the Commission deems appropriate to protect the public health and safety and the environment from radiological and non-radiological hazards associated with the processing and with the possession and transfer of such material, taking into account the risk to the public health, safety, and the environment, *with due consideration of the economic costs* and such other factors as the Commission determines to be appropriate."

42 U.S.C. § 2114(a)(1) (emphasis added).

In *AMC I*, we interpreted subsection (b) of § 22 of the 1983 amendments, which imposed upon the EPA the following statutory mandate: "In establishing such standards, the [EPA] Administrator shall consider [**\*\*13**] the risk to the public health, safety, and the environment, the environmental and economic costs of applying such standards, and such other factors as the [EPA] Administrator determines to be appropriate." 42 U.S.C. § 2022(a). We concluded that this section required the EPA to perform the type of cost-benefit analysis which we style here as cost-benefit rationalization. *See AMC I*, 772 F.2d at 632 ("We read the UMTRCA to provide that the EPA

must consider the costs involved in the regulations and, with the guidance of Congress' intent, find that these costs bear a reasonable relationship to the benefits [**\*\*1251**] derived. ... Congress intended cost-benefit analysis, but less strict than an optimized cost-benefit analysis.").

The NRC attempts to distinguish *AMC I* are unpersuasive. While it is true that the language of 42 U.S.C. § 2114(a)(1) is slightly different from the statutory language we interpreted in *AMC I*, this difference is not material. The legislative history of § 22 of the 1983 amendments demonstrates that Congress intended for the NRC to conduct the same type of analysis in promulgating [**\*\*14**] regulations pursuant to § 2114(a)(1) as that which 42 U.S.C. § 2022(a) required the EPA to conduct. The bill's Senate floor manager, Senator Simpson, noted that the amendments required both agencies to balance costs and benefits:

"The conferees have agreed to include specific references in the appropriate sections of the Atomic Energy Act directing EPA and NRC, in promulgating such standards and regulations, to consider the risk to public health and safety, and the environment, the economic costs of such standards or regulations, and such other factors as EPA or NRC, respectively, determine to be appropriate. *Essentially, we intend by this requirement that these agencies must balance the costs of compliance against the projected benefits to assure that there is a reasonable relationship between the two.*"

128 Cong. Rec. S13052 (daily ed. Oct. 1, 1982) (emphasis added); *see also id.* at 13055 ("the basis for consideration of costs by EPA in promulgating general standards and by NRC in issuing site specific regulations is now expressly established. Both of these agencies must establish that cost of compliance bears a reasonable relationship [**\*\*15**] to expected benefits") (statement of Senator Simpson).

The NRC points to other legislative history, which, it argues, shows that Congress did not intend to require NRC regulations to be justified under a cost-benefit analysis. In particular, the NRC points to the following passage from the Conference Report:

"Moreover, in adopting the language, the conferees intend neither to divert EPA and NRC from their principal focus on protecting the public health and safety nor to require that the agencies engage in cost-benefit analysis or optimization."

<sup>4</sup> A third strand of analysis, which considers costs to some degree, is feasibility analysis. Feasibility analysis in the environmental context requires an agency to protect public health to the maximum extent possible, constrained solely by what is economically or technically feasible. *AMC I*, 772 F.2d at 631. This approach places less burden on the agency than either cost-benefit optimization or cost-benefit rationalization. Feasibility and cost-benefit analyses are mutually exclusive approaches. *Id.* *See also American Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 504, 69 L. Ed. 2d 185, 101 S. Ct. 2478 (1981).

H.R. Conf. Rep. No. 97-884, 97th Cong., 2d Sess. 47, *reprinted in* 1982 U.S. Code Cong. & Admin. News 3592, 3603, 3617 (hereinafter Conference Report). The NRC also cites the following colloquy between Congressmen Ottinger and Udall, the Conference Chairman, to support its claim that Congress required only feasibility, and not cost-benefit analysis:

"Mr. OTTINGER. ... I note that the conference report also requires that the NRC and the EPA give due consideration to the environmental and economic costs of the mill tailings regulations. Is it your understanding that this is not intended to impose a new or different [\*\*16] basis for the issuance of regulations or for the review of regulations previously issued?"

Mr. UDALL. That is my understanding. The agencies have assured the conference that such factors have been duly considered in the development of their mill tailings regulations. If such regulations are feasible, nothing in this provision would require either agency to reformulate or reconsider regulations which have been issued."

128 Cong. Rec. H8824 (daily ed. Dec. 2, 1982).

We rejected this argument in *AMC I*, and we reject it again. Although the Conference Report states that the Conference Committee did not intend "to require [the EPA or NRC] to engage in cost benefit analysis or optimization," this statement may be misleading. By referring to "optimization," Congress eschews only the stricter form of cost-benefit analysis; this sentence says nothing about the less strict cost-benefit rationalization approach. The Conference Report follows immediately with the admonition that "economic and environmental costs associated with standards and requirements established by the agencies should bear a reasonable relationship to the benefits expected to be derived." [\*1252] Statements [\*\*17] in the House debates also show that Congress intended cost-benefit rationalization to support the NRC's actions. This debate clarifies that while the conferees did not envision an exact balancing of costs and benefits, *id.*, and considered health and safety to be paramount, they also intended economic factors to be considered seriously, *id.* at 8824-25 (statements of Reps. Ottinger and Lujan).

We believe that the preponderance of legislative history establishes a congressional desire that the NRC consider costs in relation to benefits in promulgating its regulations. This history also, by discussing the EPA's and NRC's parallel obligations to consider cost-benefit analysis

and imposing those obligations in the same section of the 1983 amendments to UMTRCA, shows that both agencies should apply the same level of cost-benefit analysis. Thus, the NRC, while recognizing as its "paramount responsibility protection of the public health and safety and the environment," Conference Report at 47, 1982 U.S. Code Cong. & Admin. News at 3617, also must employ cost-benefit rationalization. As we stated in *AMC I* concerning the EPA, and now hold applicable to NRC, this level of cost-benefit [\*\*18] analysis requires the agency to "consider the costs involved in the regulations and, with the guidance of Congress' intent, find that these costs bear a *reasonable relationship* to the benefits derived." *AMC I*, 772 F.2d at 632 (emphasis added); *see also AMC II*, 772 F.2d at 646.

## B

Having concluded that cost-benefit rationalization must support the criteria, we must ask whether such analysis has taken place. We address this question in two stages: (1) whether the NRC conducted cost-benefit rationalization when it promulgated the original 1980 Criteria; and (2) whether the cost-benefit analysis supporting the EPA active site regulations was sufficient to support those 1985 Criteria which differ from the 1980 Criteria.

We undertake this two-stage analysis because the 1985 Technical Criteria (criteria 1 through 8), which petitioners challenge on cost-benefit analysis grounds, can be divided into two types for purposes of our analysis.<sup>5</sup> The first type (unamended criteria) consists of those criteria that are essentially identical to the NRC's 1980 promulgation: criteria 2 (preference for large site disposal), 3 (below-grade disposal as "prime [\*\*19] option"), 4 (site and design criteria), 7 (preoperational and operational site

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<sup>5</sup> Criteria 9 through 12 compose a third type. Petitioners do not specifically challenge these criteria on cost-benefit analysis grounds because they were not enacted pursuant to the general provisions of § 2114(a)(1). Instead, more specific statutory provisions authorized their promulgation. The financial criteria (criteria 9 and 10) were promulgated pursuant to 42 U.S.C. § 2201(x); we discuss petitioners' challenges to the financial criteria separately in section VI of this opinion. Petitioners do not challenge the ownership criterion (criterion 11), which was promulgated pursuant to § 2113(b), or the long-term surveillance criterion (criterion 12), which was promulgated pursuant to § 2113(b)(5).

monitoring), and 8A (daily inspections),<sup>6</sup> and portions of each of the other technical criteria. Since these criteria are virtually unchanged from the NRC's 1980 Criteria, we uphold them if cost-benefit rationalization accompanied their original promulgation in 1980.

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The second type of criteria (revised criteria) were promulgated in 1985 to conform with the EPA general standards, 40 C.F.R. § § 192.30 to 192.43, and essentially duplicate those EPA regulations. Parts of the Introduction<sup>7</sup> and criteria 1, 5, 6 and 8 fall into this category of revised criteria.<sup>8</sup> Because [\*1253] the revisions to the criteria merely duplicate the EPA regulation, the issue to be addressed is whether the statute permits the NRC interpretation that it may rely upon the EPA cost-benefit analysis.

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<sup>6</sup> Except for minor word changes in these entirely "unamended" criteria, the only amendment to them was the deletion in criterion 4 of the following sentence pertaining to the rock cover placed over tailings disposal sites: "Shale, rock laminated with shale, and cherts shall not be used." This deletion does not affect our analysis.

<sup>7</sup> The first three paragraphs to the Introduction survive essentially unchanged from the 1980 Criteria. The NRC added the fourth paragraph to the Introduction for the 1985 Criteria to paraphrase AEA § 84(c), 42 U.S.C. § 2114(c). 50 Fed. Reg. at 41,856. We analyze this portion of the Introduction *infra* in part IV of this opinion.

<sup>8</sup> The 1985 revision of criterion 1 modifies the general goal in siting or design decisions, but leaves unchanged from the 1980 Criteria the site features that industry applicants must consider in determining tailings sites. The revised general goal--"permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance"--basically duplicates the EPA requirement of long-term protection from environmental hazards, *see* 40 C.F.R. § 192.32(b)(1)(i) (uranium), *id.* § 192.41(a) (thorium), and the EPA's decision that passive control methods, rather than ongoing maintenance, be favored. *See* 48 Fed. Reg. 45,935-36 (1983).

Criterion 5 deals with protecting groundwater. As promulgated at 48 Fed. Reg. 41,863-84 (1985), and at the time the parties to this appeal submitted their briefs, this criterion expressly imposed only an interim standard. *See id.* Petitioners argue that this standard, in connection with a minor change in criterion 1, go beyond the EPA regulations by imposing a nondegradation standard to protect all groundwater sources, usable and unusable, rather than the EPA secondary standard, which considers "the current and future uses of ground water in the area." 40 C.F.R. § 264.93(b)(1)(v); *see id.* § 192.32(a)(2) (incorporating by reference groundwater protection standard in *id.* § § 264.92 and 264.93). We do not accept petitioners' argument. By its own terms, "Criterion 5 supplements and does not conflict with or modify provisions of 40 C.F.R. Part 192. Until or unless the Commission undertakes additional rulemaking ... licensees and applicants should consult 40 C.F.R. Part 192 for the applicable ground-water protection requirements." The NRC recently revised criterion 5 and promulgated a new criterion that also addresses groundwater. 52 Fed. Reg. 43,553-68 (1987) (to be codified at 10 C.F.R. pt. 40). These criteria, which are not now before this court on appeal, were promulgated "to conform the NRC regulations to the standards promulgated by the EPA." *Id.* at 43,553.

Criterion 6 concerns the closure of mill tailings sites. The portions added in 1985--the first full sentence, the third paragraph, and footnotes 1 and 2 of the criterion--derive directly from the EPA standard. *See* 48 Fed. Reg. 45,937 (1983) (EPA assumption that tailings site operators will use earthen covers); 40 C.F.R. § 192.32(b)(1)(i) (imposing 200 year/1000 year period of effectiveness); *id.* § 192.32(b)(1)(ii) (imposing 20 picocuries per square meter per second (pCi/m<sup>2</sup>s) standard on releases of radon-222 from uranium byproduct materials); *id.* § 192.41(b) (imposing 20 pCi/m<sup>2</sup>s standard for radon-220 releases from thorium byproducts); *id.* § 192.32(b)(2) (stating conditions where requirements for longevity and control of releases from uranium byproduct materials do not apply); *id.* § 192.41(c) (stating conditions where requirements for longevity and control of release from thorium byproduct material do not apply); *id.* § 192.32, nn. 1 & 2 (which the footnotes to criterion 6 restate essentially verbatim). The remainder of criterion 6 survives with only very minor changes from the NRC's 1980 promulgation.

The final two paragraphs of criterion 8 derive directly from the EPA uranium and thorium byproduct material regulations. The penultimate paragraph of criterion 8 restates almost verbatim 40 C.F.R. § 192.41(d), which

establishes maximum annual dose emission levels from thorium byproduct materials. The final paragraph specifies that effluent limitations in 40 C.F.R. pt. 440, as applicable, cover uranium and thorium byproduct material. This paragraph merely restates 40 C.F.R. § 192.32(a)(3)(ii); see also 40 C.F.R. § 192.41 (provisions of § 192.32 also apply to thorium byproducts).

[\*\*21]

1.

The first stage of our analysis asks whether the NRC conducted cost-benefit rationalization before promulgating the 1980 Criteria. Before turning to the record accompanying the 1980 Criteria, a preliminary question arises relating to our earlier, withdrawn opinion in *Kerr-McGee Nuclear Corp. v. NRC*, 17 Env't Rep. Cas. (BNA) 1537 (10th Cir. 1982). Petitioners argue that *Kerr-McGee* held that only feasibility analysis<sup>9</sup> supported the 1980 Criteria and that the question of cost-benefit rationalization thus is not now open for our consideration. Petitioners are incorrect in both their reading of *Kerr-McGee* and their interpretation of its continuing validity. Contrary to petitioners' assertions, *Kerr-McGee* nowhere held that cost-benefit analysis was lacking to support the 1980 Criteria. What *Kerr-McGee* did hold is that UMTRCA as it existed at that time could be interpreted to require feasibility study only rather than cost-benefit analysis. *Id.* at 1551-54. All the *Kerr-McGee* panel had to say concerning whether petitioners balanced costs and benefits is that "petitioners are probably correct that NRC's analysis was not sufficient [\*\*22] [for cost-benefit balancing]." *Id.* at 1551 (emphasis added). This language does not establish any holding by the *Kerr-McGee* panel. More fundamentally, [\*1254] the *Kerr-McGee* judgment has been vacated, and as such is of no effect. See *supra* n.3. Thus, even if *Kerr-McGee* had held that the NRC had not engaged in cost-benefit analysis, we still could approach that question on a clean slate here.

We now turn to the record supporting the 1980 Criteria to determine if the NRC performed cost-benefit rationalization. For the most part, petitioners launch only a broad-based attack on the criteria by arguing that the NRC did not conduct analysis sufficient to support any of

the regulations.<sup>10</sup> Because the criteria consist mostly of general guidelines to be applied flexibly rather than specific iron-clad rules, petitioners' general challenge amounts to an argument that the NRC did not consider costs in relation to benefits when formulating these guidelines. [\*\*23]

We agree with the NRC that we need not inquire whether the agency performed "quantitative cost itemization in dollars and benefit itemization in unspecified units for every sentence in the Appendix A criteria that might impose some burden on the industry." Brief of Respondents at 22 n.10. We also recognize that the NRC has pledged to take into account "the economics of improvements in relation to benefits to the public health and safety" in making site specific licensing decisions, see 1985 Criteria, Introduction, and we believe this commitment is consistent with the statutory mandate to determine that the costs of regulation bear a "reasonable relationship" to benefits. Consequently, our inquiry is limited to whether the NRC ensured that the costs of its general approach to regulating uranium mill tailings, as embodied in the unamended criteria, were reasonable in light of the benefits to be gained from [\*\*24] such regulation.

A large portion of an NRC environmental impact statement on uranium milling, upon which the 1980 Criteria were based, is devoted to cost-benefit analysis. See Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, *Final Generic Environmental Impact Statement on Uranium Milling* (1980) (hereinafter NRC-FEIS), X R. at summary § 5 and chs. 6, 9, 11 and 12. Looking at the benefit side first, the NRC evaluated the benefits of mill tailings regulation largely in terms of reduced health risks to humans. To make this evaluation, the NRC postulated both a "model" mill and a cluster of twelve such mills that operated with "a relatively low level of environmental control." *Id.* at 6-1. Using the model mill scenarios, the NRC established a base case of risks against which it could compare various environmental control alternatives. See *id.* Ch. 9 (Environmental Impacts of Alternatives). Significant among these risks was the determination that between the years 1979 and 3000, operation of model mills in the United States would cause 6,000 premature cancer deaths, or about six deaths per year, *id.* at 6-68, 6-71 (Table 6.37),

<sup>9</sup> See *supra* note 4.

<sup>10</sup> We address *post slip op.* at 22-24 petitioners' objections to specific parts of the criteria.

and **[\*\*25]** 1,800 genetic defects, *id.* at 6-72 (Table 6.38), in the United States, Canada, and Mexico. In addition, persons living near a model mill, that is, within 2.0 kilometers (1.2 miles) downwind from the mill, *id.* at 6-23, would experience a twenty-five percent increase in risk of premature cancer death, compared to the risk from exposure to background radiation. *Id.* at 6-73. Clustered mills present a greater risk than single mills, such that the average person living in the area of clustered activity would experience a tenfold increase in risk of premature cancer death over the risk from background radiation alone. *Id.* at 6-73 to -74. Occupational exposure over a work period of approximately fifty years would lead to a lifetime risk of premature cancer death of about thirty in 1000, which would result in thirty-nine deaths between the years 1979 and 2000, about eight times the risk from natural radiation exposure. *Id.* at 6-74.

After postulating the radiation hazards of a model mill, the NRC estimated the human health benefits of reducing radiological **[\*1255]** emissions in varying degrees from the base case. For example, Table 9-13 of the NRC-FEIS set out the decline **[\*\*26]** in premature cancer deaths expected with each reduction in radon emissions. *Id.* at 9-31. *See also id.* at 9-4 to 9-10, Tables 9.1 to 9.7 (predicting effects of differing types of environmental controls). On the basis of these comparisons of health benefits, the NRC took as its goal the "long-term isolation of tailings and site decommissioning in such a way that conditions at disposal sites will be very similar to those in the surrounding environs, and in a manner which will not necessitate ongoing, active maintenance to preserve these conditions." *Id.* at 12-6.

Having determined that the greatest achievable benefit of mill tailings regulations would be to reduce emissions to background levels over the long term, the NRC next examined alternatives for tailings disposal, *see id.* at 8-18 to 8-29, the degree to which these alternatives would reduce emissions, *see id.* at 9-1 to 9-48, and their costs, *see id.* at 11-1 to 11-13; 12-8. The study estimated the costs of the base case ("no mitigating measures") and of nine alternative tailings disposal programs, which were classified into three general modes: the active care mode (alternative 1), the passive monitoring **[\*\*27]** mode (alternatives 2 through 6), and the potential reduced care mode (alternatives 7 through 9). *Id.* at 12-9 (Table 1).<sup>11</sup>

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<sup>11</sup> Assuming the price of yellowcake uranium ore (U<sub>3</sub>O<sub>8</sub>) at thirty dollars per pound, these costs were distributed over the following range: mitigative

The NRC settled on the passive monitoring mode alternatives as the best approach because they met the NRC's major regulatory objectives: "assuring long-term stability, controlling airborne radioactive emissions (radon), and protecting ground water," at a "reasonable" cost. *Id.* at 12-25. The agency rejected the potential reduced care mode alternatives as too expensive for the speculative incremental benefits they would produce, *id.* at 12-10 to 12-11, and dismissed the active care mode as unacceptable because it would saddle future generations with "a prolonged obligation to care for wastes generated to produce benefits which those generations will receive only indirectly, if at all." *Id.* at 12-7.

**[\*\*28]**

As we held in *AMC I*, we must defer to the agency's finding of a reasonable relationship between the costs and benefits of regulation. 772 F.2d at 638. We believe the NRC sufficiently related the cost of the controls required in the 1980 Criteria with the benefits of those controls to establish such a "reasonable relationship." In performing its cost-benefit analysis, the NRC not only found the overall costs reasonable, but also compared the costs of meeting each of its major objectives through the passive monitoring mode alternatives with the benefits of those goals and found the costs of accomplishing each objective to be "reasonable."<sup>12</sup>

The NRC in 1980 **[\*\*29]** set as its goal to reduce direct and airborne radon emissions from tailings piles to no more than two picocuries per square meter per second, a reduction that it believed would require, *inter alia*, burying tailings piles with covers at least three meters

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measures in the base case would equal 17% of the cost of yellowcake; 1.7% of that cost for mitigative measures under the active care mode; 2.0% to 4.1% of that cost for mitigative measures under the passive monitoring mode; and 13.7% to 38% of that cost for mitigative measures under the potential reduced care mode. NRC-FEIS at 12-8 (Table 1).

<sup>12</sup> Because of the great uncertainty and substantial dispute underlying the major factors involved, the NRC declined to perform a "fully monetized, incremental cost-benefit optimization" analysis. *Id.* at 12-19 to 12-20. As we have ruled, *ante slip op.* at 8, 16-17, this type of extensive cost-benefit analysis was not required.

thick, *see* NRC-FEIS at 12-13 to 12-15. After recapitulating the risks to individuals and populations, the NRC reasoned that the costs of these controls would be about one percent, or in the worst case about 1.5 percent, of the price of yellowcake. *Id.* at 12-12; 12-15; 12-17. The NRC concluded that this relationship between costs and the benefits of reduced risks was reasonable:

"The range of potential costs at a given site was examined to assure that no undue [\*1256] economic burdens would result at particular sites in implementing the proposed generally applicable limits. Based on this evaluation, the staff concludes that, while variability in costs may exist, no undue economic hardships will occur, as costs will represent a small fraction of product price (less than about 1.5% even in an unlikely worst case)."

*Id.* at 12-15; *see also* 45 Fed. Reg. 65,521, 65,525 (1980)<sup>13</sup>.  
[\*\*30]

With respect to the problem of toxic material seepage into underlying aquifers, the NRC set the goal of preserving current and potential groundwater uses so that, for example, aquifers that are of drinking-water quality remain so. NRC-FEIS at 12-23; 45 Fed. Reg. at 65,525. Recognizing that each disposal site presents different hydrologic and geologic conditions, the NRC concluded that specific methods for addressing [\*31] groundwater protection must be chosen on a case-by-case basis. The NRC found, however, that each of several methods considered appropriate for tailings sites would cost between one and two percent of product price. NRC-FEIS at 12-24. The NRC considered this cost reasonably related to the benefit. We find this cost-benefit rationalization

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<sup>13</sup> The EPA, in drafting its 1983 regulations, adopted a less stringent 20 pCi/m<sup>2</sup>s as the appropriate standard for radon emissions, *AMC II*, 772 F.2d at 646; *see also AMC I*, 772 F.2d at 624, and likewise did not establish a three meter minimum covering thickness. The 1985 Criteria, particularly criterion 6, were amended to conform to these more relaxed standards. To the extent that the 1985 Criteria do not alter the 1980 Criteria's approach to radon emissions, we hold that the NRC cost-benefit rationalization in 1980 was sufficient to uphold them.

adequate under *AMC I*.<sup>14</sup>

Finally, the NRC examined the costs and benefits of controlling emissions during the operation of uranium mills. Here, the NRC looked at the radioactive hazards caused both by dusting from tailings piles and radon emissions from yellowcake drying operations. *See* NRC-FEIS Summary at 13, Table 3 (effects on [\*32] nearby individual, average individual, and average mill worker of pre-reclamation airborne radioactive emissions with controls applied); *id.* at 9-3 to 9-10 (estimates of gaseous and particulate radioactive emissions during mill operations). It next considered the costs of the proposed controls, finding them to be low, about 1 percent of product price, *id.* at 12-26 to 12-27, and noted that all of the proposed control methods were then being employed at newer mills. *Id.* at 12-26. The NRC concluded that cost-benefit relationship to be reasonable, *id.*, thus satisfying the standard of *AMC I*.

We now turn to the three specific objections that petitioners raise to the criteria. First, petitioners attack criterion 4(d), which requires "full self-sustaining vegetative cover ... or rock cover" on each tailings site. Petitioners assert that the costs and practicabilities of these options were not sufficiently thought out by the NRC. They claim that in the southwest United States, where many tailings sites are located, arid conditions prevent the vegetative cover required by the NRC and that the type of rock cover specified by the NRC can be expensive to obtain. The record, [\*33] however, shows that the NRC adequately addressed each of these concerns when drafting criterion 4(d). The Appendix to the NRC-FEIS notes that "in some areas, such restoration [with vegetative cover] may not be possible, because sufficient vegetation cannot be established. In this event, stabilization by riprap may be necessary." NRC-FEIS, app. K-6, XI R. Tab 14B, at K-29. The Appendix further details that the NRC investigated and developed an estimate of the cost of obtaining rock cover, including the cost of hauling such cover to the tailings sites. *Id.* We believe that the 1980 study sufficiently addressed petitioners' concerns about the costs

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<sup>14</sup> Considering control of radon emission and protection of ground water together as part of a tailings control program, the NRC concluded that the total cost of such a tailings control program, even though it may be up to fifty percent greater than the estimated costs, was reasonable in relation to expected benefits. NRC-FEIS at 12-25.

of covering disposal sites.

Petitioners next challenge the slope requirements of criterion 4(c). This criterion provides as follows:

[\*1257] "Embankment and cover slopes must be relatively flat after final stabilization to minimize erosion potential and to provide conservative factors of safety assuring long-term stability. The broad objective should be to contour final slopes to grades which are as close as possible to those which would be provided if tailings were disposed of below grade; this could, for example, lead to [\*34] slopes of about 10 horizontal to 1 vertical (10h:1v) or less steep. In general, slopes should not be steeper than about 5h:1v. Where steeper slopes are proposed, reasons why a slope less steep than 5h:1v would be impracticable should be provided, and compensating factors and conditions which make such slopes acceptable should be identified."

10 C.F.R. pt. 40, app. A.

Petitioners particularly assert that to meet the slope requirements, many site owners would have to purchase "vast amounts of land," Brief of Petitioners at 34, and that the NRC's failure to consider this cost invalidates the criterion. While petitioners are correct that the cost of purchasing such land was not expressly factored into the NRC's analysis, this is not a fatal flaw. Many of the affected sites are located in isolated or desert areas, where land often will be obtainable at low cost. More importantly, criterion 4(c) is phrased in terms of a "broad objective" of a flat slope, and it expressly allows site owners to demonstrate why the slopes specified in the criterion would be "impracticable" at their sites. Thus, the criterion by its terms answers petitioners' concern over slopes.

Petitioners finally [\*35] object to criterion 3's designation of below-grade disposal as the "prime option." Petitioners here raise a vague challenge to the supposed benefits of such disposal, asserting that the EPA standards recommend below-grade disposal only for new sites. Brief of Petitioners at 35. We reject this challenge for two reasons. First, that the EPA and NRC differ as to the details of the required manner of disposal does not of itself render the NRC cost-benefit analysis invalid. The same set of facts may allow a reviewing agency conducting cost-benefit rationalization to reach several equally valid conclusions. Second, as with criterion 4(c), criterion 3 is sufficiently flexible to allow mill operators to use alternative methods if costs become excessive. Criterion 3 only requires mill operators to give "serious consideration

[to] this disposal mode," and it expressly recognizes that economic, geologic, and environmental factors "might make full below grade burial impracticable."

2.

Having upheld the unamended criteria, we now address whether a cost-benefit analysis adequately supports the revised criteria. Here, the NRC concedes that it performed no new cost-benefit studies in promulgating [\*36] these criteria. It argues that because the revised criteria are identical to portions of the EPA active site regulations, and because we ruled that the EPA properly performed cost-benefit analysis in promulgating those regulations, *AMC II*, 772 F.2d at 646, UMTRCA allows the NRC to rely upon the EPA's analysis and does not require a new study. Petitioners dispute this, asserting that Congress required the NRC to perform a separate cost-benefit analysis.

The statutory language admits of the readings advocated by both parties. UMTRCA requires the EPA Administrator to "consider," *inter alia*, "the environmental and economic costs" of its active site regulations, 42 U.S.C. § 2022(b)(1); the NRC is to give "due consideration to economic costs," *id.* § 2114(a)(1). By petitioners' reading of the statute, "due consideration" by the NRC requires it to consider *anew* cost-benefit concerns for all of its criteria. The NRC's reading of the statute would allow it to rely upon the EPA cost-benefit study in "duly considering" the economic costs of the revised criteria.

The legislative history concerning cost-benefit study likewise is ambiguous [\*37] concerning whether the NRC must separately study those criteria that are identical to the EPA regulations. The Conference Report accompanying the 1982 amendments states:

"The conferees have agreed to include specific references in the appropriate sections [\*1258] of the Atomic Energy Act directing EPA and NRC, in promulgating such standards or regulations, to consider the risk to the public health, safety, and the environment, the environmental and economic costs of such standards of [sic] regulations, and such other factors as EPA or NRC, respectively, determine [sic] to be appropriate.

...

The conferees are of the view that the economic and environmental costs associated with standards and requirements established by the agencies should bear a reasonable relationship to the benefits expected to be derived. This recognition is consistent with the accepted approach to establishing radiation protection standards, and

reflects the view of the conferees that, in promulgating such general environmental standards and regulations, EPA and NRC should exercise their best independent technical judgment in making such a determination."

Conference Report at [\*\*38] 47, 1982 U.S. Code Cong. & Admin. News at 3617.

Petitioners argue that the references to both agencies, and the admonition that each apply "their best independent technical judgment," show that Congress required a full cost-benefit analysis by the NRC, even of those criteria identical to the EPA regulations. While we may indeed read the legislative history in this way, we also may read it to require such independent judgment concerning costs and benefits only when the two agencies are promulgating different regulations. The passages quoted do not specifically address the issue presented. As such, they do not foreclose the NRC's argument that, when EPA and NRC regulations coincide, the NRC can adequately exercise its independent judgment by relying upon the EPA's study.

Since Congress has not spoken to the precise question at issue--whether the NRC must re-weigh costs and benefits for the revised criteria--we inquire under *Chevron* whether the NRC interpretation is "based on a permissible construction of the statute." *Chevron*, 467 U.S. at 843. We find the NRC interpretation of UMTRCA--that it may rely upon the EPA cost-benefit analysis--a permissible construction [\*\*39] of the statute. First, UMTRCA requires the NRC to give "due consideration" to economic costs. While such consideration requires all of the NRC criteria to be justified by cost-benefit analysis, it does not explicitly require the NRC rather than another agency to perform that analysis. It is a permissible construction of the "due consideration" command for the NRC to accept the EPA analysis for the revised criteria. Further, to allow the NRC to rely on the EPA cost-benefit analysis does not render the "due consideration" command of § 2114 superfluous. As to those criteria that differ from the EPA regulations, "due consideration" requires the NRC, on its own, to compare costs and benefits.

Finally, the timing requirement imposed by 42 U.S.C. § 2022(f)(3) supplies practical support for the NRC interpretation. This section requires the NRC to conform its criteria to the EPA regulations within six months after the EPA has promulgated final standards. The NRC argues that six months is an inadequate period of time to perform a second cost-benefit analysis of criteria conforming to the EPA regulations, and thus this short time period shows that

Congress did not [\*\*40] wish to require the NRC to perform a second cost-benefit study. This is a reasonable plumbing of Congress' intent, and it receives some support from the legislative history to that section. The Conference Report, in setting out this six-month time period, noted that "the conferees fully expect that the six month period of time is of sufficient length to enable the Commission to provide notice and opportunity for public comment prior to reaching its determination." Conference Report at 46-47, 1982 U.S. Code Cong. & Admin. News at 3616-17. By mentioning only the time as needed for public notice and comment, Congress implicitly stated that no further time was needed for an NRC cost-benefit study. We thus uphold the NRC's reliance upon the EPA cost-benefit analysis.

#### IV

Petitioners next assert that the NRC has not provided "site-specific flexibility" [\*\*1259] for individual licensing decisions as required by AEA § 84(c), added in 1985. That section provides as follows:

"In the case of sites at which ores are processed primarily for their source material content or which are used for the disposal of byproduct material as defined in section 2014(e)(2) of this title, a licensee [\*\*41] may propose alternatives to specific requirements adopted and enforced by the Commission under this chapter. Such alternative proposals may take into account local or regional conditions, including geology, topography, hydrology and meteorology. The Commission may treat such alternatives as satisfying Commission requirements if the Commission determines that such alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with such sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by standards and requirements adopted and enforced by the Commission for the same purpose and any final standards promulgated by the Administrator of the Environmental Protection Agency in accordance with section 2022 of this title."

Pub. L. No. 97-415, § 20, 96 Stat. 2067, 2079, *codified at* 42 U.S.C. § 2114(c). To implement this statutory command, the NRC added the following paraphrase of the statutory language to the Introduction accompanying [\*\*42] the 1985 Criteria:

"Licensees or applicants may propose alternatives to the specific requirements in this Appendix. The alternative

proposals may take into account local or regional conditions, including geology, topography, hydrology, and meteorology [sic]. The Commission may find that the proposed alternatives meet the Commission's requirements if the alternatives will achieve a level of stabilization and containment of the sites concerned, and a level of protection for public health, safety, and the environment from radiological and nonradiological hazards associated with the sites, which is equivalent to, to the extent practicable, or more stringent than the level which would be achieved by the requirements of this Appendix and the standards promulgated by the Environmental Protection Agency in 40 CFR Part 192, Subparts D and E."

10 C.F.R. pt. 40, app. A.

Petitioners assert that the addition to the Introduction was not sufficient to carry out the statutory command for flexibility. We disagree. The NRC drafted its modification to the Introduction as a functional equivalent of the statutory language of § 84(c).<sup>15</sup> The Introduction explicitly commits the NRC to [\*\*43] evaluate alternatives to the numbered criteria on precisely the terms Congress commands: when the alternative "is equivalent to the extent practicable, or more stringent than" the applicable NRC criteria. 42 U.S.C. § 2114(c). Petitioners may have cause in the future to challenge, in the context of individual licensing procedures, whether the NRC's application of this provision achieves the statutory command of flexibility<sup>16</sup>. See, e.g., *E.I. duPont de Nemours & Co. v. Train*, 541 F.2d 1018, 1028 (4th Cir. 1976) (whether EPA will properly administer provision for variances under Federal Water Pollution Control Act properly reviewable "when a claim for a variance is made in a permit application"), *aff'd in relevant part*, 430 U.S. 112, 128 n.19, 97 S. Ct. 965, 51 L.

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<sup>15</sup> We address whether the NRC, when exercising its power under § 84(c) to approve alternatives to the numbered criteria, must obtain the prior approval of the EPA Administrator when those alternatives do not comply with the EPA active site regulations in a companion opinion that we enter this same day. See *Environmental Defense Fund v. United States Nuclear Regulatory Comm'n*, 866 F.2d 1263 (10th Cir. 1989).

<sup>16</sup> Much of petitioners' argument presents a parade of horrors that will occur at particular mill sites if the NRC does not regulate with the flexibility set forth in the Introduction.

*Ed. 2d 204* (1977). We will not, however, anticipate that the NRC will administer the provision for flexibility so as to violate the command of § 84(c). See *Westinghouse [\*\*1260] Elec. Corp. v. United States Nuclear Regulatory Comm'n*, 555 F.2d 82, 92 (3d Cir. 1977) (refusing to anticipate that application of rule will violate governing statute, [\*\*44] and noting ample opportunity for judicial intervention should such violations occur). We conclude that the Introduction adequately incorporates the § 84(c) command for flexibility.

In a related challenge, petitioners argue that the Criteria as a whole do not adequately distinguish between new and existing mill tailings sites. The premise of this argument is that UMTRCA explicitly requires the [\*\*45] NRC positively to make such a distinction.<sup>17</sup> Even if we accept this premise, however, we believe that the site-specific flexibility incorporated into the Introduction meets such a requirement.

## V

Petitioners next attack those portions of the 1985 Criteria that apply to thorium tailings. Here, they raise two challenges. First, they state that since "thorium and uranium are different elements ... display[ing] different physical characteristics," Brief of Petitioners at 42, application of the 1985 [\*\*46] Criteria to thorium, without additional cost-benefit analysis, is arbitrary and capricious. Second, they challenge on due process grounds the application of the 1985 Criteria to thorium tailings absent a formal adjudication. We address these challenges seriatim.

## A

As part of their authority to regulate "byproduct material," 42 U.S.C. § 2014(e), both the EPA active site regulations, 40 C.F.R. § 192.40-43, and the NRC 1985 Criteria, specifically criteria 6 and 8, regulate thorium

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<sup>17</sup> In arguing that UMTRCA requires the NRC to distinguish between new and existing sites, petitioners rely upon several items of legislative history. See, e.g., H.R. Rep. No. 1080, 95th Cong., 2d Sess., pt. 1, at 16, reprinted in 1978 U.S. Code Cong. & Admin. News 7433, 7438-39 (NRC to consider possible differences in applicability of regulations to existing versus new tailings sites). Petitioners, however, cite no provision of UMTRCA explicitly requiring a distinction between new and existing sites.

tailings. Petitioners correctly state that the NRC did not conduct an independent "scientific and cost-benefit analysis," Brief of Petitioners at 43, of the specific thorium regulations contained in criteria 6 and 8. Nevertheless, we reject their assertion that the thorium regulations are invalid. As previously noted, in *AMC II* we rejected a broad challenge that the EPA active site criteria lacked adequate cost-benefit analysis. 772 F.2d at 646-47. While *AMC II* did not specifically analyze the technical and cost-benefit basis of the thorium active site regulations, we believe that *AMC II*, by explicitly reviewing the regulations "codified at 40 C.F.R. [\*\*47] § 192.30-43," *id.* at 643, adequately upheld the thorium regulations against the broad cost-benefit carping petitioners assert here.

In addition, our review of the record in this case shows that the EPA indeed conducted technical and cost-benefit analysis of its thorium criteria. See EPA-FEIS Vol. I, App. G (Thorium Mill Tailings) (1983), XII R. tab 15; EPA-FEIS Vol. II, B.1.1 to 6.1 (response to Comments Regarding Standards for Thorium Byproduct Materials) XII R. tab 15A. In particular, the EPA concluded, from its Appendix and analysis, "that risks from thorium mill tailings are reasonably comparable to those from uranium mill tailings and that the same numerical standards are appropriate." EPA-FEIS Vol. II, B.3.2, XII R. tab 15A. As we have previously ruled, the NRC may rely upon the EPA technical and cost-benefit analysis supporting its active site criteria. Accordingly, we hold that the NRC thorium regulations are adequately supported by cost-benefit analysis.<sup>18</sup>

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<sup>18</sup> We reject petitioners' argument, based on the NRC ruling in *In re Kerr-McGee Chemical Corp. (Kress Creek Decontamination)*, 23 N.R.C. 799 (1986), that the NRC Atomic Safety and Licensing Board views the EPA active site thorium regulations to be "not scientifically valid" for thorium tailings. Brief of Petitioners at 43. *Kress Creek* expresses no such view. *Kress Creek* was not a tailings pile management case, and its statement that the EPA thorium standards are not appropriate to cleaning up the offsite contamination that was the subject of *Kress Creek* does not render the EPA standards inappropriate to the situation for which they were designed--tailings piles. As the NRC noted in *Kress Creek*, it expressed "no conclusion with regard to the appropriateness of this standard in dealing with a different situation." 23 N.R.C. at 810.

[\*\*48]

[\*1261]

B

Petitioners next assert a constitutional due process challenge. At present, the criteria would apply to only one thorium tailings site, Kerr-McGee Chemical Corporation's West Chicago facility. Petitioners assert that since the thorium criteria would apply only to that site, their promulgation under the APA's informal notice and comment rulemaking procedure, *see* 5 U.S.C. § 553, was improper. *See* 50 Fed. Reg. 41,861 (1985) (Appendix A criteria issued pursuant to § 553). Kerr-McGee argues that applying the criteria to the single thorium site is the "equivalent of an adjudication," Brief of Petitioners at 44, and that the failure to provide Kerr-McGee a formal adjudication on the record, *see* 5 U.S.C. § § 554-57, violated due process.<sup>19</sup>

[\*\*49]

Petitioners premise their claim on the assertion that if a "rulemaking" potentially will apply only to one site, it is not "rulemaking" but is an "adjudication" under the APA. Courts uniformly have rejected this assertion. In *Anaconda Co. v. Ruckelshaus*, 482 F.2d 1301 (10th Cir. 1973), for example, the EPA promulgated a proposed county-wide rule concerning emission of sulfur oxide. *Anaconda* was "the only significant source of sulfur oxide pollution in the

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<sup>19</sup> We read Kerr-McGee's argument as resting purely on constitutional grounds. Kerr-McGee does not claim that the NRC rulemaking procedures were improper under 42 U.S.C. § 2239 in that Kerr-McGee was denied a "hearing," as required by that statute, or that such a hearing did not comply with APA § 553. Nor does Kerr-McGee argue that the § 2239 reference to a "hearing" requires the rulemaking procedure to be conducted "on the record after opportunity for an agency hearing," APA § 553(c), and thus to incorporate the procedural protections of APA § § 556, 557. *See City of West Chicago v. United States Nuclear Regulatory Comm'n*, 701 F.2d 632, 641-45 (7th Cir. 1983) (in licensing adjudication under § 554 of APA, 42 U.S.C. § 2239 does not require formal procedural protections of APA § § 556 and 557). *Cf. United States v. Florida East Coast Ry.*, 410 U.S. 224, 234-38, 35 L. Ed. 2d 223, 93 S. Ct. 810 (1973) (Interstate Commerce Act requirement that Commission promulgate rules "after hearing" did not trigger trial-type procedures of APA § § 556, 557).

county and so concededly the proposed regulation, although general in form, would apply to Anaconda alone." *Id.* at 1303. This court rejected Anaconda's claim that its status as the only regulated party was "conclusive as to whether the hearing should be adjudicatory." *Id.* at 1306. The grant of a public hearing, at which Anaconda appeared and submitted material, satisfied the company's procedural due process rights; an adjudicatory hearing was not required. *Id.* at 1306-07.

Similarly, in *Hercules, Inc. v. EPA*, 194 U.S. App. D.C. 172, 598 F.2d 91 (D.C. Cir. 1978), the EPA issued regulations under the Federal Water Pollution Control Act limiting [\*\*50] discharge of two toxic substances, endrin and toxaphene. Velsicol Chemical Corporation, the sole domestic manufacturer of endrin, and Hercules, Inc., which asserted that it was the sole domestic manufacturer of toxaphene, each argued that the status as the only manufacturer subject to regulation required that the agency use adjudication rather than rulemaking. The court disagreed. It first quoted the Supreme Court's distinction between rulemaking and adjudication, with the former involving promulgation of "policy type rules or standards," and the latter "adjudicat[ing] disputed facts in particular cases." *Id.* at 118 (quoting *United States v. Florida East Coast Ry.*, 410 U.S. 224, 244-45, 35 L. Ed. 2d 223, 93 S. Ct. 810 (1973)). It then noted that, in promulgating the regulations, the EPA was charged by statute to consider general policy issues regarding a pollutant, and that "these inquiries are the same whether the substance is discharged by one manufacturer or one thousand." *Hercules, Inc.*, 598 F.2d at 118. Finally, the court rejected Velsicol's assertion that as the only manufacturer of endrin, it was the only entity affected by the rule. [\*\*51] The court concluded that

"the standards affect the multitude who fish, take drinking water, or otherwise, directly or indirectly, come in contact [\*\*1262] with waters containing the discharged toxic substance, all of whom may appear in proceedings. Toxic substances are mobile, and individuals far from the site of the discharge may be exposed to them. Rulemaking, not adjudication, is the appropriate flexible procedural mechanism to accommodate the input of all concerned."

*Id.*; see also *South Terminal Corp. v. EPA*, 504 F.2d 646, 660-61 (1st Cir. 1974) (that a proposed rule written in general terms imposes regulatory duty on only one facility does not render it "adjudicatory"; no due process violation in not conducting adjudicatory proceedings).

In the instant case, the thorium regulations, although applying to only one site, are written in general terms so as to apply to a prospective class of such sites. The thorium criteria translate general policy concerns about the proper level of emissions into concrete regulations governing all future sites. In addition, the health and environmental effects of thorium tailings potentially affect a multitude [\*\*52] of people, and rulemaking is an appropriate procedural mechanism to accommodate the interests of all concerned. We thus conclude that promulgation of the Appendix A thorium criteria was properly conducted as rulemaking.

That we classify the NRC's action as rulemaking does not automatically resolve whether that rulemaking accorded Kerr-McGee due process. The record shows that the proposed thorium rules were published on November 26, 1984, 49 Fed. Reg. 46,418 (1984), and the comment period, originally scheduled to expire on January 10, 1985, was extended to February 10, 1985. 50 Fed. Reg. 2,993 (1985). Kerr-McGee took full advantage of this time period, submitting extensive written comments concerning the thorium criteria. See I R. tab 6 (comments by Kerr-McGee, et al., before NRC); see also II R. tab 6A, 6B (comments about proposed EPA thorium standards). Further, Kerr-McGee never raised any procedural objections before the NRC or asked to present oral argument or cross-examine witnesses. Cf. *South Terminal Corp.*, 504 F.2d at 660-61. Finally, we note that Kerr-McGee will have a full opportunity in the licensing proceeding concerning [\*\*53] its West Chicago facility to argue that site-specific concerns, 42 U.S.C. § 2114(c), require deviation from the criteria as to that facility. We hold that the rulemaking procedure accorded Kerr-McGee due process.

## VI

Finally, petitioners raise specific challenges to the financial criteria, criteria 9 and 10. First, they challenge criterion 9, which allows for a variety of surety mechanisms to ensure the decontamination, decommissioning, and reclamation of tailings sites, but rejects bare self-insurance:

"However, self insurance, or any arrangement which essentially constitutes self insurance (e.g., a contract with a State or Federal agency) will not satisfy the surety requirement since this provides no additional assurance other than that which already exists through license requirements."

866 F.2d 1246, \*; 1989 U.S. App. LEXIS 649, \*\*;  
29 ERC (BNA) 1055; 19 ELR 20778

Petitioners assert that this rejection of self-insurance is arbitrary and capricious under 5 U.S.C. § 706(2)(A). We disagree.

Criterion 9 was promulgated pursuant to UMTRCA § 203, 42 U.S.C. § 2201(x)(1), which authorizes the NRC to establish

"such standards and instructions as the Commission [\*\*54] may deem necessary or desirable to ensure --

(1) that an adequate bond, surety, or other financial arrangement (as determined by the Commission) will be provided ... by a licensee to permit the completion of all requirements established by the Commission for the decontamination, decommissioning, and reclamation of sites, structures, and equipment used in conjunction with [mill tailings]."

In enacting § 2201(x), Congress left it to the NRC to define what constitutes "adequate" assurance of financial responsibility for decommissioning a site. In the NRC's view, mere self-insurance provided insufficient protection. See NRC-FEIS at 14-9. [\*1263] In light of the current precarious financial situation of most uranium producers, see Brief of Petitioners at 17-19, the NRC's rejection of self-insurance as a form of adequate financial protection is reasonable. Further, criterion 9 does not limit a licensee's financial flexibility in providing financial surety, and it does not require the NRC to reject a licensee's "self-insurance" proposal that would in fact provide additional assurance beyond the licensee's unsupported promise to decommission the site in accordance [\*\*55] with its license. We do not find criterion 9's rejection of bare self-insurance arbitrary or capricious.

Petitioners also argue that criterion 10, which establishes a minimum charge of \$ 250,000 (1978 dollars) to cover the costs of long-term surveillance of each tailings site, is inconsistent with UMTRCA § 203, 42 U.S.C. § 2201(x). Section 203 authorizes the NRC to

"x. Establish by rule, regulation or order ... such standards and instructions as the Commission may deem necessary or desirable to ensure--

...

(2) that ...

(B) in the case of each license for such material (whether in effect on [the date of the enactment of this section] or issued or renewed thereafter), if the Commission determines that any such long-term maintenance and monitoring is necessary, the licensee, before termination of any license for byproduct material as defined in section 2014(e)(2) of this title, will make available such bonding, surety, or other financial arrangements as may be necessary to assure such long-term maintenance and monitoring."

Specifically, petitioners assert that the statutory language "in the case of *each* license ... [\*\*56] if the Commission determines" that such monitoring is necessary--requires the NRC to determine that each site requires such monitoring before imposing any cost. Brief for Petitioners at 45-46 & n.62. We disagree.

By definition, every site regulated under the Appendix A criteria contains uranium or thorium byproduct material. These substances present potential health and environmental hazards for hundreds or even thousands of years into the future, see H.R. Rep. No. 1480, 95th Cong., 2d Sess., pt. 1, at 11, reprinted in 1978 U.S. Code Cong. & Admin. News 7433, 7433. Since all sites pose such long-term hazards, the NRC reasonably interpreted § 203 to apply to each tailings site. The \$ 250,000 initial fee assures that a fund exists to provide basic monitoring and to continue that monitoring into the future. See NRC-FEIS at 14-12 to 14-14. We find criterion 10 to be a proper regulatory implementation of § 2201(x).

For the foregoing reasons, we AFFIRM the NRC Appendix A criteria against the challenges raised herein.