Sollenberger, Dennis

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Sent: Wednesday, July 08, 2009 3:55 PM
To: Sollenberger, Dennis
Subject: Westlaw Document 11_06_13.doc
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Here's the Appeals Board case. Joan

N/31

33 N.R.C. 81, 1991 WL 204282 (N.R.C.)

**1 In the Matter of
KERR–McGEE CHEMICAL CORPORATION (West Chicago Rare Earths Facility)

NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING APPEAL BOARD

(ALAB–944)
Docket No. 40-2061-ML

February 28, 1991

*81 Administrative Judges: Thomas S. Moore, Chairman; Christine N. Kohl; Howard A. Wilber

*93 William D. Seith, Chicago, Illinois (with whom Neil F. Hartigan, Springfield, Illinois, and Michelle D. Jordan, Matthew J. Dunn, Douglas J. Rathe, J. Jerome Sisul, Richard A. Verkler, Joseph Williams, and Joseph M. Claps, Chicago, Illinois, were on the brief and pleadings), for the People of the State of Illinois.

Joseph V. Karaganis, Chicago, Illinois (with whom James D. Brusslan, Chicago, Illinois, and Robert D. Greenwalt, West Chicago, Illinois, were on the brief and pleadings), for the City of West Chicago, Illinois.

Richard A. Meserve, Washington, D.C. (with whom Peter J. Nickles and Herbert Estreicher, Washington, D.C., were on the brief and pleadings) for applicant Kerr–McGee Chemical Corporation.

Bertram C. Frey and Marc M. Radell, Chicago, Illinois, for amicus curiae United States Environmental Protection Agency.

Ann P. Hodgdon (with whom Patricia Jehle was on the brief and pleadings) for the Nuclear Regulatory Commission staff.

Due to developments occurring while the appeals were pending, the Appeal Board vacates the Licensing Board's disposition of Contentions 4(c), 4(d), 4(e), 4(g), 2(k), 2(p), 2(s), 2(u), and 2(h), found in LBP–89–35, 30 NRC 677 (1989), and LBP–90–9, 31 NRC 150 (1990). Even if these new developments did not compel vacation of the Licensing Board's decisions, the Appeal Board concludes that reopening the record on these contentions would be warranted. In addition, the Appeal Board reverses the Licensing Board's disposition of these contentions, as well as Contention 4(a). Finally, the Appeal Board orders the Director of NMSS to revoke the materials license amendment authorized by LBP–90–9, and it terminates the entire proceeding.

RULES OF PRACTICE: STAY OF AGENCY ACTION (IRREPARABLE INJURY)

Whether the moving party will be irreparably injured unless a stay is granted is " "[t]he most significant fact in deciding whether to grant a stay request." " ALAB–928, 31 NRC 263, 267–69 (1990).

NRC POLICY: TRANSFER OF JURISDICTION TO AGREEMENT STATE ATOMIC ENERGY ACT (AEA): TRANSFER OF JURISDICTION TO AGREEMENT STATE

The unquestionable intent of NRC policy on the state agreement process under section 274 of the AEA, is that jurisdiction is to be transferred to an "agreement state" in an orderly manner with minimal disruption to any pending licensing proceeding. See "Criteria for Guidance of States and NRC in Discontinuance of NRC Regulatory Authority and Assumption Thereof by States Through Agreement", 46 Fed.Reg. 7540, 7543 (1981).

NRC POLICY: TRANSFER OF JURISDICTION TO AGREEMENT STATE

ATOMIC ENERGY ACT (AEA): TRANSFER OF JURISDICTION TO AGREEMENT STATE

The transfer of NRC's jurisdiction over section 11(e)(2) byproduct material to an agreement state in and of itself does not necessarily demand immediate termination of an existing NRC licensing proceeding.

RULES OF PRACTICE: MOOTNESS (PENDING APPEAL)

ADJUDICATORY PROCEEDINGS: MOOTNESS (PENDING APPEAL)

It is the duty of an appellate court, upon motion, to reverse or vacate the judgment below and remand with a direction to dismiss an action that has become moot "through happenstance" while pending on appeal. United States v. Munsingwear, Inc. 340 U.S. 36, 39–40 (1940).

RULES OF PRACTICE: MOOTNESS

ADJUDICATORY PROCEEDINGS: MOOTNESS (PENDING APPEAL)

The Munsingwear principle is applicable to unreviewed administrative decisions. See A.L. Mechling Barge Lines, Inc. v. United States, 368 U.S. 324 (1961).

RULES OF PRACTICE: MOOTNESS

ADJUDICATORY PROCEEDINGS: MOOTNESS

"Mootness" means the absence of a "case or controversy"; i.e., the issues presented are no longer "live" or the parties lack a legally cognizable interest in the outcome. Powell v. McCormack, 395 U.S. 486, 496 (1969).

RULES OF PRACTICE: MOOTNESS

ADJUDICATORY PROCEEDINGS: MOOTNESS

A party must overcome a "heavy" burden to demonstrate mootness. See County of Los Angeles v. Davis, 440 U.S. 625, 631 (1979).

RULES OF PRACTICE: MOOTNESS (PENDING APPEAL)

ADJUDICATORY PROCEEDINGS: MOOTNESS (PENDING APPEAL)

Vacating the lower court's decision is fitting only if "happenstance" prevents the completion of appellate review and if that procedure does not prejudice the rights of any of the parties. Munsingwear, 340 U.S. at 40. See also Karcher v. May, 484 U.S. 72, 83 (1987); United States v. Garde, 848 F.2d 1307, 1310 & n. 6 (D.C.Cir.1988).

RULES OF PRACTICE: FINAL AGENCY ACTION

Although a Licensing Board's initial decision on appeal is "preliminary," it nonetheless becomes "immediately effective" insofar as it provides the authority for license issuance, which latter action is considered final for purposes of judicial review. See 10 C.F.R. § 2.764(b); Massachusetts v. NRC, No. 89–1306, slip op. at 17–19 (D.C.Cir. Jan. 25, 1991); Oystershell Alliance v. NRC, 800 F.2d 1201 (D.C.Cir.1986).

RULES OF PRACTICE: MOOTNESS (PENDING APPEAL)

ADJUDICATORY PROCEEDINGS: MOOTNESS (PENDING APPEAL)

"There is ample room for discretion in deciding whether a case is moot, or whether some practical purpose would be served by deciding the merits. If there is an adequate reason to preserve the judgment, the appeal should be decided." 13A C. Wright, A. Miller, & E. Cooper, Federal Practice and Procedure § 3533.10, at 430 (2d ed. 1984). See also Pickus v. United States Bd. of Parole, 543 F.2d 240, 242 (D.C.Cir.1986).

REGULATIONS: 10 C.F.R. PART 40, APPENDIX A

UMTRCA: NRC REGULATIONS; TAILING DISPOSAL SITES

Criterion 6 establishes the basic performance standard for a mill tailings disposal system—there must be reasonable assurance of control of radiological hazards for 1,000 years, and in any event for at least 200 years, and of limiting releases of radon–222 from uranium byproduct materials, and radon–220 from thorium byproduct materials, to the atmosphere. See 10 C.F.R. Part 40, App. A, Criterion 6.

RULES OF PRACTICE: NEW MATERIAL; VACATION

ADJUDICATORY PROCEEDINGS: NEW MATERIAL; VACATION

Agency case law makes clear that, when circumstances change while an adjudicatory decision is pending on appeal so as to supersede or to alter in a significant way the evidentiary basis of that decision, the decision should be vacated. See Tennessee Valley Authority (Browns Ferry Nuclear Plant, Units 1, 2 and 3), ALAB–677, 15 NRC 1387 (1982).

RULES OF PRACTICE: NEW MATERIAL; VACATION

ADJUDICATORY PROCEEDINGS: NEW MATERIAL; VACATION

Vacation of a decision may be appropriate if the Appeal Board finds that new information is "material to the resolution of the issues before [it]" and that, "with appropriate opportunity for comment or rebuttal, [the information] might well have changed the outcome of the appeal." Browns Ferry, ALAB–677, 15 NRC at 1393.

RULES OF PRACTICE: NEW MATERIAL; VACATION

ADJUDICATORY PROCEEDINGS: NEW MATERIAL; VACATION

COMMISSION PROCEEDING(S): PRECEDENT

If an Appeal Board decision "was based on a record that no longer represents the [current] situation ... and will not be reviewed by the Commission, that decision [should be] vacated and shall be given no weight as a precedent." Tennessee Valley Authority (Browns Ferry, Nuclear Plant, Units 1, 2 and 3), CLI-82-26, 16 NRC 880, 881 (1982).

RULES OF PRACTICE: NEW MATERIAL; VACATION

ADJUDICATORY PROCEEDINGS: NEW MATERIAL; VACATION

If, while a Licensing Board's decision is pending on appeal, the applicant indicates its intention to alter its plans substantially, the Appeal Board may vacate the Licensing Board's decision without prejudice. See Delmarva Power & Light Co. (Summit Power Station, Units 1 and 2), ALAB-516, 9 NRC 5 (1979).

RULES OF PRACTICE: NEW MATERIAL; VACATION

ADJUDICATORY PROCEEDINGS: NEW MATERIAL; VACATION

FEDERAL COURTS: VACATION

Agency practice of vacating a decision when circumstances change so as to alter effectively the evidentiary record supporting a decision on appeal is fully consistent with federal court practice. Rule 60(b) of the Federal Rules of Civil Procedure provides that new evidence diligently discovered after trial and decision or "any other reason justifying relief" can deprive a judgment of its operative effect. The "other reason" language in Rule 60(b) simply "vests power in courts adequate to enable them to vacate judgments whenever such action is appropriate to accomplish justice." Klapprott v. United States, 335 U.S. 601, 614-15 (1949).

RULES OF PRACTICE: BURDEN OF PROOF

As the applicant of a license has the burden of proof, the principal focus of the hearing is accordingly on its presentation, not the staff's. See Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-123, 6 AEC 331, 345 (1973); Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-728, 17 NRC 777, 807, review declined, CLI-83-32, 18 NRC 1309 (1983).

ADJUDICATORY HEARINGS: CONSIDERATION OF NRC STAFF NEPA REVIEW

NEPA: NRC RESPONSIBILITIES

The adequacy of the staff's environmental review can be challenged in a hearing. Diablo Canyon, ALAB-728, 17 NRC 777, 807.

NEPA AND AEA: JURISDICTION; REQUIREMENTS

A finding of adequate protection of radiological health and safety under the AEA and UMTRCA, does not necessarily mean that the NRC staff's environmental review under NEPA is sufficient. See generally Limerick Ecology Ac-

tion, Inc. v. NRC, 869 F.2d 719, 729–30 (3d Cir.1989).

RULES OF PRACTICE: RESPONSIBILITIES OF PARTIES (TO INFORM OF NEW INFORMATION)

There is a long-established obligation imposed on all parties in NRC adjudicatory proceedings to call to the attention of both the Licensing Board and other parties "new information which is relevant and material to the matters being adjudicated." Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB–143, 6 AEC 623, 625 (1973).

STAFF TECHNICAL POSITIONS: APPLICATION

REGULATORY GUIDES: APPLICATION

Staff technical positions and the like do not have the force of regulations; rather, they provide guidance to applicants as to acceptable methods for implementing regulatory criteria. Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), CLI–74–40, 8 AEC 809, 811 (1974); Petition for Emergency and Remedial Action, CLI–78–6, 7 NRC 400, 406–07 (1978). "Simply stated, [such] staff guidance generally sets neither minimum nor maximum standards." Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB–725, 17 NRC 562, 568 n. 10 (1983).

RULES OF PRACTICE: REOPENING OF RECORD

Under the Commission's Rules of Practice, a closed record will not be reopened unless the movant satisfies the three criteria found in 10 C.F.R. § 2.734(a)—timeliness, safety or environmental significance, and materiality. In addition, "[t]he motion must be accompanied by one or more affidavits which set forth the factual and/or technical bases for the movant's claim that the [three] criteria ... have been satisfied." 10 C.F.R. § 2.734(b).

RULES OF PRACTICE: REOPENING OF RECORD

STAFF TECHNICAL POSITIONS: SIGNIFICANCE

A staff "working paper" that serves only to explore a new approach and that does not conflict with staff expert testimony in a proceeding is of no regulatory significance. Consolidated Edison Co. of New York (Indian Point Station, Unit No. 2), ALAB–209, 7 AEC 971, 973–74 (1974). As such, a motion to reopen based solely on such a working paper will be denied. Id. at 972–74.

APPEAL BOARD(S): AUTHORITY; ACTION ON NEW MATTERS

Although an Appeal Board has the authority to hear evidence and decide matters in the first instance, the exercise of that authority has always been solely a matter of discretion, dependent upon the particular circumstances of the case and available resources.

UMTRCA: PURPOSE

Congress enacted UMTRCA in 1978 to ameliorate the health and environmental hazards presented by uranium and thorium mill tailings. The purposes of UMTRCA are twofold: first, to provide a remedial action program at inactive mill tailings sites, Pub.L. No. 95–604, § 2(b)(1), 92 Stat. 3022 (1978); and second, to provide a program for the regulation of "mill tailings during uranium or thorium ore processing at active mill operations and after termination of such operations," id. § 2(b)(2), 92 Stat. 3022.

UMTRCA: NRC REGULATIONS

The validity of the Commission's mill tailings regulations, specifically the 10 C.F.R. Part 40, Appendix A Criteria, has been upheld. Quivira Mining Co. v. NRC, 866 F.2d 1246 (10th Cir.1989).

UMTRCA: NRC REGULATIONS; NRC RESPONSIBILITY; COST–BENEFIT ANALYSIS

The UMTRCA cost-benefit analysis only requires the Commission to conduct "cost-benefit rationalization" in issuing regulations and managing mill tailings. Quivira, 866 F.2d at 1251–58. That standard "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." Id. at 1250 (citing AMC I, 772 F.2d at 632).

UMTRCA: NRC REGULATIONS; NRC RESPONSIBILITY; COST–BENEFIT ANALYSIS

The agency's general endeavor to take into account the " "economics of improvements in relation to benefits to the public health and safety," " set forth in the fifth paragraph of the Appendix A Introduction, 10 C.F.R. Part 40, ensures that in future licensing actions the costs of regulation bear a reasonable relationship to its benefits. Quivira, 866 F.2d at 1254.

UMTRCA: APPLICATION; NRC REGULATIONS

The fourth introductory paragraph to Appendix A in 10 C.F.R. Part 40, permitting licensees to propose equivalent alternatives to the Commission's criteria, fully meets all of UMTRCA's site-flexibility requirements. Quivira, 866 F.2d at 1259–60.

UMTRCA: APPLICATION; NRC REGULATIONS

The statutory language of UMTRCA makes no positive distinction between new and existing mill tailings sites, and the legislative history indicates only that NRC is to "consider possible differences in applicability of regulations to existing versus new tailings sites." Quivira, 866 F.2d at 1260 n. 17.

UMTRCA: NRC REGULATIONS; TAILING DISPOSAL SITES

Criterion 1 of Appendix A, 10 C.F.R. Part 40, sets forth the siting requirements of the Commission's mill tailings regulations. Among other things, Criterion 1 requires that the following three site features be considered in assessing the adequacy of a disposal site: (1) remoteness from populated areas; (2) hydrologic and other natural conditions that contribute to the isolation of tailings from groundwater; and (3) the potential for minimizing erosion over the long term. 10 C.F.R. Part 40, App. A, Criterion 1.

REGULATIONS: INTERPRETATION

The starting point in interpreting any regulation is the language and structure of the provision itself. Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB–900, 28 NRC 275, 288, review declined, CLI–88–11, 28 NRC 603 (1988); 1A Sutherland, Statutory Construction § 31.06 (4th ed. 1984).

REGULATIONS: INTERPRETATION

In interpreting a regulation, we must bear in mind the elementary canon of construction that the regulation should be

interpreted so as not to render any part inoperative; the whole of the regulation must be given effect. See Mountain States Tel. & Tel. Co. v. Pueblo of Santa Ana, 472 U.S. 237, 249–50 (1985); 2A Sutherland, Statutory Construction § 46.06.

REGULATIONS: INTERPRETATION

"Although administrative history and other available guidance may be consulted for background information and the resolution of ambiguities in a regulation's language, its interpretation may not conflict with the plain meaning of the wording used in that regulation." Shoreham, ALAB–900, 28 NRC at 288.

REGULATIONS: INTERPRETATION

Disregarding portions of a regulation is a wholly unacceptable method of regulatory construction. Rather, the regulation must be read as it is written and in its entirety. See Natural Resources Defense Council v. EPA, 822 F.2d 104, 113 (D.C.Cir.1987). See also Mountain States, 472 U.S. at 249–50; 2A Sutherland, Statutory Construction § 46.06.

UMTRCA: NRC REGULATIONS; TAILING DISPOSAL SITES

In judging the adequacy of an existing tailings site against the three siting features of Criterion 1 in 10 C.F.R. Part 40, Appendix A, and then comparing that site to alternative sites measured against the same siting requirements, the differences between sites become matters of degree; they are nonetheless to be measured by the same yardstick.

REGULATIONS: INTERPRETATION

While care must always be taken not to apply dictionary definitions mechanically in unintended contexts, see Farmers Reservoir & Irrigation Co. v. McComb, 337 U.S. 755, 764 (1949), such application is appropriate where the purpose of the Commission's word choice is evident.

UMTRCA: NRC REGULATIONS; TAILING DISPOSAL SITES

"[S]iting is of paramount importance in developing optimum tailings disposal programs. The problem of tailings disposal cannot be approached with the attitude that inadequate siting features can be compensated for by design." 45 Fed.Reg. 65,521, 65,524 (1980).

UMTRCA: NRC REGULATIONS; TAILING DISPOSAL SITES (NO ACTIVE MAINTENANCE)

Criterion 12 of Appendix A, 10 C.F.R. Part 40, requires that the final disposition of mill tailings must be such that ongoing active maintenance is not necessary to preserve isolation. See also 10 C.F.R. Part 40, App. A, Criterion 1.

UMTRCA: NRC REGULATIONS; TAILING DISPOSAL SITES

REGULATIONS: INTERPRETATION (10 C.F.R. PARTS 40 AND 61)

It is clear from the Part 61 regulations themselves that the Commission did not intend for any part thereof to be applied to Part 40 mill tailings disposal. See 10 C.F.R. § 61.2.

REGULATIONS: INTERPRETATION

If regulations are to have any meaning, express exclusions and prohibitions must be obeyed. In some circumstances, if a regulation does not define a particular term, it may be acceptable to borrow the definition of a like term from another part of an agency's regulations. But this can never be the case where there are specific prohibitions against such application.

RULES OF PRACTICE: SUMMARY DISPOSITION

Only if there are no genuine issues of material fact and the moving party is entitled to a decision as a matter of law, may the presiding officer grant a motion for summary disposition. 10 C.F.R. § 2.749(d). See, e.g., Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units Nos. 3 and 4), ALAB–660, 14 NRC 987, 1003 (1981) (citing Virginia Electric and Power Co. (North Anna Nuclear Power Station, Units 1 and 2), ALAB–584, 11 NRC 451, 453 (1980)).

RULES OF PRACTICE: SUMMARY DISPOSITION (MATERIAL FACT)

A material fact is one that affects the outcome of the litigation or tends to resolve any of the issues raised by the parties. See generally 10A C. Wright, A. Miller, & M. Kane, Federal Practice and Procedure § 2725, at 93–95 (1983).

RULES OF PRACTICE: SUMMARY DISPOSITION (MATERIAL FACT)

If a disputed issue of material fact exists, a motion for summary disposition must fail. See, e.g., Public Service Co. of N.H. (Seabrook Station, Units 1 and 2), ALAB–924, 30 NRC 331, 345–47 (1989).

RULES OF PRACTICE: SUMMARY DISPOSITION

In weighing the evidence, it is well-settled that all inferences must be drawn in favor of the party opposing summary disposition. See, e.g., Adickes v. S.H. Kress & Co., 398 U.S. 144 (1970).

RULES OF PRACTICE: SUMMARY DISPOSITION; EXPERT WITNESS(ES)

As has been observed, "[e]xpert opinion is admissible and may defeat summary judgment if it appears the affiant is competent to give an expert opinion and the factual basis for the opinion is stated in the affidavit, even though the underlying factual details and reasoning upon which the opinion is based are not." Bulthuis v. Rexall Corp., 789 F.2d 1315, 1318 (9th Cir.1985). See also Fed.R.Evid. 703, 705.

UMTRCA: NRC RESPONSIBILITY; COMPLIANCE WITH EPA REGULATIONS

Concerning the longevity requirement of Criterion 6, the Commission recognized that "EPA's primary design standard is 1,000 years. Accordingly, the Commission has no discretion to promulgate a different design standard for a shorter period." 50 Fed.Reg. at 41,856 (1985). "The 200–year minimum longevity requirement [of Criterion 6] provides relief in those unique reclamation situations where the 1,000–year criterion can be shown to impose too much of a cost hardship. The Commission views the EPA longevity standard to be 1,000 years unless site specific circumstances preclude meeting 1,000 years." Id. at 41,858.

UMTRCA: NRC REGULATIONS; EPA STANDARDS

The concern of the Commission's mill tailings regulations that the design of tailings disposal sites effectively resist human intrusion can be traced, in part, to the EPA mill tailings regulations that are intended to inhibit the "misuse" of tailings. See 40 C.F.R. § 192.20(a)(1); AMC I, 772 F.2d at 632–33.

LICENSE: REVOCATION

RULES OF PRACTICE: LICENSE REVOCATION

There no longer being a record and decision to support authorization of a license amendment, it necessarily must be revoked as well. See Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-902, 28 NRC 423, 434, review declined, CLI-88-11, 28 NRC 603 (1988).

ATOMIC ENERGY ACT (OR AEA): HEARING RIGHT; HEARING REQUIREMENT (MATERIALS LICENSE)

The need for a new license amendment triggers the right to a hearing under section 189(a) of the Atomic Energy Act. 42 U.S.C. § 2239(a)(1). See Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-785, 20 NRC 848, 884 n. 163 (1984); id., ALAB-778, 20 NRC 42, 48 (1984), aff'd sub nom. Anthony v. NRC, 770 F.2d 1066 (3d Cir.1985).

ATOMIC ENERGY ACT (AEA): TRANSFER OF JURISDICTION TO AGREEMENT STATE; HEARING REQUIREMENT

In any byproduct material licensing proceeding conducted by an agreement state, section 274(o)(3) of the AEA requires the State to provide procedures that include (1) an opportunity, after public notice, for written comments and a public hearing, with a transcript, (2) an opportunity for cross examination, and (3) a written determination which is based upon findings included in such determination and upon the evidence presented during the public comment period and which is subject to judicial review. 42 U.S.C. § 2021(o)(3). See State Agreement Policy, 46 Fed.Reg. at 7544; 10 C.F.R. § 150.31(b)(3)(i).

TECHNICAL ISSUES DISCUSSED

Byproduct Material

Cell Design

Erosion

Half-lives

Intrusion Barrier

Mill Tailings

Probable Maximum Precipitation (or PMP)

Radioactivity Waste Storage

Site Suitability

DECISION

Pending before us are the appeals of the People of the State of Illinois ("the State") and the City of West Chicago ("the City") from the Licensing Board's February 1990 initial decision authorizing the issuance of a license amendment to the applicant, Kerr–McGee Chemical Corporation, for its West Chicago Rare ***94** Earths Facility.[FN1] The license amendment permits Kerr–McGee permanently to dispose of approximately 376,400 cubic meters [FN2] of radioactive thorium "mill tailings" and other associated wastes in an engineered "disposal cell" on 27 acres of the site of its Rare Earths Facility—a facility that will then be decommissioned.[FN3] The site is located in the midst of a densely populated residential area in the City of West Chicago in DuPage County, Illinois. The waste is to be piled above grade, several meters over the water table, on compacted clay soils. A cap is to be placed over the waste, composed of several intermediate layers of clay, geotextile material, and sand and gravel, topped with a two-feet thick "intrusion barrier" of graded clays and cobble and a two-feet thick cover of topsoil and vegetation. All together, the waste pile is to be approximately 35 feet high, with side slopes of 1:5.[FN4]

While the appeals were pending, several significant developments occurred, including the Commission's approval of an agreement under section 274 of the Atomic Energy Act (AEA) [FN5] transferring regulatory jurisdiction over "section 11(e)(2) byproduct material"—like the mill tailings involved here [FN6] —to the State of Illinois. These significant developments subsequent to the rendering of the Licensing Board's decision prompted numerous motions and other filings over the last year from all of the parties, several of which remain undecided.

Upon consideration of the lengthy record in this proceeding, the initial decision and related rulings of the Licensing Board, and subsequent pertinent events, we conclude, as explained below, that the Licensing Board's decisions must be vacated, or in the alternative reversed, and the license amendment necessarily must be revoked. We also conclude that this NRC proceeding must be terminated.

I. Background

****9** Kerr–McGee produced thorium at the West Chicago facility from 1967, when it acquired the plant in a merger with American Potash & Chemical Company, ***95** to 1973, when it ceased this operation. The NRC has had the disposal of the waste materials generated at the West Chicago site under consideration since at least 1976.[FN7] Shortly after Congress enacted the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA),[FN8] the NRC staff issued a notice to Kerr–McGee advising that its existing license for the West Chicago facility was being amended to include a requirement that Kerr–McGee submit a detailed plan for decontamination and decommissioning of the facility and disposal of the ore residues located at the site.[FN9] Kerr–McGee submitted a "stabilization plan" in August 1979, and several months later the Commission gave notice of its intent to prepare a draft environmental impact statement (DEIS) "to support future licensing action." [FN10] The DEIS was issued in May 1982, followed a year later by the Final Environmental Statement (FES). The FES prepared by the NRC staff considered eight alternatives, none of which involved permanent onsite disposal, as Kerr–McGee had proposed. The staff recommended approval of onsite storage of the thorium mill tailings for an indeterminate period of time, subject to monitoring before deciding whether to approve the site and cell design for permanent disposal.[FN11]

Soon thereafter, the Commission issued a notice of opportunity for hearing on the licensing actions recommended in the FES, thus initiating this licensing proceeding.[FN12] The State's request for a hearing was granted and it was admitted as a party to the litigation. Among the contentions it sought to raise was a challenge to the staff's proposal for indeterminate onsite storage as an improper segmentation under the National Environmental Policy Act (NEPA).[FN13] The State argued that Kerr–McGee's proposal for permanent onsite storage must be considered and rejected. The Licensing Board agreed that permanent onsite disposal must be considered, and, accordingly, it directed the staff to prepare and circulate a supplement to its FES addressing this subject.[FN14]

The instant proceeding essentially remained inactive until 1989, when the staff issued its Supplement to the FES (SFES).[FN15] The Licensing Board subsequently admitted several of the State's additional contentions based on the

*96 SFES.[FN16] It also ruled on a staff motion to hold the proceeding in abeyance. The occasion for the staff's motion was a then-pending request by the State, asking the Commission to transfer its jurisdiction over section 11(e)(2) byproduct material, like the mill tailings involved here, to the State, pursuant to section 274 of the AEA. The staff estimated that it would take 6 to 12 months for the Commission to complete action on the State's request, and it expressed a desire not to devote further resources to this proceeding. The State supported the staff's motion to hold the proceeding in abeyance, and Kerr–McGee opposed it. After considering the equities involved and the resources already expended in the litigation, the Board denied the staff's motion and set a schedule for the filing of summary disposition motions and hearing.[FN17]

**10 In the meantime, the United States Environmental Protection Agency (EPA) reviewed the SFES and expressed certain concerns about permanent onsite storage of the mill tailings.[FN18] Pursuant to its responsibility under UMTRCA, EPA has promulgated the general health and safety standards (the "Mill Tailings Standards," found in 40 C.F.R. Part 192), which the NRC applies and implements in regulating the disposal of mill tailings under its own regulations in 10 C.F.R. Part 40, Appendix A. After being apprised of EPA's concerns about the SFES, the Licensing Board solicited comments from the parties.[FN19] In addition, the City of West Chicago, which had not previously sought to participate in the proceeding,[FN20] petitioned for and was granted permission to participate as an interested government under 10 C.F.R. § 2.715(c).[FN21]

Following the filing of motions for summary disposition by both Kerr–McGee and the State, the Licensing Board resolved most of the issues in Kerr–McGee's favor, and scheduled a two-day hearing on two of the remaining issues for the next month.[FN22] On February 13, 1990, the Licensing Board issued the initial decision now before us on review. The Board concluded that EPA's concerns about the SFES had "no direct impact on the admitted contentions and thus need not be considered.[FN23] It then went on to resolve all the remaining issues in Kerr–McGee's favor and, subject to two conditions, authorized the staff to issue a license amendment to Kerr–McGee permitting permanent onsite disposal of the *97 mill tailings in a cell as described in Kerr–McGee's application and supporting materials.[FN24]

The State and the City appealed and moved for a stay of the license amendment authorization. Both Kerr–McGee and the staff opposed the grant of a stay. On March 13, 1990, we denied the stay motion, explaining in a subsequent memorandum that we could not find, at that time, any irreparable injury—" "[t] he most significant fact in deciding whether to grant a stay request." " [FN25] In this connection, we noted that

> Kerr–McGee's activities and expenditures over the next few months will be quite limited and, for the most part, confined to site work that would have to be conducted regardless of whether the contaminated soils and sediments involved are ultimately disposed of onsite or at another location. This being so, Kerr–McGee's limited expenditures during the administrative appeal process cannot reasonably be said to skew the ultimate cost-benefit analysis, should it need to be revisited.[FN26]

During the briefing and consideration of the State's and the City's motions for a stay, several related events occurred. On February 23, the staff issued the license amendment to Kerr–McGee.[FN27] On or about March 6, however, the City issued a "stop work" notice and informed Kerr–McGee that it was obliged to comply with a local ordinance concerning dust control and erosion before commencing the onsite disposal operation. Kerr–McGee challenged the City's action in federal district court. The court denied Kerr–McGee's request for a preliminary injunction and was affirmed on appeal.[FN28] Thus, although Kerr–McGee's license amendment remains outstanding, disposal activities have apparently not yet begun.

**11 Before either the State or the City filed their briefs on appeal, we invited EPA to file an amicus curiae brief expressing its views on the Licensing Board's decision.[FN29] EPA accepted our invitation. In its brief, EPA states that "the disposal method currently approved in the Initial Decision may not meet all of the applicable standards found in 40 C.F.R. Part 192," and recommends that we remand the matter to the Licensing Board for further consideration of the *98 comments EPA submitted to the agency in July 1989 in connection with the SFES.[FN30]

As a result of EPA's brief, specifying several areas in which that agency believes the Kerr–McGee disposal proposal fails to satisfy the Mill Tailings Standards, the NRC staff requested approximately two additional months in which to file its brief in response to those of the State, the City, and EPA. The staff's extension request noted that the EPA brief has a "potentially significant bearing on the arguments made by the State and the City." [FN31] The staff also asserted a need for more time to obtain additional information from Kerr–McGee and to analyze it to determine whether there is warrant for reconsideration of the staff's positions on certain issues in this proceeding, "for example, regarding probable maximum precipitation and associated design and maintenance implications." [FN32] We granted the staff's request.[FN33]

Over the next two months, the staff held several meetings with Kerr–McGee, obtaining additional information and details about the disposal cell.[FN34] At about this same time, the staff was also in the process of reevaluating its generic position on some of the same matters raised by the State during the hearing and questioned by EPA in connection with the SFES. On August 10, the staff filed its brief, opposing the State's and the City's appeals. The staff indicates that it has changed its position on certain issues from that asserted before the Licensing Board, and that its further, post-hearing review of Kerr–McGee's disposal cell has resulted in "engineering specifications that may vary from the engineering implications of conclusions reached by the Licensing Board." [FN35] The staff nonetheless concludes that the proposed onsite disposal is adequate to protect the public health and safety and satisfies the requirements of 10 C.F.R. Part 40, Appendix A, "provided ... that the license is amended to incorporate the specifications for the protective rock and the other design details provided in Kerr–McGee's submissions [to the staff] of July 23, 1990 and July 31, 1990." [FN36] While the staff acknowledges that the other parties are entitled to an opportunity to respond to this new information, it urges that this process take place before us, without a remand to the Licensing Board.[FN37]

***99** The staff's brief prompted a motion from the State and the City to vacate the license amendment issued to Kerr–McGee because

> [t]he design approved by the [Licensing Board] is not the design now before the Appeal Board. Indeed, Kerr–McGee and the NRC staff have now rejected the design assumption of the [Licensing Board-] approved project and have offered a new design based on dramatically different technical assumptions.[FN38]

****12** The State and the City request that this matter also be remanded to the Office of Nuclear Material Safety and Safeguards (NMSS) for processing as a new license amendment application. In the alternative, the movants contend that the adjudicatory record be reopened and remanded to the Licensing Board for consideration in the first instance. Kerr–McGee opposes the motion, arguing that any new developments occasioned by the staff's consideration of EPA's concerns are beyond the proper scope of this proceeding. While the staff contends that we should proceed with review of the Licensing Board's decision, at the same time it has no objection to reopening for our consideration of certain new information. The staff also repeats its earlier view that the other parties should have a chance to respond to this new information.

Following the receipt of the State's, the City's, and Kerr–McGee's briefs in reply to that of the staff, yet another event occurred that would have an effect on this protracted litigation. On October 17, the Commission approved the State's request, pursuant to section 274 of the AEA, for the authority to regulate section 11(e)(2) byproduct material.[FN39] This agreement, which took effect on November 1, 1990,[FN40] led to another round of motions. The State and the City now maintain that this proceeding is moot by reason of the Commission's transfer to the State of regulatory control over the mill tailings here involved. Asserting a lack of jurisdiction, they move for termination of the proceeding and vacation of the Licensing Board's initial decision. Kerr–McGee opposes both terminating the proceeding and vacating the Board's decisions, and it urges us to resolve the pending appeals. It also argues that, if we nonetheless terminate the proceeding, the Licensing Board's decision should be allowed to stand for equitable reasons. The NRC staff argues that the proceeding should be terminated but the decision below should not be vacated.

***100** Finally, on December 5, the Illinois Department of Nuclear Safety (IDNS) notified Kerr–McGee that, as a result of the State's recent assumption of jurisdiction over section 11(e)(2) byproduct material, it now has authority over the NRC license issued to Kerr–McGee for the onsite disposal of mill tailings at West Chicago. The IDNS went

on to inform Kerr–McGee that its license would expire within 90 days of receipt of the letter (i.e., March 10, 1991), but that Kerr–McGee could apply for a new license with the IDNS.[FN41] Kerr–McGee quickly moved for a protective order from us, arguing that the IDNS letter revealed an inappropriate attempt to arrogate our authority to decide, among other matters, the State's and City's own pending motion to terminate and vacate. Kerr–McGee claims that a protective order is necessary to preserve our jurisdiction and the status quo, as well as to prevent unspecified irreparable harm to Kerr–McGee. The State, City, and staff all oppose Kerr–McGee's motion.

On January 16, 1991, we heard lengthy oral argument from all the parties (except amicus EPA) on the appeals; the motion to vacate the license amendment and to remand for consideration of recent new developments in this case; and the motion to terminate the proceeding for lack of jurisdiction and to vacate the Licensing Board's decision.

II. The Effect of the Transfer of Jurisdiction to Illinois

**13 The State and the City argue that, as a consequence of the Commission's October 17, 1990, approval of the agreement transferring regulatory authority over section 11(e)(2) byproduct material—the subject of this proceeding—to the State, the Commission has affirmatively relinquished its jurisdiction (and that of its adjudicatory boards) over the instant proceeding. In their view, this lack of jurisdiction makes the case now moot, and our decision in the Sheffield proceeding [FN42] requires that we immediately terminate this case and vacate the Licensing Board's decision, removing all operative effect.[FN43] In Sheffield, while the case was pending before us on the appeal of the respondent in that show-cause proceeding, the Commission agreed to transfer its regulatory authority over the Sheffield waste disposal site to Illinois pursuant to a section 274 agreement. Noting that the NRC staff had withdrawn (or was about to withdraw) its show-cause order that initiated the proceeding, and citing the Supreme Court's decision *101 in United States v. Munsingwear, Inc.,[FN44] we vacated the Licensing Board orders pending on appeal and terminated the proceeding.[FN45]

Kerr–McGee strongly opposes the State's and the City's motion. It points out that, in responding to a petition for reconsideration of the decision approving the section 274 agreement with Illinois, the Commission explicitly declined to express an opinion as to how the motion to terminate and vacate should be decided.[FN46] Kerr–McGee also argues that "[t]he Commission has only approved the State regulatory program in general terms and not as applied to any specific site, including, in particular, the West Chicago facility." [FN47] In addition, it distinguishes Sheffield and asserts that, inasmuch as the propriety of Kerr–McGee's disposal plan remains a live controversy, the case is not moot, making the application of Munsingwear both inappropriate and unfair in the circumstances here.[FN48] The staff agrees with the State and the City that the proceeding must be terminated, but argues against vacation of the Licensing Board's decision, contending that neither Sheffield nor Munsingwear requires such action here.[FN49]

We think it clear that, in executing the section 274 agreement with Illinois last fall, the Commission did not intend for this proceeding to cease immediately simply by virtue of the existence of that agreement. Well aware of the status of this proceeding, the Commission had at least two opportunities to terminate the matter itself or to direct us to do so, and, as Kerr–McGee points out, it declined to do either.[FN50] The Commission's approval of the agreement with Illinois is also couched in unmistakably generic terms and refers to another potential, site-specific proceeding involving the West Chicago site.[FN51]

Further, the Commission policy on the state agreement process, pursuant to which the agreement was negotiated and executed, provides that,

> [i]n effecting the discontinuance of jurisdiction, appropriate arrangements will be made by NRC and the State to ensure that there will be no interference with or interruption of licensed activities or the processing of license applications, by reason of the transfer.[FN52]

**14 The unquestionable intent of this NRC policy is that jurisdiction is to be transferred to an "agreement state" in an orderly manner, with minimal disruption *102 to any pending licensing proceeding, such as that here.[FN53] The agreement with Illinois in this case contains no indication that "appropriate arrangements" have been made to assure this orderly process; indeed, it is silent as to its effect on any pending licensing or enforcement proceedings.[FN54] It is reasonable to infer from this and from the Commission's statement declining to express an opinion on how the

motion to terminate and to vacate should be decided,[FN55] however, that those "appropriate arrangements" are to be fashioned in and through this adjudicatory proceeding. Thus, in these circumstances, we find unpersuasive the argument that the transfer of jurisdiction to the State in and of itself demands immediate termination of this proceeding.

We also disagree with the State and the City that this proceeding is moot and that the Munsingwear case thus requires vacation of the decisions pending appeal. The Court in Munsingwear held that it is the duty of an appellate court, upon motion, to reverse or vacate the judgment below and remand with a direction to dismiss an action that has become moot "through happenstance" while pending on appeal.[FN56] "Mootness" means the absence of a "case or controversy"; i.e., the issues presented are no longer "live" or the parties lack a legally cognizable interest in the outcome. [FN57] But here, Kerr–McGee has not retreated from its onsite disposal plan, and the litigation over it promises to continue among the principal parties in a variety of federal, state, and administrative forums, amply demonstrating that the controversy is quite alive and active. The State and the City have thus failed to meet their "heavy" burden of demonstrating mootness.[FN58]

It is also clear from the case law that, even if this case can be considered technically moot by reason of the agreement transferring jurisdiction over byproduct material to the State, Munsingwear does not necessarily require ***103** vacation of the judgment below. The Court stressed in Munsingwear that vacating the lower court's decision was fitting only if "happenstance" prevents the completion of appellate review and if that procedure does not prejudice the rights of any of the parties.[FN59] Relying on this reasoning in Karcher v. May, the Supreme Court dismissed the appeal for want of jurisdiction, but declined to vacate the lower court's decision. The Court concluded that the "controversy did not become moot due to circumstances unattributable to any of the parties. The controversy ended when the losing party ... declined to pursue its appeal. Accordingly, the Munsingwear procedure is inapplicable to this case." [FN60] So too, the court of appeals in United States v. Garde declined to vacate the lower court's decision, even though the case became moot while the appeal was pending. The court determined that it would be unfair to the parties that prevailed below to lose the ongoing benefits and operative effect of their victory in district court as a result of actions taken by the losing party while its appeal was pending.[FN61]

****15** Although one can debate where the responsibility, in fact, lies for effecting the transfer of jurisdiction over mill tailings from the NRC to Illinois, no one can reasonably characterize this event as "happenstance" or an action "unattributable to any of the parties." The State actively sought this new regulatory authority, over the strong objections of Kerr–McGee.[FN62] This is not to imply culpable behavior on the part of the State in seeking the transfer of jurisdiction or on the part of the Commission in agreeing to it; indeed, section 274 of the AEA seemingly encourages such agreements. It does, however, render inapplicable the mechanical application of the Munsingwear doctrine.

The Supreme Court also did not expect rigid adherence to Munsingwear when the rights of any party might be prejudiced. While the extent of harm to Kerr–McGee's rights can be disputed, it cannot be gainsaid that the act of vacating the decision below, which would in turn necessarily require the revocation of the license amendment already issued to Kerr–McGee,[FN63] surely amounts to the kind of prejudice the Court in Munsingwear sought to avoid.[FN64] In other words, ***104** if the decision below is to be vacated and the license revoked, it should be thus after consideration on the merits, not as a consequence of applying the largely procedural rule of Munsingwear.

Both courts and commentators recognize that, if there is any doubt as to mootness, the better course is to decide the case. "There is ample room for discretion in deciding whether a case is moot, or whether some practical purpose would be served by deciding the merits. If there is an adequate reason to preserve the judgment, the appeal should be decided." [FN65] In short, the very principles that underlie the Munsingwear doctrine strongly militate against its application by rote in the circumstances here. Thus, insofar as the State's and the City's October 22 motion seeks the immediate termination of this proceeding and the corresponding vacation of the Licensing Board's initial decision, by reason of the Commission's approval of the agreement transferring jurisdiction over mill tailings to the State, the motion is denied.

III. Developments Since the Issuance of the Initial Decision

As noted above, following the filing of the staff's brief on the merits in response to their appeals, the State and the City filed a joint motion to "vacate as moot the materials license amendment issued to Kerr–McGee" as a consequence of the Licensing Board's initial decision, to remand this matter to the Director of NMSS for review of "Kerr–McGee's new design," and, in the alternative, to reopen the record of this proceeding and to remand it to the Licensing Board for consideration of "whether Kerr–McGee's new cell design satisfies" 10 C.F.R. Part 40, Appendix A.[FN66] The State and the City argue that this action has become necessary because, subsequent to the issuance of the Licensing Board's decision, (1) Kerr–McGee has made design changes; (2) the NRC staff has reversed the position it took in the hearing below and has rejected the design approved by the Licensing Board; (3) Kerr–McGee, the staff, and EPA have submitted into the record of this proceeding substantial "additional material evidence that goes to the heart of this matter;" and (4) Kerr–McGee and the staff now rely on the rock riprap (i.e., clay-cobble) intrusion barrier (rather than the top vegetative cover) [FN67] as the primary means to prevent erosion.[FN68]

**16 To understand the import of the State's and the City's motion, it is necessary to view it in the context of the pertinent contentions admitted for litigation and *105 the governing regulatory criteria, found in 10 C.F.R. Part 40, Appendix A.[FN69] For example, Criterion 3 states that "[t]he "prime option" for disposal of tailings is placement below grade," but recognizes that full below grade burial may not always be "practicable." In such cases, "it must be demonstrated that an above grade disposal program will provide reasonably equivalent isolation of the tailings from natural erosional forces." Criterion 4 establishes certain site and design standards that "must be adhered to whether tailings or wastes are disposed of above or below grade." For instance,

> (a) Upstream rainfall catchment areas must be minimized to decrease erosion potential and the size of floods which could erode or wash out sections of the tailings disposal area.
>
> * * *
>
> (c) 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....
>
> (d) A full self-sustaining vegetative cover must be established or rock cover employed to reduce wind and water erosion to negligible levels.
>
> Where a full vegetative cover is not likely to be self-sustaining due to climatic or other conditions, such as in semi-arid and arid regions, rock cover must be employed on slopes of the impoundment system....
>
> The following factors must be considered in establishing the final rock cover design to avoid displacement of rock particles by human and animal traffic or by natural process, and to preclude undercutting and piping:
>
> Shape, size, composition, and gradation of rock particles (excepting bedding material average particles [sic] size must be at least cobble size or greater);
>
> Rock cover thickness and zoning of particles by size; and
>
> Steepness of underlying slopes.
>
> Individual rock fragments must be dense, sound, and resistant to abrasion, and must be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost actions....
>
> * * *
>
> ... In addition to providing for stability of the impoundment system itself, overall stability, erosion potential, and geomorphology of surrounding terrain must be evaluated to assure that there are not ongoing or potential processes, such as gully erosion, which would lead to impoundment instability.

Criterion 6 establishes the basic performance standard for a mill tailings disposal system—i.e., a design that

> provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the exten[t] reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases if radon–222 from uranium byproduct materials, and radon–220 from thorium byproduct materials, to the atmosphere so as to not

> exceed an average release rate of 20 ***106** picocuries per square meter per second ... to the extent practicable throughout the effective design life determined pursuant to (i) above. [[[Footnote omitted.]

****17** Finally, Criterion 12 requires that "[t]he final disposition of tailings or wastes at milling sites should be such that ongoing active maintenance is not necessary to preserve isolation." State Contentions 4(c), 4(d), 4(e), and 4(g), admitted by the Licensing Board, alleged that the Kerr–McGee proposal would require "active maintenance" or would not minimize erosion, contrary to Criteria 3, 4, 6, and 12.[FN70]

In their motion to vacate, the State and the City focus on principally three matters addressed by the parties in their presentations and resolved by the Licensing Board against the position asserted by the State. First, they point out that Kerr–McGee and the staff maintained below that the top vegetative cover on the pile would provide the primary erosion protection.[FN71] Consequently, the Licensing Board found that it was not necessary to "scrutinize the parameters of the rock riprap intrusion barrier to determine if the barrier itself will prevent erosion," as the State had urged.[FN72]

Second, the State and the City note that "the Licensing Board—at the urging of Kerr–McGee and Staff—adopted a narrow definition of active maintenance, such that Kerr–McGee's anticipated maintenance of the vegetation cover could not be considered "active." " [FN73] Specifically, under Kerr–McGee's proposal, for the vegetative cover "to be sustained permanently as a prairie ecosystem [[[,] it must be burned or mowed every few years, otherwise natural vegetative succession will cause a forest to develop." [FN74] As seen above, Appendix A Criterion 12 dictates that no "ongoing active maintenance" must be necessary in order to preserve isolation of the mill tailings.[FN75] Appendix A, however, does not define "active maintenance." The Licensing Board thus looked elsewhere and adopted the definition of "active maintenance" in 10 C.F.R. Part 61, the NRC regulations governing the "Licensing Requirements for Land Disposal ***107** of Radioactive Waste." [FN76] That definition excludes "custodial activities such as repair of fencing, repair or replacement of monitoring equipment, revegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep such as mowing grass." [FN77] Accordingly, the Licensing Board concluded that "the maintenance contemplated by Kerr–McGee to preserve the prairie vegetation is clearly not "active maintenance" as that term is defined in section 61.2." [FN78]

Third, contrary to the State's position,[FN79] Kerr–McGee and the staff contended that it was not necessary to consider how a "Probable Maximum Precipitation" (PMP) event would affect the erosion of the disposal cell. A PMP event is the "theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year." [FN80] The Licensing Board concluded that the analyses performed by Kerr–McGee and the staff, which were based on assumptions of storm magnitude somewhat less than a PMP event, were acceptable under Appendix A and demonstrated that "the topsoil of the cell will not be lost by erosion over its design life." [FN81] The Board also found that

> ****18** [t]he bare allegation that a larger storm event should have been considered is insufficient to call into question the analyses performed by Kerr–McGee and Staff.... Moreover, the definition of "active maintenance" contained in section 61.2 contemplates that certain minor repairs to the cell cover are permissible. The damage that Dr. Thiers [the State's witness] alleges will take place appears to be of the sort that could be corrected by minor repairs.[FN82]

The State and, in most instances, the City challenge the Licensing Board's rulings in regard to these matters in their briefs on appeal. They also note that EPA, in its amicus brief, expressed reservations about the same concerns—i.e., reliance on the vegetative cover as the primary erosion barrier, the definition of "active maintenance," and use of a storm less than a PMP event.[FN83] Most significant, however, the State and the City contend that, during the pendency of their appeals, the NRC staff "has abandoned its position before the [Licensing Board] and has adopted virtually every concern related to erosion articulated by Illinois, West Chicago and EPA." [FN84] They contend further that, as a consequence ***108** of the staff's change in position on these various issues, Kerr–McGee has made design modifications in the clay-cobble intrusion barrier, diversion ditch, and sedimentation basin, and that the staff has acknowledged that these new specifications must be incorporated into a new license amendment.[FN85]

The State and the City therefore argue that these changes have rendered moot the license amendment approved by the Licensing Board and already issued to Kerr–McGee, and that it would be "inappropriate" for us "to review the original and withdrawn design" and the Licensing Board decision thereon.[FN86] They contend that the license amendment must be vacated and the design changes referred to the Director of NMSS for the usual pre-hearing review given by the staff to applications under 10 C.F.R. § 2.101(a).[FN87] In this connection, the State and the City note that under section 189 of the Atomic Energy Act [FN88] they are entitled to a hearing on any such license amendment, and they invoke that right here.[FN89] In the alternative, they move for a reopening of the record and remand to the Licensing Board for consideration of the new information generated since the issuance of that Board's initial decision.[FN90]

Kerr–McGee opposes the joint motion. It contends at the outset that both the EPA amicus brief and the NRC staff's response to EPA's concerns (presumably as set forth in the staff's August 10 brief on appeal) should be "disregarded." [FN91] Kerr–McGee denies that it has made any significant changes in the cell design and directs most of its reply to a discussion of the PMP issue. Relying on the "Erosion Evaluation" it submitted to the staff last summer in response to the latter's request for further information during the pendency of this appeal,[FN92] Kerr–McGee asserts that it has "demonstrated" the adequacy of the cell design to withstand a PMP event and erosion.[FN93] Again focusing solely on the PMP issue, Kerr–McGee also argues that none of the Commission's criteria for reopening a record has been satisfied by the State and the City in their motion.[FN94]

**19 *109 The NRC staff's reply to the State's and the City's motion is confusing at best. It notes that "Kerr–McGee has not withdrawn its design for the cell ..., but has merely specified certain design details in response to [[[the staff's] request." [FN95] The staff fails to mention, however, that it requires a license amendment for these newly provided "design details." [FN96] As for the alternative motion to reopen, the staff does not object to reopening the record for consideration of the "new evidence" contained in the Erosion Evaluation and the staff's "Technical Evaluation Report" on that Kerr–McGee submission,[FN97] but urges us to receive and consider the parties briefs in reply to the staff before making a reopening determination.[FN98]

A. We turn first to the movants argument that the staff's changes in position and the corresponding design specifications added by Kerr–McGee warrant vacation of the Licensing Board's decision authorizing the issuance of the license amendment to Kerr–McGee.

Agency case law makes clear that, when circumstances change while an adjudicatory decision is pending on appeal so as to supersede or to alter in a significant way the evidentiary basis of that decision, the decision should be vacated. For example, in Browns Ferry, after we completed our appellate review of the Licensing Board's decision and while our decision was pending review by the Commission, we learned that the Tennessee Valley Authority (TVA) had substantially amended the waste disposal proposal at issue in that case through various submissions it had made to the staff.[FN99] Specifically, it transformed its proposal to reduce, incinerate, and store low-level radioactive waste during the life of the plant to a five-year onsite storage plan.[FN100] We rejected TVA's argument that this was not "a material alteration of its earlier presentation," [FN101] noting that our prior decision in ALAB–664 [FN102] turned on the very matters now addressed in TVA's latest submissions to the staff—i.e., "TVA's failure to explain on the record how five year storage was to be separated from the original integrated proposal including long-term storage and incineration." [FN103]

We thus found that the new information "was material to the resolution of the issues before us," and that, "with appropriate opportunity for comment or rebuttal, [it] might well have changed the outcome of the appeal." [FN104] Further, we *110 dismissed as "disingenuous" TVA's assertions that its submission to the staff "did not constitute an amendment [of its application]." [FN105] In this regard, we noted that TVA's submissions were in response to the staff's requests for additional information, and that the staff had advised TVA to amend its application.[FN106]

At the time we learned of this significant change in circumstances, the Browns Ferry proceeding was pending before the Commission for review. Indeed, the Commission had already taken review and requested briefing of the issues.

After being apprised of the changed circumstances, the Commission then determined that, "[s]ince ALAB–664 [the Appeal Board decision on appeal] was based on a record that no longer represents the situation in this case and will not be reviewed by the Commission, that decision is hereby vacated and shall be given no weight as a precedent." [FN107] It also remanded the proceeding to us for further action.[FN108]

**20 Vacating a decision in such circumstances is also fully consistent with federal court practice. For instance, Rule 60(b) of the Federal Rules of Civil Procedure provides that new evidence diligently discovered after trial and decision or "any other reason justifying relief" can deprive a judgment of its operative effect. As the Supreme Court has noted, the "other reason" language in Rule 60(b) simply "vests power in courts adequate to enable them to vacate judgments whenever such action is appropriate to accomplish justice." [FN109]

There can be no doubt that the staff's changes in position on the vegetative cover as the primary erosion protection, the definition of active maintenance, and the use of the PMP event in erosion analyses—not just on a generic basis, but in this case—constitute "a material alteration of its earlier presentation" [FN110] to the Licensing Board. As the applicant and proponent of its cell design, Kerr–McGee, of course, has the burden of proof,[FN111] and the principal focus of the hearing is accordingly on its presentation, not the staff's.[FN112] But, as discussed *111 below, the staff's former position on each of the three identified issues amounted to a significant part of the evidentiary record and was accorded substantial weight by the Licensing Board.

As a consequence of Kerr–McGee's reliance on the top vegetative cover to provide the primary protection against erosion and the staff's then-support of that position, the Licensing Board rejected the State's efforts to pursue in greater detail the adequacy of the underlying clay-cobble intrusion barrier. The Board noted that Appendix A does not require such an "intrusion barrier," and that it was included in Kerr–McGee's design "to provide added assurance of cell stability in the event that the topsoil layer is lost for some unspecified reason during the design life of the cell." [FN113] It then specifically referred to a staff analysis showing

> that erosion of the surface layer might take place on a time scale well in excess of the design life of the cell[,] ... that it poses no credible mechanism by which the topsoil might be lost within 1000 years[,] ... [and] that if the soil layer is lost by some unspecified mechanism the intrusion barrier would offer long-term protection.[FN114]

The Board thus concluded that "there is only a very remote possibility that the barrier will be required to perform an erosion control function within the design life of the cell." [FN115] The State criticized the absence of certain information concerning the size, composition, and distribution of rocks in the clay-cobble intrusion barrier. Acknowledging that the "final choice of materials has not been specified" and that "no computations that rely on graded particle sizes in the intrusion layer have been performed," the Board responded that the "allegation does not rebut Kerr–McGee's and Staff's evidence or establish the materiality of the missing data." [FN116]

**21 The staff now "places no reliance on the vegetative cover." [FN117] Instead, for the purpose of satisfying the criteria of Appendix A, the staff regards the underlying clay-cobble layer in the Kerr–McGee cell design "as the principal erosion barrier." [FN118] This position is assertedly based on the recently completed "Final Staff Technical Position: Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites" (May 1990 Draft) [hereinafter STP], which *112 reflects a preference for rock, rather than vegetative, covers.[FN119] The staff also indicates that, based on its evaluation of the additional design details provided by Kerr–McGee last summer (i.e., specifications for the rock component of the clay-cobble layer [FN120]), the clay-cobble barrier will satisfy regulatory requirements.[FN121] The staff adds, however, that these specifications for the protective rock must be incorporated into a new license amendment for the cell.[FN122]

It is now apparent that the previously-lacking details and computations concerning the clay-cobble intrusion barrier—which the Licensing Board found to be immaterial in light of the role of the vegetative cover as the primary erosion protection—have become so material to the staff's analysis that they must be incorporated into a new license amendment. Nor can it still be said that "there is only a very remote possibility that the [clay-cobble] barrier will be required to perform an erosion control function within the design life of the cell;" [FN123] the staff's new analysis assumes that is exactly the function that the clay-cobble layer will perform. It is of no moment here that the staff has

reviewed these new design details and pronounced them sufficient to satisfy the pertinent regulatory criteria. The other parties, namely the State and the City, have not had an opportunity to undertake such a review and to challenge the new analyses within the hearing process, as is their right.[FN124] Moreover, the new information relating to the clay-cobble layer is now of concededly greater significance than was ascribed to it during the hearing and at the time the Licensing Board rendered its decision on summary disposition. In fact, as a result of the staff's change in position, the principal focus of erosion control—and thus compliance with Appendix A—is now on the clay-cobble layer of the cell, not the top vegetative cover. So, too, the principal focus of the hearing has necessarily changed.

Inextricably related to the staff's change in position on the primary protection against erosion is its about-face on what constitutes "ongoing active maintenance" prohibited by Criteria 1 and 12. As noted earlier, at Kerr–McGee's urging and without objection from the staff,[FN125] the Licensing Board borrowed the definition of "active maintenance" from other NRC regulations not specifically concerned with mill tailings disposal. The definition of "active maintenance" ***113** contained in 10 C.F.R. § 61.2 and adopted by the Board excludes the mowing and related activities on which the Kerr–McGee proposal relies in order to maintain the prairie grasses in the top vegetative cover.[FN126] The Licensing Board relied on this definition in rejecting, on summary disposition, the State's complaints that the vegetative cover was flawed and did not provide the "reasonably equivalent isolation of the tailings from natural erosional forces" required by Appendix A Criterion 3 [FN127] for above grade disposal.[FN128] The Board also concluded that, under its "active maintenance" definition, minor repairs to the cell necessitated by a PMP event could be performed.[FN129]

****22** The staff, however, has changed the position it presented to the Licensing Board on "active maintenance." [FN130] The STP acknowledges that "the goal of any design for long-term stabilization to meet applicable design criteria should be to provide overall site stability for very long time periods, with no reliance placed on active maintenance." [FN131] To that end, the staff now defines the "active maintenance" prohibited by Appendix A Criteria 1 and 12 as "any maintenance that is needed to assure that the design will meet specified longevity requirements. Such maintenance includes even minor maintenance, such as the addition of soil to small rills and gullies." [FN132] As a result of applying this new definition to the case at bar,[FN133] Kerr–McGee's maintenance plan for the prairie grasses in the vegetative cover may not be taken into account in determining if the cell provides adequate erosion protection—explaining why the staff now regards the underlying clay-cobble layer as serving that purpose.[FN134]

As for consideration of a PMP event in determining whether the cell design can withstand erosion and meet the longevity requirements of Appendix A Criterion 6, the Licensing Board rebuffed the State's efforts, supported on summary disposition with an expert affidavit, to join this issue.[FN135] In doing so, the Board noted that "Appendix A does not specify particular criteria for assessing longevity based on a design flood or storm." [FN136] Thus, the Board relied on analyses of the staff and Kerr–McGee that used assumptions of storms of lesser magnitude than a PMP event and based calculations on variations of ***114** the Universal Soil Loss Equation, which the Board found did not use a PMP event as a parameter.[FN137] The staff's SFES, for example, used "a rainfall factor derived from 25 years of record expressed in annualized terms." [FN138] The staff also accepted the use of less than a PMP event because "the disposal cell could be repaired if a worse event damaged it," and, as noted above, the Licensing Board agreed.[FN139]

Once again the staff confesses that its current position on the PMP event differs from that presented to the Licensing Board. The STP provides that "[t] he design flood or precipitation event on which to base the stabilization plan should be one for which there is reasonable assurance of non-exceedance during the 1000–year design life." Thus, the STP concludes that the so-called "1000–year flood"—an event with a probability of 0.001 per year and a 63 percent chance of being equalled or exceeded during the 1000–year design life—would not meet the reasonable assurance test. But the STP does find the PMP event to be of "sufficiently low likelihood that the NRC staff concludes that there is reasonable assurance that larger events will not occur during the 1000–year design life. Therefore, the staff accepts the use of these events as design events for a stabilization plan." [FN140] Other events may be used, but only with detailed justification. In this case, however, the staff's affidavit makes clear that, as EPA has urged, "the disposal cell should be designed to withstand an occurrence of the PMP event because no other precipitation event provides reasonable assurance that a more severe event will not occur within 1000 years." [FN141]

**23 Like the staff's revisionist view on what constitutes "active maintenance," its new-found reliance on the PMP event inexorably led to the staff's retreat from the vegetative cover to the underlying clay-cobble layer as the primary erosion barrier.[FN142] But after requesting and receiving additional specifications and analyses from Kerr–McGee on the clay-cobble layer, the staff determined that this layer can withstand a PMP event.[FN143] And, as noted above, the staff believes that the proposal now satisfies the requirements of Appendix A, provided Kerr–McGee's license is amended to incorporate the rock specifications and other design details. The staff nonetheless recognizes, however, that the other parties must be afforded an opportunity to address the new design details and analyses.[FN144]

*115 The preceding discussion reveals that, as in the Browns Ferry proceeding, there has been "a material alteration" in an earlier presentation to the Licensing Board (i.e., the staff's),[FN145] and the decisions pending before us on appeal are "based on a record that no longer represents the situation in this case," warranting vacation of those decisions.[FN146] The Licensing Board gave substantial weight to the staff's views and analyses concerning the Kerr–McGee proposal, and the staff has now significantly altered those views in several critical areas. As the Director of NMSS delicately puts it, "the position on design for erosion protection that the NRC staff presented to the ... Licensing Board ... in this proceeding had apparently lagged behind other developments taking place within the NRC." [FN147] In a further example of the staff's gift of understatement, it notes that its (belated) review of the Kerr–McGee proposal "has resulted in engineering specifications that may vary from the engineering implications of conclusions reached by the Licensing Board," and that "[t]he basis for these conclusions is, in some respects, different from that reflected in the hearing record." [FN148] In fact, the changes are so significant that the license already issued by the staff to Kerr–McGee must now be further amended.[FN149]

Moreover, the staff's reevaluation of Kerr–McGee's proposal since the issuance of the Licensing Board's decision was not simply a matter of confirmatory, post-hearing review or an effort to "tie up loose ends." The staff's first written request to Kerr–McGee for additional information refutes any such notion:

> At the present time [almost four months after the license was issued], it is not clear that the designs of the top and side slopes, the diversion channels, or the sedimentation basin are adequate to resist erosion to the extent that the requirements of 10 CFR 40 Appendix A are met.... The staff expects that, upon further evaluation and analysis, Kerr–McGee may decide to redesign several features.[FN150]

*116 Referring to the clay-cobble layer, the staff stated that it "considers such analyses to be incomplete and unacceptable." [FN151] The staff ultimately may have reached essentially the same outcome as before—i.e., the requirements of Appendix A are now met, subject to a new license amendment—but that conclusion is based on new information not presented to the Licensing Board, reviewed on the basis of significantly different staff standards, and untested in an adjudicatory context.

**24 Kerr–McGee argues that the STP, on which the staff's new position is based, "is of no binding regulatory significance." [FN152] To be sure, staff technical positions and the like do not have the force of regulations; rather, they provide guidance to applicants as to acceptable methods for implementing regulatory criteria.[FN153] "Simply stated, [such] staff guidance generally sets neither minimum nor maximum standards." [FN154] The issue here, however, is not whether the staff's new STP on erosion protection for mill tailings covers is ultimately controlling vis-a-vis the pertinent regulatory requirements. The significance of the STP is that it represents a material change in the position and evidentiary presentation by the staff in the hearing below—a position to which the Licensing Board gave substantial deference in its decision. Whether the new staff position is "correct" or not remains to be seen. What is clear now is that the existing evidentiary basis for the Licensing Board's decision on erosion issues has itself been eroded to a major extent.

Kerr–McGee also complains that "[t]he erosion issue has come to the fore chiefly as a result of a brief filed with this Board by the EPA," a brief that allegedly "raises new issues." [FN155] It thus urges us to disregard all such matters.[FN156] But the current posture of this proceeding cannot be attributed to the filing of EPA's amicus brief on appeal. As has been shown, the State attempted to pursue its various contentions asserting non-compliance with the Appendix A criteria on erosion protection, but it failed on summary disposition of issues concerning the vegetative

cover, active maintenance, and the PMP event—all issues on which the staff has now changed its views.

Moreover, the differing views of EPA in nine areas were made known to all the parties and the Licensing Board well before summary disposition motions were filed.[FN157] In August 1989, the Licensing Board requested the parties advice ***117** as to whether those EPA views related to any of the admitted contentions, but the Board did not issue its judgment thereon until the following February, when it rendered the initial decision completing its consideration of the case. The Board then concluded, with no explanation, that "EPA's concerns ... have no direct impact on the admitted contentions" and "need not be considered in this proceeding." [FN158] In this connection, the Board stated that "Illinois found a nexus between most of the EPA concerns and its own admitted contentions while the Staff and Applicant find the relationship remote." [FN159] The Board's characterization of the parties" comments, however, does not square with the record.

The staff responded, also with the benefit of no explanation whatsoever, that "the EPA's concerns do not impact the admitted contentions." [FN160] Kerr–McGee acknowledged, however, that EPA's comments on the SFES related to several of the State's admitted contentions, including those concerned with long-term maintenance and siting.[FN161] Kerr–McGee stated that these concerns should nevertheless have no effect on this proceeding because, "[t]o the extent that the EPA concerns are encompassed by the admitted contentions, those concerns will be addressed." [FN162] As we have seen, however, that prediction did not come true.

****25** Thus, while many of the issues addressed in EPA's amicus brief coincide with the staff's changes in position and the bases for the State's and the City's motion to vacate, it is clear that these are not "new" issues, appearing for the first time on appeal. In any event, the fact that the staff may have changed its position due to a belated sensitivity to EPA's concerns is irrelevant; the dispositive fact is the staff's change in position, irrespective of the motivation for it.

We therefore agree with the State and the City that those portions of the Licensing Board's decision that concern the vegetative cover as the primary erosion barrier, "active maintenance," and erosion analyses that are not based on a PMP event must be vacated.[FN163] Specifically, this includes the Board's disposition of Contentions 4(c), 4(d), 4(e), and 4(g), as well as Contentions 2(k), 2(p), 2(s), 2(u), and 2(h), which the Board found were essentially duplicative.[FN164] We address in a later portion of this opinion the effect of this ruling on the future course of this proceeding and on the outstanding license issued to Kerr–McGee.[FN165]

***118** B. The State and the City have also moved, in the alternative, to reopen the record for further consideration by the Licensing Board of the new developments discussed above. We conclude that, even if the Browns Ferry decisions did not compel vacation of the Licensing Board's decision on the involved issues, reopening would clearly be warranted.

Under the Commission's Rules of Practice, a closed record will not be reopened unless the movant satisfies the following three criteria:

(1) The motion must be timely, except that an exceptionally grave issue may be considered in the discretion of the presiding officer even if untimely presented.

(2) The motion must address a significant safety or environmental issue.

(3) The motion must demonstrate that a materially different result would be or would have been likely had the newly proffered evidence been considered initially.[FN166]

In addition, "[t]he motion must be accompanied by one or more affidavits which set forth the factual and/or technical bases for the movant's claim that the [[[three] criteria ... have been satisfied." [FN167] The State's and the City's motion easily meets all of these requirements.

1. The motion was clearly timely. It was filed within just three weeks of the staff's brief, in which the staff confirmed for the first time through affidavits that it had, in fact, changed its position on the critical issues discussed

above. Kerr–McGee complains, however, that, insofar as the PMP event is concerned, the motion is untimely.[FN168] In its view, the State only belatedly attempted to establish that a PMP event should be evaluated, and "the Licensing Board denied consideration of the matter in part on the basis that the issue should have been advanced earlier." [FN169] Thus, Kerr–McGee reasons that "[i]f the PMP issue was untimely when advanced before the Licensing Board, it obviously cannot be timely now." [FN170]

**26 The problem with Kerr–McGee's argument is that the Licensing Board never rejected the PMP issue as untimely. When the Board first considered this matter on summary disposition, there is no discussion whatsoever about the timeliness of the issue.[FN171] Rather, the Board ruled against the State on the PMP issue for essentially three reasons: (i) it believed Appendix A does not require consideration of such an event; (ii) it found the State's argument and supporting *119 affidavit insufficient to withstand summary disposition, in light of the staff's and Kerr–McGee's analyses based on lesser magnitude rainfall events; and (iii) the definition of "active maintenance" adopted by the Board permits minor repairs to the cell cover that might be necessary as a result of a PMP event.[FN172] The State sought reconsideration and supplemented its earlier affidavit with additional references.[FN173] The Board, however, reaffirmed its prior ruling, noting that the additional documentation submitted by the State on reconsideration was available earlier and "should have been cited in connection with Illinois"[s] opposition to Kerr–McGee's cross-motion." [FN174] Thus, the Board did not find the PMP issue untimely, only some additional references supplied as support for the State's motion for reconsideration.

2. The significance of the matters raised in the State's and the City's motion is patent.[FN175] They go to the heart of the Commission's controlling regulatory requirements—i.e., the ability of the cell design to resist erosion, without ongoing active maintenance, and thereby to provide reasonable assurance that the radioactive waste thereunder will be isolated to the extent reasonably achievable for 1000 years, as required by Appendix A Criteria 1, 3, 4, 6, and 12. The staff itself acknowledged this last summer when it began its post-hearing, post-license-issuance (re)consideration of the Kerr–McGee design and solicited further information and technical analyses: "At the present time, it is not clear that the designs of the top and side slopes, the diversion channels, or the sedimentation basin are adequate to resist erosion to the extent that the requirements of 10 CFR 40 Appendix A are met." [FN176]

Consideration of the PMP event in erosion analyses, for example, is essential in order to assure compliance with the NRC's requirements established for mill tailings disposal. Although, as the Licensing Board found, Appendix A does not explicitly state that disposal systems must be designed to withstand a PMP event,[FN177] this necessarily follows from the 1000–year longevity requirement imposed by Appendix A Criterion 6. As EPA explains,

> "reasonable assurance" of control of radiological hazards means use of the Probable Maximum Precipitation (PMP) event in disposal cell design, since no other reference precipitation event (100 year, 200 year storm, etc.) carries reasonable assurance (e.g., 95% probability) *120 that a more severe event will not occur within 1,000 years. Hence, to be adequately protective of human health and the environment, a disposal cell design should be modelled to withstand the PMP event.[FN178]

**27 The staff now agrees with and fully adopts this position in its STP and appellate brief.[FN179]

3. The materiality of the staff's changes in position subsequent to the rendering of the Licensing Board's decisions has already been demonstrated in connection with the State's and the City's motion to vacate.[FN180] Certainly the Licensing Board was influenced by the staff's former (1) acceptance and approval of the vegetative cover as the primary erosion protection for purposes of satisfying the Appendix A Criteria, and corresponding lack of analyses concerning the clay-cobble layer; (2) definition of "active maintenance" so as to include mowing, revegetation, and minor repairs; and (3) use of less than a PMP event in its erosion analysis. Had the current staff views been made known during the course of the proceeding below, the focus of the litigation would have been on the clay-cobble intrusion barrier, instead of the vegetative cover, and the composition of the evidentiary record would have been quite different.[FN181]

*121 Kerr–McGee contends that a materially different result would not have been likely because "[t]he new information merely serves to show that the cell can withstand a PMP even if such a demonstration were required." [FN182]

But this assumes that the ability of the clay-cobble layer to withstand a PMP and otherwise to resist erosion has been irrefutably shown. To be sure, Kerr–McGee is confident in the new analyses that it has performed, and the staff has given the clay-cobble layer its blessing. But in their separate replies to the staff's brief and attached affidavits, the State and the City challenge, through their own affidavits, the conclusion that the new analyses and design specifications recently supplied by Kerr–McGee to the staff satisfactorily address the erosion problem and meet regulatory requirements.

For example, the State's expert, Dr. Gerald R. Thiers—who provided testimony, by way of affidavit, on behalf of the State before the Licensing Board—criticizes Kerr–McGee's new design flow calculations. Specifically, he claims that both the runoff velocity and coefficient have been understated, and that the calculations have failed to account for a concentration of runoff on the east side of the disposal cell. As a result, according to Dr. Thiers, Kerr–McGee proposes to use smaller riprap than is necessary to prevent erosion.[FN183] Dr. Thiers also questions Kerr–McGee's assumptions regarding the size, fines content (i.e., clay and silt), and specific gravity of the rock riprap used in the clay-cobble layer. He asserts that the assumptions used in the analysis are based on materials that differ significantly in both content and quality from those proposed for the West Chicago site.[FN184] As a consequence, Dr. Thiers believes that "the changes proposed will not prevent the likelihood of riprap erosion and breaching of the cell cover, leading to spreading of tailings into the environment, or at least requiring active maintenance to prevent spread of tailings." [FN185] Dr. Thiers challenges the rock size proposed for the diversion ditches as well. Finally, he contends that, if larger size rock riprap is used—which Dr. Thiers believes is necessary—increased costs will be incurred and must be factored into the cost-benefit balance.[FN186] The City's expert, Dr. George B. Levin, makes similar challenges to the new Kerr–McGee and staff analyses.[FN187]

**28 In the face of these challenges to the new analyses, we conclude that "a materially different result ... would have been likely had the newly proffered evidence been considered initially." [FN188] This is not to say that the views of Dr. *122 Thiers and Dr. Levin alone would necessarily have been, or are, dispositive of the issue. But the combined effect of these challenges with the staff's changes in position and the significant amount of new information that has been generated since the Licensing Board's decision precludes the result reached earlier by the Licensing Board—i.e., a grant of summary disposition in Kerr–McGee's favor.[FN189] At a minimum, a hearing on these new disputed issues of material fact would be necessary.[FN190]

4. The motion to reopen is also more than adequately documented, as required by 10 C.F.R. § 2.734(b). It contains specific references to, among other things, the Board's decision, earlier filings, the parties" briefs, and other materials generated and provided by Board Notification during the pendency of the appeals.[FN191] It also specifically incorporates the affidavits attached to the staff's brief and on which the State and the City rely heavily to establish the staff's changes in position.[FN192] Finally, as has been shown, the affidavits attached to the State's and the City's reply briefs to the NRC staff brief supplement their motion to reopen.[FN193]

Thus, had we not already determined that the Licensing Board's decision should be vacated in light of subsequent developments, there is ample ground for reopening the record to consider this new information. In ordinary circumstances, *123 we would remand the matter to the Licensing Board for further evidentiary development.[FN194] But as is evident from Part II of this opinion, the circumstances of this proceeding are quite extraordinary. And, as also noted above, we address the future course of this matter later in this decision.[FN195]

IV. The Appeals

Obviously the events discussed in Part III of this opinion have overtaken, in large measure, many of the issues raised by the State and the City in their briefs on appeal from the Licensing Board's initial decision and related rulings. Review of several of the most significant of those issues, however, demonstrates that, even if the staff had not subsequently and substantially changed the position it presented to the Licensing Board, the Licensing Board's ultimate decision cannot stand. As discussed below, we conclude that the Board erred in several fundamental rulings, so as to warrant reversal of its decision authorizing the issuance of the license amendment to Kerr–McGee.

A. The State and the City initially challenge the Licensing Board's interpretation of the siting provisions of Appendix A Criterion 1. Before addressing the background and requirements of the Commission's mill tailings regulations and the Licensing Board's reading of them, it is helpful first to review the provisions of UMTRCA and its amendments, pursuant to which Appendix A was promulgated.

**29 1. Congress enacted UMTRCA in 1978 to ameliorate the health and environmental hazards presented by uranium and thorium mill tailings. This action was based upon a finding that

> mill tailings located at active and inactive mill operations may pose a potential and significant radiation health hazard to the public, and that the protection of the public health, safety, and welfare and the regulation of interstate commerce require that every reasonable effort be made to provide for the stabilization, disposal, and control in a safe and environmentally sound manner of such tailings in order to prevent or minimize radon diffusion into the environment and to prevent or minimize other environmental hazards from such tailings.[FN196]

*124 The purposes of UMTRCA are twofold: first, to provide a remedial action program at inactive mill tailings sites;[FN197] and second, to provide a program for the regulation of "mill tailings during uranium or thorium ore processing at active mill operations and after termination of such operations." [FN198] Thus, Title I of UMTRCA provides a specific remedial program for a number of designated inactive and abandoned tailings sites under the primary direction of the Department of Energy.[FN199] Title II, on the other hand, establishes a comprehensive program for NRC regulation at active (licensed) mill tailings sites, by amending the AEA to include uranium and thorium mill tailings in the definition of byproduct material in section 11(e)(2), and by adding sections 83, 84, and 275 and amending sections 161 and 274 of the AEA so as to provide the Commission with broad authority to manage all aspects of mill tailings sites.[FN200] UMTRCA also directed EPA to promulgate "standards of general application" for both programs.[FN201] Title II charged the NRC, however, with implementing and enforcing the EPA standards, in addition to establishing its own specific requirements and standards for carrying out the purposes of UMTRCA and conforming its regulations to the EPA general standards.[FN202]

*125 As originally enacted, UMTRCA directed EPA to issue general standards for inactive sites within 12 months, and for active sites within 18 months, after passage.[FN203] When EPA failed to promulgate its standards within the time set by Congress, the NRC published its "Uranium Mill Licensing Requirements," to meet its responsibilities under the Act.[FN204] The Commission's 1980 regulations were based upon the conclusions reached in the agency's generic environmental impact statement on uranium milling operations and management of mill tailings [FN205] and consisted of a general explanatory introduction and 12 technical criteria appearing as Appendix A to 10 C.F.R. Part 40. The regulations established a program to manage mill tailings by setting criteria for siting and disposing of mill tailings piles, controlling erosion and stabilizing tailings, limiting radioactive effluents from uranium and thorium mills and mill tailings, controlling seepage of toxic materials from tailings into groundwater, providing financial assurances for meeting disposal costs and long-term monitoring, and meeting the UMTRCA ownership requirements for tailings and disposal sites.[FN206]

**30 After the Commission issued its 1980 mill tailings regulations, and primarily in response to the EPA's failure to meet the statutorily imposed deadlines of the Act for issuing general standards, Congress amended UMTRCA.[FN207] The amendments set new deadlines for EPA to issue general standards.[FN208] Congress also amended UMTRCA to clarify that EPA, in promulgating general standards, and the NRC, in issuing mill tailings regulations, should consider—in addition to the risk to the public health, safety, and environment—the economic *126 costs of regulation, as well as such additional factors as the agencies consider appropriate.[FN209] Thus, Congress added the language emphasized below to the end of section 84(a)(1) of the AEA (which section had been added originally by UMTRCA):

> The Commission shall insure that the management of any byproduct material, as defined in section [11(e)(2)], is carried out in such manner as—
>
> (1) 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.[FN210]

Finally, Congress added a provision to the AEA permitting licensees to propose alternatives to the Commission's mill tailings requirements. Thus, section 84(c) provides:

> 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 [11(e)(2)], a licensee may propose alternatives to specific requirements adopted and enforced by the Commission under this [[[Act]. 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 [275].[FN211]

Immediately after Congress enacted the amendments to UMTRCA in 1983, EPA issued its general standards for inactive sites.[FN212] Later that year, EPA published its general standards for active sites, which, with the exception of those for groundwater, were essentially identical to its inactive site standards.[FN213] ***127** Among other things, the EPA standards established radon emission limits for disposal areas and provided that such areas must assure control of radiological hazards "for one thousand years, to the extent reasonably achievable, and, in any case, for at least 200 years." [FN214]

****31** Subsequent to the issuance of EPA's general standards for active sites, the Commission undertook rulemaking proceedings to bring its 1980 mill tailings regulations into conformity with the EPA standards.[FN215] Those proceedings culminated in the promulgation of the Commission's 1985 regulations, amending the earlier 1980 requirements.[FN216] Many of the 1985 criteria, again appearing as Appendix A to 10 C.F.R. Part 40, were unchanged from the 1980 version. The Commission changed other criteria to conform to the EPA standards and essentially duplicated the EPA regulations. For example, Criterion 6 was amended to adopt both EPA's radon emission limits for disposal areas and its longevity standard, requiring waste areas to be designed to control radiological hazards "for 1,000 years, to the exten[t] reasonably achievable, and, in any case, for at least 200 years." [FN217]

As pertinent here, the first three paragraphs of the Introduction to Appendix A remained essentially unchanged from 1980. The Commission, however, added a new fourth paragraph in the 1985 regulations to implement one of the 1983 amendments to UMTRCA. As previously noted, that amendment added section 84c to the AEA in order to provide site-specific flexibility in licensing by permitting licensees to propose alternatives to Commission mill tailings requirements.[FN218] The new fourth paragraph of the Introduction is virtually identical to the statute and states:

> 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. 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 ***128** 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.[FN219]

The 1985 regulations also added a fifth paragraph to the Introduction, reiterating the 1983 amendment to UMTRCA and the AEA that was intended to clarify the factors the NRC should consider in regulating mill tailings. As earlier indicated, the amendment to section 84(a)(1) of the AEA provided that, in addition to taking into account the risk to the public health, safety, and environment when regulating mill tailings, the Commission should also give "due consideration" to economic costs and any other appropriate factors.[FN220] Thus, the new fifth paragraph to the Appendix A Introduction paraphrases the UMTRCA amendment:

> All site specific licensing decisions based on the criteria in this Appendix or alternatives proposed by licensees or applicants will take into account the risk to the public health and safety and the environment with due consideration to the economic costs involved and any other factors the Commission determines to be appropriate. In implementing this Appendix, the Commission will consider "practicable" and "reasonably achievable" as equivalent terms. Decisions involved [sic] these terms will take into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socio-economic considerations, and in relation to the utilization of atomic energy in the public interest.[FN221]

**32 Upon issuance of the Commission's 1985 mill tailings regulations, industry petitioners, including Kerr–McGee, challenged them. The court of appeals upheld the validity of the Appendix A Criteria in Quivira Mining Co. v. NRC.[FN222] This case plays a prominent role in the assertions of the parties before us; indeed, several of their arguments are nearly identical to those made to the Quivira court. It is thus useful briefly to review that decision.

In Quivira, the petitioners initially argued that the 1985 criteria were not supported by the cost-benefit analysis required by UMTRCA. The court held, however, that the 1983 UMTRCA amendments only required the Commission to conduct "cost-benefit rationalization" in issuing regulations and managing mill tailings, and it concluded that the Commission had done so.[FN223] According to the court, that standard "requires the agency merely to consider and compare the costs and benefits of various approaches, and to choose an approach in which ***129** costs and benefits are reasonably related in light of Congress intent." [FN224] It is significant that, in upholding the mill tailings regulations, the court determined that the 1983 amendment did not require the agency to perform " "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." " [FN225] Further, the court noted that the agency's general endeavor to take into account the " "economics of improvements in relation to benefits to the public health and safety," " set forth in the new fifth paragraph of the Appendix A Introduction, was sufficient to ensure that in future licensing actions the costs of regulation bear a reasonable relationship to its benefits.[FN226]

Next, the petitioners argued that the Commission's Appendix A Criteria failed to provide for the kind of site-specific flexibility in individual licensing decisions that the 1983 addition of section 84(c) to the AEA requires. The petitioners also claimed that the new fourth paragraph of the Appendix A Introduction was insufficient to carry out this statutory command for flexibility. The court rejected these arguments, holding that the new fourth introductory paragraph, permitting licensees to propose equivalent alternatives to the Commission's criteria, fully met all of the statute's site-flexibility requirements.[FN227]

Finally, the Quivira petitioners argued that UMTRCA explicitly requires the Commission to make a positive distinction between new and existing mill tailings sites, and that the Appendix A Criteria do not adequately make that distinction. The court summarily dismissed this argument, noting that the statutory language of UMTRCA makes no such distinction and that the legislative history relied upon by the petitioners indicates only that the agency is to "consider possible differences in applicability of regulations to existing versus new tailings sites." [FN228] Moreover, the court stated that, even if it accepted petitioners premise, the site-specific flexibility incorporated into the fourth paragraph of the Appendix A Introduction meets any such supposed requirement.[FN229]

33 2. With this background in mind, we now turn to the parties arguments here regarding the Licensing Board's decision interpreting Criterion 1. That ***130 Criterion sets forth the siting requirements of the Commission's mill tailings regulations.

In Contention 4(a) the State asserted that, in its SFES, the staff misinterpreted the Commission's siting requirements for mill tailings disposal by concluding that Kerr–McGee's proposal for leaving the wastes onsite satisfies the requirements of Criterion 1.[FN230] Among other things, Criterion 1 requires that the following three site features be considered in assessing the adequacy of a disposal site: (1) remoteness from populated areas; (2) hydrologic and other natural conditions that contribute to the isolation of tailings from groundwater; and (3) the potential for minimizing erosion over the long term.[FN231] In light of Kerr–McGee's plan to dispose permanently of 376,400 cubic

meters of radioactive waste in the midst of the densely populated West Chicago area, just several meters above the water table,[FN232] the Licensing Board aptly characterized Contention 4(a) as going "to the heart of the ultimate issue to be decided: Is the West Chicago site acceptable for the disposal of the tailings?" [FN233]

The Licensing Board resolved Contention 4(a) in Kerr–McGee's favor, holding that the proposal for onsite disposal "satisfies the requirements of 10 C.F.R. Part 40, Appendix A, Criterion 1." [FN234] In reaching this conclusion, it interpreted the Commission's mill tailings regulations as focusing on primarily two considerations: economics and the difference between "new" and "existing" tailings sites. The Board's analysis is relatively brief and straightforward:

> Kerr–McGee correctly points out that the 1983 NRC Authorization Act amended § 84(a)(1) to require the Commission to take into account risks to public health and safety and the environment while giving due consideration to economics. The Commission responded by inserting language in the Introduction to Appendix A which requires that all site-specific decisions take economics into account. This language goes on to state that in interpreting the terms "practicable" and "reasonably achievable" (which are to be considered equivalent), consideration must be given to, among other things, "the economics of improvements in relation to the benefits to the public health...."
>
> Illinois is correct in its observation that Criterion 1 requires consideration of remoteness from population and hydrologic factors in choosing among alternatives, as well as that it directs that the site-selection process should result in an optimization of these goals. Were this proceeding concerned with the siting of a new facility so that cost differences among potential sites were minor, Criterion 1 clearly would result in the disapproval of the West Chicago site because of its population density. But this proceeding concerns the disposal of an existing tailings pile located on the West Chicago site. Kerr–McGee correctly points out that, like it or not, we must deal with that site. We believe that the amendments to the Introduction to Appendix A, which require that consideration be given to economics in all ***131** siting decisions and permit applicants to propose alternatives, require that we approach this case with due regard for the fact that West Chicago is an existing site. If those provisions were not in place, Illinois'[s] position would be correct and it would be necessary to reject the West Chicago site at the outset. The requirement to consider economics as well as alternatives means that West Chicago may be rejected only after consideration is given to the costs and benefits that would be incurred by moving the tailings to another site. Criterion 1, when read in conjunction with the Introduction to Appendix A, clearly requires this result. Criterion 1 requires optimization of its enumerated goals "to the maximum extent reasonably achievable...." The Introduction to Appendix A directs that we interpret "to the maximum extent reasonably achievable" in light of the costs and potential benefits that would be achieved by moving the tailings to another site which would optimize those goals.[FN235]

****34** Before us, the State and the City each argue that the Licensing Board turned Criterion 1 on its head by shifting the proceeding into one large cost-benefit analysis and allowing short-term economics and design features to override the Criterion's siting features, which are intended to ensure the isolation of mill tailings for the very long term.[FN236] There is no dispute that the West Chicago site cannot be considered remote from populated areas. In fact, the City points out that the site is located across the street from numerous residences in the middle of the dense population center of West Chicago and is within 490 meters of five schools containing some 80 percent of the City's school children.[FN237] Similarly, the State and the City contend that it is undisputed that hydrologic and other conditions at the West Chicago site do not "contribute to continued immobilization and isolation of contaminants from ground-water sources." [FN238] Indeed, they claim that all parties agree that the West Chicago site has leached and will continue to leach into the groundwater, and that it is the only site of those studied that will not isolate the tailings from groundwater. In these circumstances, where the Commission's siting requirements call for the selection of a disposal site that isolates contaminants from groundwater, the appellants argue that it is totally incongruous to rely, as the Licensing Board did, upon the great flow of groundwater under the site to dilute the contaminants to regulatory limits at the site boundary. They further argue that the features of the West Chicago site do not contribute to minimizing erosion, so the site is not an optimization of the three siting features as required by Criterion 1. Thus, the State asserts that "West Chicago was selected as a disposal site for one reason—the tailings are already there—and was approved as a disposal site for one ***132** reason—it will cost Kerr–McGee at least $40 million to move the tailings to another site." [FN239]

Kerr–McGee, along with the staff, argues that the Licensing Board correctly concluded that the onsite disposal proposal satisfies Criterion 1.[FN240] In this connection, they both emphasize that the Licensing Board did not treat onsite disposal at the West Chicago site as a licensee-proposed alternative to the requirements of Criterion 1 pursuant to section 84(c) of the AEA and the fourth paragraph of the Appendix A Introduction. Rather, Kerr–McGee and the staff assert that the Board found only that onsite disposal met the siting provisions of Criterion 1.[FN241]

In support of the Licensing Board's decision, Kerr–McGee argues, as it did below, that three guiding principles must be used in the interpretation of the Commission's mill tailings criteria. First, Kerr–McGee claims that the history of UMTRCA and the Commission's regulations "shows that the NRC has a fundamental obligation to construe the criteria so as to achieve a reasonable relationship between costs and benefits." [FN242] Second, it recasts an argument that the court of appeals rejected in Quivira and asserts that, in applying the criteria, the NRC must recognize the difference between new and existing sites. Finally, it attempts to revive yet another argument cast aside in Quivira by claiming that the criteria must be applied flexibly on a site-specific basis to comport with the commands of UMTRCA. After reciting these "over-arching principles," Kerr–McGee argues that Criterion 1 does not set out rigid siting requirements; rather, it merely articulates a general goal of permanent isolation of mill tailings and requires only that the various siting factors " "be considered'—as they demonstrably were." [FN243] Thus, it argues that, in determining that only Kerr–McGee's onsite disposal provides a reasonable relationship between costs and benefits, the Licensing Board interpreted Criterion 1 in a fashion fully consistent with its language and the enumerated guiding principles.

**35 3. Contrary to the assertions of Kerr–McGee and the staff, however, the Licensing Board's interpretation of Criterion 1 cannot be squared with the plain language of the regulation. The starting point in interpreting any regulation is not, as Kerr–McGee would have it, the consideration of "over-arching," albeit unwritten, principles. Rather, we must begin with the language and structure of the provision itself.[FN244] In undertaking this task, we must bear in mind the *133 elementary canon of construction that the regulation should be interpreted so as not to render any part inoperative; the whole of the regulation must be given effect.[FN245] Further, "[a]lthough administrative history and other available guidance may be consulted for background information and the resolution of ambiguities in a regulation's language, its interpretation may not conflict with the plain meaning of the wording used in that regulation." [FN246]

Here, Criterion 1 must be read in concert with the appropriate portions of the Introduction to Appendix A, which we have already set out.[FN247] Because Criterion 1 is central to our interpretative task, we also set it forth in full:

I. Technical Criteria

Criterion 1—The general goal or broad objective in siting and design decisions is permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance. For practical reasons, specific siting decisions and design standards must involve finite times (e.g., the longevity design standard in Criterion 6). The following site features which will contribute to such a goal or objective must be considered in selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites:

Remoteness from populated areas; Hydrologic and other natural conditions as they contribute to continued immobilization and isolation of contaminants from ground-water sources; and

Potential for minimizing erosion, disturbance, and dispersion by natural forces over the long term.

The site selection process must be an optimization to the maximum extent reasonably achievable in terms of these features.

In the selection of disposal sites, primary emphasis must be given to isolation of tailings or wastes, a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land acquisition costs. While isolation of tailings will be a function of both site and engineering design, overriding consideration must be given to siting features given the long-term nature

of the tailings hazards.
Tailings should be disposed of in a manner that no active maintenance is required to preserve conditions of the site.

As is evident from a comparison of the language of Criterion 1 and the Licensing Board's decision interpreting it, the Board in effect penciled out not only key words but entire provisions, including the penultimate paragraph of the regulation. While disregarding portions of Criterion 1 undoubtedly simplifies it, such an approach is a wholly unacceptable method of construing the Commission's regulations. Rather, the regulation must be read as it is written ***134** and in its entirety.[FN248] We therefore reject staff counsel's untenable suggestion at oral argument that, in interpreting Criterion 1, we simply "ignore" certain key words.[FN249] When effect is given to all the words and provisions of Criterion 1 and the Introduction to Appendix A, the regulations clearly require the nondiscretionary consideration of a number of explicit factors. As we explain below, the Licensing Board's interpretation not only overlooks several of those factors, it blinks at the Commission's commands regarding the weight to be assigned to those factors in assessing a mill tailings disposal site.

****36** Initially, we note our agreement with Kerr–McGee and the staff that the Licensing Board did not judge permanent disposal at the West Chicago site as a licensee-proposed alternative to the requirements of Criterion 1 under section 84(c) of the AEA and the fourth paragraph of the Appendix A Introduction. Rather, as they correctly assert, the Board held simply that disposal at the West Chicago facility satisfies the siting requirements of Criterion 1.[FN250] In its analysis of the mill tailings regulations, the Licensing Board several times observed that the regulations permit licensees to propose alternatives to the requirements of the various Criteria. Yet the Board made no mention of the statutory standard under which such alternatives must be judged. Nor did the Board analyze onsite disposal under that standard, as would be required if it were treating onsite disposal as a licensee-proposed alternative. Accordingly, we need not consider disposal at the West Chicago site as a licensee-proposed alternative to the requirements of Criterion 1 in reviewing the Licensing Board's interpretation of the mill tailings regulations.

The Licensing Board made several errors in construing the first paragraph of Criterion 1. First, it characterized, as mere general "goals," the three siting features—remoteness, hydrology, and erosion minimization—that the regulation mandates be considered in all tailings disposal siting decisions. As a consequence, these siting features played only a subsidiary role in the Board's analysis.[FN251] Before us, Kerr–McGee echoes this theme, arguing that the siting features are only general goals or broad objectives and, therefore, they are not mandatory requirements.[FN252] But this interpretation is contrary to the plain language of Criterion 1 because it confuses the goal set forth in that Criterion with the requirements specified to effectuate the goal. The first sentence sets out the only goal identified in Criterion 1—the "permanent isolation of tailings ... by minimizing disturbance and dispersion by natural forces, and to do ***135** so without ongoing maintenance." The three siting features that the Licensing Board and Kerr–McGee so readily dismiss as mere goals are instead requirements that the regulation states "must be considered in selecting" a disposal site.[FN253] In the words of the Criterion, when the three siting features are properly considered they "will contribute to such a goal or objective," i.e., the permanent isolation of tailings without active maintenance. This reading is precisely the interpretation the court of appeals gave Criterion 1 in Quivira, and it is the only construction that is consistent with the wording and context of the regulation.[FN254]

Second, the Licensing Board read out of the first paragraph of Criterion 1 the Commission's directive that the three siting features "must be considered in selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites." [FN255] Rather than heed this clear instruction, it construed Criterion 1 to differentiate between new sites and existing sites and to require the consideration of the three site features only vis-a-vis the former. Thus, in its analysis of the regulation, the Licensing Board acknowledge that the State is correct that "Criterion 1 requires consideration of remoteness from population and hydrologic factors in choosing among alternatives." [FN256] But in the next breath, the Board states:

> ****37** [w]ere this proceeding concerned with the siting of a new facility so that cost differences among potential sites were minor, Criterion 1 clearly would result in the disapproval of the West Chicago site because of its population density. But this proceeding concerns the disposal of an existing tailings pile located on the West

Chicago site. Kerr–McGee correctly points out that, like it or not, we must deal with that site.[FN257]
*136 Not only is this interpretation contrary to the manifest language of the first paragraph of Criterion 1, the Licensing Board's construction reads into the regulation Kerr–McGee's assertion that UMTRCA explicitly requires the Commission's regulations to make a positive distinction between new and existing mill tailings sites. But in upholding the validity of the NRC's mill tailings regulations in Quivira, the court rejected that same argument by Kerr–McGee and it has no more currency before us.[FN258]

Moreover, as the Quivira court indicated, even if Kerr–McGee's view of UMTRCA is accepted, the provisions of the fourth paragraph of the Introduction to the Appendix A Criteria, providing that licensees may propose alternatives to the Commission's requirements, fully meet any supposed UMTRCA requirement that the mill tailings regulations distinguish between new and existing sites.[FN259] Here, of course, Kerr–McGee has not pursued that option and that situation was not before the Licensing Board.[FN260] More important, however, the Commission already considered any possible differences between new and existing tailings sites in promulgating Criterion 1. As is evident from the language of the regulation, the Commission determined that, regardless of any such differences, the three siting features—remoteness from populated areas, hydrologic conditions, and erosion resistance—are so important that they "must be considered in selecting among alternative tailings disposal sites or judging the adequacy of existing tailings sites." [FN261] In light of this explicit instruction, the Licensing Board could not properly interject into Criterion 1 any other differentiation between new and existing sites.[FN262]

*137 The Licensing Board's treatment of the second and third paragraphs of Criterion 1 is similarly flawed and does not comport with the plain language of the regulation. The second paragraph provides that the process of selecting a tailings disposal site "must be an optimization to the maximum extent reasonably achievable" of the three siting features. The third paragraph then explains the ground rules for achieving the optimization of those siting features. First, the Criterion requires that in selecting a disposal site "primary emphasis must be given to isolation of tailings" because this radioactive waste presents "a matter having long-term impacts, as opposed to consideration only of short-term convenience or benefits, such as minimization of transportation or land-acquisition costs." Second, although the Criterion explains that "isolation of tailings will be a function of both site and engineering design," it then commands that "overriding consideration must be given to siting features given the long-term nature of the tailings hazards." [FN263]

**38 In reading the Criterion, the Licensing Board noted that the second paragraph directs that the site selection process must optimize "to the maximum extent reasonably achievable" the siting features. As previously indicated, however, the Board erroneously labeled and treated the siting features as mere goals that can be disregarded for existing sites.[FN264] The Board also recognized that the use of the term "reasonably achievable" in the second paragraph of the criterion brings into play the fifth paragraph of the Introduction, which provides, inter alia, that specific licensing decisions involving this term "will take into account ... the economics of improvements in relation to benefits to the public health and safety." But, as is evident from the following portion of its analysis, the Licensing Board read that provision in isolation from the third paragraph of Criterion 1:

> We believe that the amendments to the Introduction to Appendix A, which require that consideration be given to economics in all siting decisions ... require that we approach this case with due regard for the fact that West Chicago is an existing site. If those provisions were not in place, Illinois' [[[s] position would be correct and it would be necessary to reject the West Chicago site at the outset. The requirement to consider economics ... means that West Chicago may be rejected only after consideration is given to the costs and benefits that would be incurred by moving the tailings to another site.[FN265]

*138 The Board thus totally ignored the Criterion's provisions specifying how siting and design factors, including short-term economic costs, are to be weighed in judging the adequacy of a disposal site. Indeed, nowhere in the Licensing Board's analysis does it even mention the significant provisions of the third paragraph of Criterion 1, in particular, dictating that "overriding consideration must be given to siting features." Instead of putting its thumb on the long-term siting features side of the scale, as the second and third paragraphs of Criterion 1 require, the Board tipped the balance in favor of short-term economic considerations.

Contrary to the Licensing Board's approach, the provisions of the Criterion's third paragraph must be read in conjunction with the fifth paragraph of the Introduction. In promulgating that introductory paragraph, the Commission incorporated the mandate of new section 84(a)(1) of the AEA into the regulations so that all licensing decisions "will take into account the risk to the public health and safety and the environment with due consideration to the economic costs involved and any other factors the Commission determines to be appropriate." [FN266] As the court held in Quivira, section 84(a)(1) requires the NRC to abide by the cost-benefit rationalization standard in issuing regulations and managing mill tailings.[FN267] According to the court, that standard "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." [FN268] Given the Licensing Board's reading of the regulations, it bears repeating that the application of that standard does not require a precise quantitative cost-benefit itemization in dollars or some other unit for every requirement in the Appendix A Criteria that imposes some burden on a licensee.[FN269] Rather, that standard allows a much more general relationship between costs and benefits. The Quivira court held that the Commission met the cost-benefit rationalization standard in promulgating the mill tailings regulations; [FN270] thus, when the commands of the second and third paragraph of Criterion 1 are followed in assessing the adequacy of a mill tailings site, that standard is necessarily met in implementing Criterion 1.

**39 Criterion 1 directs that, due to the long-term impacts of mill tailings, "primary emphasis" must be given to the isolation of the tailings and less importance is to be attributed to "short-term convenience or benefits, such as minimization *139 of transportation or land acquisition costs." This crucial weighing is necessary because mill tailings disposal is an exceedingly long-term waste management problem. As the Statement of Considerations accompanying the original 1980 mill tailings regulations states, "[t]he NRC has evaluated this problem and developed regulations considering the inescapable fact that the tailings will, in fact, remain hazardous for extremely long periods of time, hundreds of thousands of years." [FN271] Here, for example, the half-life of the major thorium element in the West Chicago tailings is on the order of 14 billion years.[FN272] Or, as the House Report on UMTRCA states, the hazard will persist "until long after our existing institutions can be expected to last in their present forms." [FN273] Although Criterion 1 recognizes that for "practical reasons" siting decisions and design standards must involve finite time periods, the tailings hazard does not disappear with the expiration of the 1000–year longevity design standard of Criterion 6. That being so, the third paragraph of Criterion 1 directs that, in judging the adequacy of a disposal site, isolation of mill tailings (through an optimization of the three siting features of remoteness from populated areas, hydrologic conditions, and resistance to erosion) is paramount, and short-term impacts like the costs of transporting tailings to another site are to be accorded lesser weight.[FN274]

Furthermore, and again because of the long-term nature of the mill tailings hazard, the Criterion commands that "overriding consideration must be given to siting features" relative to "engineering design" in order to ensure the isolation *140 of tailings. "Overriding" is defined as "subordinating all others to itself." [FN275] While care must always be taken not to apply dictionary definitions mechanically in unintended contexts,[FN276] here the purpose of the Commission's word choice seems evident. Once again, because of the exceedingly long-term nature of the tailings hazard and the potential for failure of engineered features over the very long term, the Criterion directs that the three siting features are to be given preeminence over engineered design features in assessing the adequacy of a tailings disposal site. As the Commission itself put it: "siting is of paramount importance in developing optimum tailings disposal programs. The problem of tailings disposal cannot be approached with the attitude that inadequate siting features can be compensated for by design." [FN277]

As detailed above, the Licensing Board's construction of Criterion 1 completely ignores the Criterion's third paragraph, and its interpretation of the first and second paragraphs cannot be squared with the plain language of the regulations. Accordingly, we reverse the Board's determination that the West Chicago site satisfies the provisions of Appendix A, Criterion 1. The current state of the record, as well as our determination in the next section that the Licensing Board erred in granting summary disposition on a number of the State's contentions, precludes us from applying the provisions of Criterion 1, properly interpreted, to the West Chicago site and the alternative sites. Hence, we reach no conclusion on the adequacy of any site under Criterion 1.

**40 B. The State also challenges the Licensing Board's grant of Kerr–McGee's cross-motion for summary disposition on the State's admitted contentions concerning the ability of the proposed disposal cell to isolate mill tailings and to resist human intrusion over the long term without active maintenance, as required by the Commission's regulations.[FN278] Because the Licensing Board based its grant of summary disposition of these contentions upon an erroneous definition of "active maintenance" and upon an incorrect application of the standard for granting summary disposition, we reverse. In its resolution of these contentions, the Licensing Board combined Contentions 4(c) and 4(d) and similarly addressed Contentions 4(e) and 4(g) together. It then disposed of each grouping without further differentiation. For ease of reference, we discuss the contentions in the same manner.

1. As previously indicated, Criterion 12 requires that the final disposition of mill tailings must be such that ongoing active maintenance is not necessary to preserve isolation.[FN279] Additionally, a portion of the siting and design goal *141 set forth in the first sentence of Criterion 1 provides that tailings should be permanently isolated "without ongoing maintenance." The last paragraph of that criterion further amplifies that provision, stating that "[t] ailings should be disposed of in a manner that no active maintenance is required to preserve conditions of the site." The State's Contention 4(c) alleged that Kerr–McGee failed to demonstrate that, without active maintenance, its proposed above-grade disposal cell provides isolation of the tailings from natural erosional forces reasonably equivalent to below-grade disposal, as Criterion 3 requires.[FN280] Related Contention 4(d) alleged that the embankment and cover slopes of the proposed cell are not relatively flat after stabilization so as to minimize the potential for erosion and provide conservative factors for safely assuring long-term stability, as Criterion 4 requires.[FN281] Further, the contention asserts that the final slopes will not be contoured to grades that are as close as possible to those that would exist for below-grade disposal. The Licensing Board characterized Contentions 4(c) and 4(d) as alleging that, "because the 20% slope proposed for the disposal cell's sides, while not prohibited, will require active maintenance over the long term in order to resist erosion, the cell will not provide isolation equivalent to that provided by below-grade disposal." [FN282]

In its resolution of these joined contentions, the Licensing Board determined that the kinds of maintenance necessary to repair the damage to the disposal cell that the State claimed would be caused by erosion—namely, burning or mowing the top vegetative cover and making other minor repairs—did not constitute "active maintenance" within the meaning of Appendix A. It concluded, therefore, that such anticipated maintenance activities could be performed in the future without running afoul of the mill tailings regulations. At the urging of Kerr–McGee, the Licensing Board adopted the definition of the types of activities that do and do not constitute "active maintenance" found in the Commission's regulations governing the land disposal of radioactive waste.[FN283] Section 61.2 of 10 C.F.R. defines "active maintenance" as

> **41 any significant remedial activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives [of Part 61] are met. Such active maintenance includes ongoing activities such as the pumping and treatment of water from a disposal unit or one-time measures such as replacement of a disposal unit cover. Active maintenance does not include custodial activities such as repair of fencing, repair or replacement of monitoring equipment, revegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep such as mowing grass.[FN284]

*142 According to the Board, "Illinois and Staff pose[d] no objections to this definition in their responses to [Kerr–McGee's] cross-motion" for summary disposition.[FN285] Thus, the Board incorporated this definition into Part 40, Appendix A, "because the goal stated in 10 C.F.R. § 61.44, elimination to the extent practicable of the need for active site maintenance following closure, is very similar to the goal of Criterion 12." [FN286]

But in its cross-motion for summary disposition urging adoption of the section 61.2 definition of active maintenance for use in Part 40, Kerr–McGee did not inform the Board,[FN287] nor apparently did the Board independently discover, that the immediately preceding section of the regulations, section 61.1(b), explicitly provides that the Part 61 "regulations ... do not apply to ... disposal of uranium or thorium tailings or wastes (byproduct material as defined in § 40.4(a–1)) as provided for in Part 40 of this chapter in quantities greater than 10,000 kilograms and containing more than five (5) millicuries of radium–226." [FN288] Moreover, section 61.2 itself defines "[w] aste" for purposes of Part 61 as "low-level waste[,] ... that is, radioactive waste not classified as high-level radioactive waste, transuranic

waste, spent nuclear fuel, or byproduct material as defined in section 11e.(2) of the Atomic Energy Act (uranium or thorium tailings and waste)." [FN289] It is thus clear from the Part 61 regulations themselves that the Commission did not intend for any part thereof to be applied to mill tailings disposal.

The Board was also seriously mistaken in its expressed belief that the State did not oppose the use of the Part 61 definition.[FN290] Contrary to the Licensing ***143** Board's statement, the State disputed explicitly the use of the Part 61 definition in its response to Kerr–McGee's cross-motion for summary disposition and the accompanying affidavit of its expert witness, Dr. Thiers. He explained why Part 61 does not assist in discerning the meaning of active maintenance as used in Part 40, by contrasting Part 61 low-level waste with Part 40 mill tailings. In this regard, Dr. Thiers stated that, pursuant to Part 61, low-level wastes generally will be placed below grade or sealed in concrete vaults with a 500–year design life. He further explained that the Part 61 regulations provide for only a 100–year period of institutional control because Class A and Class B low-level wastes have a relatively short half-life and will decay during that period, while thorium tailings include radioactive materials with half-lives of many thousands of years. Next, Dr. Thiers stated that EPA's regulations for inactive mill tailings sites, 40 C.F.R. Part 192, and the basis for those regulations set forth in the Statement of Considerations accompanying them, provide the correct guidance for dealing with the disposal of mill tailings. He then explained that, because of the long-term impacts of mill tailings, those regulations distinguish between active and passive controls and that passive maintenance, unlike active maintenance, includes no planned maintenance by people. Consequently, Dr. Thiers stated that a passive maintenance structure is self-maintaining and designed against the probable maximum flood (PMF), the PMP, the maximum credible earthquake (MCE), and other conceivable destructive events, with no planned human maintenance.[FN291]

****42** In light of the explicit statements in 10 C.F.R. §§ 61.1(b) and 61.2 of the inapplicability of Part 61 to mill tailings regulated under Part 40, we hold that the Licensing Board erred in its use of the Part 61 definition in this proceeding. If regulations are to have any meaning, express exclusions and prohibitions must be obeyed. In some circumstances, if a regulation does not define a particular term, it may be acceptable to borrow the definition of a like term from another part of an agency's regulations. But this can never be the case where, as here, there are specific prohibitions against such application.[FN292]

Furthermore, the definition adopted by the Licensing Board is inappropriate for the very reasons stated by the State's expert, Dr. Thiers. By virtue of the extremely long half-lives of the elements found in mill tailings and the correspondingly long times the tailings will remain hazardous and need to be isolated, the Licensing Board should have crafted a definition for the active maintenance prohibited by Part 40 that would preclude any maintenance, even minor in nature, that is needed to ensure compliance with the design longevity ***144** standards of Part 40. Accordingly, insofar as the Licensing Board relied upon the Part 61 definition of active maintenance in granting Kerr–McGee's motion for summary disposition of Contentions 4(c) and 4(d), we reverse.

2. In addition, we reverse the Board's treatment of these contentions for the independent reason that it misapplied the standard for granting summary disposition. Section 2.749 of the Commission's Rules of Practice governs motions for summary disposition. Only if there are no genuine issues of material fact and the moving party is entitled to a decision as a matter of law, may the presiding officer grant the motion.[FN293] Conversely, if a disputed issue of material fact exists, the motion must fail.[FN294] In weighing the evidence, it is well-settled that all inferences must be drawn in favor of the party opposing summary disposition.[FN295] Here, due to the existence of several disputed issues of material fact, the Licensing Board erred in granting Kerr–McGee's cross-motion for summary disposition on Contentions 4(c) and 4(d).

First, the Licensing Board erred in dismissing, on summary disposition, the State's challenges to the intrusion barrier. As the Board saw it, the purpose of the clay-cobble intrusion barrier underlying the vegetative cover is "to prevent human and animal intrusion and to provide added assurance of cell stability in the event that the topsoil layer is lost for some unspecified reason during the design life of the cell." [FN296] The State, in opposing Kerr–McGee's cross-motion for summary disposition, challenged the adequacy of the disposal cell design because it failed to pro-

vide certain information on the particle size and distribution of the clay-cobble layer, thereby preventing the State from being able to determine the effectiveness of the intrusion barrier. Despite its acknowledgment that the intrusion barrier served some purpose, the Board nonetheless held that the missing information was immaterial because the barrier was not required by Appendix A.[FN297]

**43 Contrary to the Board's determination, however, the missing information regarding the particle size and distribution of the clay-cobble layer was material. As the State's expert, Dr. Thiers, explained in his affidavit in support of the State's position, without the specification of the percentage of such particle size *145 and the percentage of soil fines to be employed in the intrusion barrier, the ability of the material to resist the design storm cannot be reliably evaluated.[FN298] The Licensing Board examined the intrusion barrier "[b]ecause [it] is part of the design," and for that reason the Board sought "to determine whether it is likely to perform its intended function under conditions likely to prevail during the design life of the cell." [FN299] In addition, the Board stated that one of the intended functions of the barrier was to assure "cell stability in the event that the topsoil layer is lost." [FN300] In such a circumstance—i.e., the absence of a "full self-sustaining vegetative cover"—however, Appendix A Criterion 4 requires a "rock cover" like the intrusion barrier in order to reduce erosion to negligible levels.[FN301] Thus, under the terms of its own analysis for examining the barrier, the Board could not dismiss as immaterial the particle size and distribution of the clay-cobble layer on the ground that it was not required by the regulations.[FN302] Accordingly, the Board erred in rejecting the State's challenge by determining that the intrusion barrier was not required by the regulations.

Second, the Licensing Board also erred in summarily disposing of the State's challenge to the flooding event used by Kerr–McGee in its erosion analyses. The State, through the affidavit of Dr. Thiers, pointed out that the erosion estimates of both Kerr–McGee and the staff relied on flooding events of less intensity than that generally accepted by the NRC. As Dr. Thiers explained:

> [i]f the topsoil is not designed to resist the PMP a gully will form, concentrating runoff and tending to erode the underlying intrusion layer. Unless the intrusion layer is designed to withstand this condition, erosion will continue downwards and back into the tailings, spreading those materials into the environment. This is major damage, and would require active maintenance or major reconstruction to correct the spill. Unless erosion protection sufficient to resist runoff from the PMP is provided the design does not meet the practice generally accepted by the NRC.[FN303]

*146 He also noted that the Department of Energy (DOE) designs its mill tailings disposal cells to withstand erosion from a PMP event.[FN304]

The Board, however, dismissed Dr. Thiers's opinion as a "bare allegation" with "no technical basis for his conclusion." [FN305] It also described the erosion damage that Dr. Thiers alleged would occur as "the sort that could be corrected by minor repairs." [FN306] Thereafter, in denying the State's motion for reconsideration, the Board determined that the flooding event employed by Kerr–McGee "has a return frequency of far less than once every 200 years," so "the minimum design objective of Appendix A to assure isolation for 200 years is self evidently met by a wide margin under [Kerr–McGee's reduced flooding event design]." [FN307]

**44 The Licensing Board improperly disregarded, as a "bare allegation," Dr. Thiers's expert opinion concerning the appropriate flooding event.[FN308] Dr. Thiers's affidavit unquestionably raises a disputed issue of material fact and provides an adequate technical foundation—i.e., the generally accepted positions of both the NRC and DOE, as well as his own expert opinion—which the Board was not free to disregard. Further, the Board fails to explain how the "major reconstruction" alleged by Dr. Thiers can be characterized as "minor repairs." And, as previously shown, even "minor repairs" fall within the bounds of prohibited active maintenance. Finally, the Board was mistaken concerning the acceptability of a design longevity standard of 200 years. In promulgating the final rule for its Part 40 regulations, the Commission recognized that "EPA's primary design standard is 1,000 years. Accordingly, the Commission has no discretion to promulgate a different design standard for a shorter period." [FN309] The Commission also stated that "[t]he 200–year minimum longevity requirement provides relief in those unique reclamation situations where the 1,000–year criterion can be shown to impose too much of a cost hardship. The Commission views the EPA longevity standard to be 1,000 years unless site specific circumstances preclude meeting 1,000

years." [FN310] Kerr–McGee did not contend, let alone show, that circumstances at West Chicago preclude compliance with the 1000–year standard. Hence, the Licensing Board mistakenly ***147** used 200 years as the minimum design objective in granting summary disposition of Contentions 4(c) and 4(d).[FN311]

3. The Licensing Board similarly erred in its disposition of the State's Contentions 4(e) and 4(g). The principal focus of the Licensing Board's discussion of these contentions was the State's argument that "the location of the disposal cell within a densely populated area almost guarantees human intrusion absent a rigorous security program," and that such a program is inconsistent with the 1000–year longevity and "no active maintenance" criteria of Appendix A.[FN312] The Board granted Kerr–McGee's cross-motion for summary disposition of these two contentions, concluding that, while "some human intrusion onto the site is likely[,] ... we do not believe that the site would constitute an attractive nuisance, so as to make such intrusion probable." [FN313] Further, the Board determined that, "given the design of the cell so as to resist erosion, we do not believe that Dr. Thiers has made a case that human intrusion could create damage so extensive that active maintenance would be required to correct it as that term is defined in section 61.2." [FN314]

In opposing the cross-motion for summary disposition on these contentions, the State took issue with, among other things, Kerr–McGee's position that the design of the cell was sufficient to resist human intrusion. The State asserted that, since its deactivation, the West Chicago site has had a history of unauthorized human intrusion "despite fences, "radioactive" warning signs, and security guards." [FN315] Further, the State claimed that, not only would such intrusion continue, the cell itself would be invaded and require periodic active maintenance to repair it.[FN316] In support of its position, the State offered excerpts from the prior testimony of a Kerr–McGee official concerning the numerous intrusions at the West Chicago site notwithstanding Kerr–McGee's efforts to prevent such activities.[FN317] The State also offered the expert testimony, by way of affidavit, of Dr. Thiers. He contrasted underground disposal of mill tailings, "which ***148** would reduce the temptation for unauthorized post construction excavation to essentially zero," with Kerr–McGee's above ground design for the disposal cell at West Chicago. In the latter regard, he stated that "an unguarded 35–foot high, 27–acre mound in a partly residential area has a nearly 100% probability of being dug into, either out of curiosity, or for "free fill" or both." [FN318] As a result of such human intrusion, Dr. Thiers further concluded that "[e]ach excavation episode would require at least maintenance level repair." [FN319]

****45** Once again, in granting Kerr–McGee's cross-motion for summary disposition, the Licensing Board was not free to disregard the State's evidence concerning past intrusions onto the West Chicago site and the obvious inference from that evidence that such intrusions would continue in the future. This evidence raised a disputed issue of material fact not amenable to summary disposition. Indeed, the Licensing Board's unexplained, unsubstantiated, and contradictory conclusions that, on the one hand, such intrusion is "likely," but, on the other hand, not "probable" because the site is not an "attractive nuisance," only serve to highlight the Board's error. For one thing, in the context of the comprehensive scheme of multi-agency federal regulation of mill tailings, the tort law concept of attractive nuisance is entirely irrelevant. The Licensing Board also wrongly slighted Dr. Thiers's expert opinion on the probability of intrusion into the disposal cell and the need for periodic maintenance to repair the damage. This expert opinion and the accompanying documentation were sufficient to raise a disputed issue of material fact concerning the likelihood of purposeful entry into the cell and the inadequacy of the cell design to resist it without active maintenance, so as to preclude the grant of summary disposition.[FN320] Further, as already shown, the Board relied upon an improper definition of active maintenance to "define away" this disputed issue. Accordingly, we reverse the Licensing Board's grant of summary disposition on the State's Contentions 4(e) and 4(g).[FN321]

4. Although the State and the City have raised a number of additional issues in their appeal from the Licensing Board's decision, we emphasize that we have reviewed only those matters addressed in this decision. The absence of ***149** discussion concerning these other issues should not be taken as our endorsement or approval of how the Licensing Board disposed of them. Indeed, we have considerable reservations about the Board's treatment of several areas, e.g., groundwater [FN322] and radiological impact. But the rulings set forth in this opinion, as well as time constraints and other circumstances, obviate consideration of any other issues, and we see no purpose in thus lengthening further either this proceeding or our decision.

V. License Revocation and Termination of the Proceeding

The Licensing Board's decision authorizing the staff to issue the requested license amendment for Kerr–McGee's proposal was premised on that Board's resolution of all issues in Kerr–McGee's favor.[FN323] Parts III and IV of this opinion, however, establish that that is no longer the case. A significant portion of the Licensing Board's rulings must be vacated and/or reversed, and, in the alternative, the record warrants reopening for the consideration of new evidence on several critical issues. There no longer being a record and decision to support authorization of the license amendment, it necessarily must be revoked as well.[FN324] Indeed, this action arguably should have been taken by the staff itself when it determined, several months after issuing the license amendment, that "it is not clear that the designs of the top and side slopes, the diversion channels, or the sedimentation basin are adequate to resist erosion to the extent that the requirements of 10 CFR 40 Appendix A are met." [FN325] In any event, the staff's later requirement that Kerr–McGee obtain a new license amendment to incorporate the additional design specifications requested by the staff, in effect, amounts to an acknowledgment that the outstanding license amendment no longer provides sufficient legal authority from the NRC for Kerr–McGee's proposal.

**46 As noted earlier, in normal circumstances, we would remand this proceeding to the Licensing Board, both to consider the new information developed since the rendering of its initial decision, and to reconsider specified rulings in light *150 of the conclusions we have reached herein. Several facts militate against this action, however.

First, the Commission has transferred its jurisdiction over mill tailings located within Illinois to the State. And, in doing so, the Commission contemplated that there would be some future, site-specific proceeding conducted by the State involving the West Chicago facility.[FN326] Second, the staff has determined that a new license amendment is necessary to incorporate the design specifications supplied by Kerr–McGee during the staff's reevaluation of the proposal.[FN327] As the State and the City correctly point out, the need for a new license amendment triggers their right to a hearing under section 189(a) of the Atomic Energy Act.[FN328] Third, consideration of the developments since the issuance of the Licensing Board's decisions and correction of the other errors identified in those decisions would require substantial further effort. In large part, the proceeding must begin anew.

The appropriate remedy in these unusual circumstances, therefore, is to terminate this NRC proceeding,[FN329] thereby allowing consideration of Kerr–McGee's plan to begin under the auspices of the State regulatory body now responsible for overseeing the disposal of mill tailings.[FN330] We note in this regard that, in any licensing proceeding conducted by the State with regard to Kerr–McGee's disposal plan, section 274(o)(3) of the AEA requires the State to provide procedures that include

(i) an opportunity, after public notice, for written comments and a public hearing, with a transcript,
(ii) an opportunity for cross examination, and
(iii) a written determination which is based upon findings included in such determination and upon the evidence presented during the public comment period and which is subject to judicial review[.] [FN331]

*151 VI. Conclusion

The Licensing Board's disposition of Contentions 4(c), 4(d), 4(e), 4(g), 2 (k), 2(p), 2(s), 2(u), and 2(h), found in LBP–89–35, 30 NRC 677, and LBP–90–9, 31 NRC 150, is vacated. In the alternative, the record on these contentions is reopened. In addition, the Licensing Board's disposition of these same contentions, as well as Contention 4(a), in LBP–89–35 and LBP–90–9 is reversed. The Director of NMSS is directed to revoke the materials license amendment authorized by LBP–90–9. This proceeding is terminated.

It is so ORDERED.

FOR THE APPEAL BOARD

Barbara A. Tompkins

Secretary to the Appeal Board

FN1 LBP–90–9, 31 NRC 150 (1990).

FN2 According to counsel for the State, this amounts to about 500,000 tons. App.Tr. 8.

FN3 "Tailings" are a sand-like substance defined in section 101(8) of the Uranium Mill Tailings Radiation Control Act of 1978 as "the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted." Pub.L. No. 95–604, 92 Stat. 3021, 3023 (1978). "[T]ailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" is characterized as "byproduct material" under section 11(e)(2) of the Atomic Energy Act of 1954, as amended, 42 U.S.C. § 2014(e)(2).

FN4 NUREG–0904, Supp. No. 1, "Supplement to the Final Environmental Statement Related to the Decommissioning of the Rare Earths Facility, West Chicago, Illinois" (Apr. 1989) [hereinafter SFES], at 3–3 to 3–7, 4–23, 4–85 to 4–87, B–6 to B–12.

FN5 42 U.S.C. § 2021.

FN6 See supra note 3.

FN7 See Letter from R.E. Cunningham to Kerr–McGee (Nov. 16, 1978) [hereinafter 1978 Notice].

FN8 Pub.L. No. 95–604, 92 Stat. 3021 (codified in scattered sections of 42 U.S.C.).

FN9 1978 Notice.

FN10 44 Fed.Reg. 72,246 (1979). See generally Kerr–McGee Corp. (West Chicago Rare Earths Facility), CLI–82–2, 15 NRC 232 (1982), aff'd sub nom. City of West Chicago v. NRC, 701 F.2d 632 (7th Cir.1983).

FN11 See LBP–84–42, 20 NRC 1296, 1299, 1308, 1313 (1984), reconsideration denied, LBP–85–3, 21 NRC 244 (1985).

FN12 48 Fed.Reg. 26,381 (1983). The Commission subsequently directed the formal hearing procedures of 10 C.F.R. Part 2, Subpart G, to apply to this adjudication. Commission Order of Nov. 3, 1983 (unpublished).

FN13 42 U.S.C. § 4321.

FN14 LBP–84–42, 20 NRC at 1307–17 & n. 45; LBP–85–3, 21 NRC at 251–56.

FN15 See supra note 4.

FN16 LBP–89–16, 29 NRC 508 (1989); Licensing Board Memorandum and Order of July 12, 1989 (unpublished) [hereinafter July 12 Order].

FN17 LBP–89–16, 29 NRC at 516–18.

FN18 Board Notification 89–6 (July 12, 1989); Letter from R. Springer to J. Swift (July 27, 1989), and Enclosure [hereinafter EPA Comments on SFES], attached to Letter from D.J. Rathe to J.H Frye (Aug. 21, 1989).

FN19 Licensing Board Memorandum and Order of Aug. 24, 1989 (unpublished).

FN20 Early in the proceeding, the West Chicago Chamber of Commerce withdrew its petition to intervene. LBP–84–42, 20 NRC at 1299 n. 1.

FN21 Licensing Board Order of Sept. 5, 1989 (unpublished). This status allows a governmental entity to participate in a hearing and to file an appeal under 10 C.F.R. § 2.762 without sponsoring its own contentions. See 10 C.F.R. § 2.715(c).

FN22 LBP–89–35, 30 NRC 677 (1989); Licensing Board Memorandum and Order of Nov. 14, 1989 (unpublished).

FN23 LBP–90–9, 31 NRC at 154.

FN24 Id. at 194–95.

FN25 ALAB–928, 31 NRC 263, 267–69 (1990).

FN26 Id. at 268 (footnote omitted).

FN27 The Commission's Rules of Practice authorize the Director of Nuclear Material Safety and Safeguards to issue license amendments like that here involved within ten days of the Licensing Board's initial decision, despite the pendency of an appeal. 10 C.F.R. § 2.764(b).

FN28 Kerr–McGee Chemical Corp. v. City of West Chicago, 732 F.Supp. 922 (N.D.Ill.), aff'd, 914 F.2d 820 (7th Cir.1990). The State also sought judicial intercession by the Illinois state court in this matter. It obtained a temporary restraining order, enjoining Kerr–McGee from beginning any construction activities at the site or from interfering with inspection of the facility by State officials. State ex rel. Hartigan v. Kerr–McGee Chemical Corp., No. 90–CH–220 (Ill. 18th Cir. Mar. 14, 1990).

FN29 Appeal Board Memorandum and Order of Mar. 21, 1990 (unpublished) (citing Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB–636, 13 NRC 312, 315 n. 2 (1981)).

FN30 Amicus Curiae Brief of the United States Environmental Protection Agency (May 21, 1990) [hereinafter EPA Brief] at 2–3, 15. See supra p. 7.

FN31 NRC Staff's Motion for an Extension of Time (May 30, 1990) at 1.

FN32 Id. at 2.

FN33 Appeal Board Memorandum and Order of June 6, 1990 (unpublished).

FN34 See, e.g., Board Notifications 90–04 (July 13, 1990); 90–05 (July 31, 1990, reissued Aug. 7, 1990); 90–06 (Aug. 3, 1990); 90–08 (Aug. 8, 1990). Although the State and City were permitted to attend these meetings, they

were not allowed to participate.

FN35 NRC Staff Brief in Response to the Briefs of the State of Illinois, the City of West Chicago and the U.S. Environmental Protection Agency (Aug. 10, 1990) [hereinafter NRC Staff Brief] at 38.

FN36 Ibid.

FN37 Id. at 38–39.

FN38 Motion to Vacate as Moot the License Amendment and to Remand ... to [NMSS] or to Reopen the Record and Remand to Licensing Board (Aug. 31, 1990) [[[hereinafter Motion to Vacate] at 2 (emphasis in original).

FN39 State of Illinois, CLI–90–9, 32 NRC 210, reconsideration denied, CLI–90–11, 32 NRC 333 (1990), petition for review pending sub nom. Kerr–McGee Chemical Corp. v. United States, No. 90–1534 (D.C.Cir. filed Nov. 14, 1990). The Commission had previously entered into an agreement transferring jurisdiction to the State over other types of nuclear material. See 52 Fed.Reg. 22,864 (1987), review denied sub nom. Kerr–McGee Chemical Corp. v. NRC, 903 F.2d 1 (D.C.Cir.1990).

FN40 55 Fed.Reg. 46,591, 46,593 (1990).

FN41 Letter from J.G. Klinger to J.C. Stauter (dated Dec. 5, 1990, and stamped as "received" by Kerr–McGee on Dec. 10, 1990), attached as Exhibit 1 to Kerr–McGee's Motion for a Protective Order (Dec. 12, 1990).

FN42 US Ecology, Inc. (Sheffield, Illinois Low–Level Radioactive Waste Disposal Site), ALAB–866, 25 NRC 897 (1987).

FN43 Motion to Terminate Proceeding and to Vacate Initial Decision for Lack of Jurisdiction (Oct. 22, 1990) at 1–3.

FN44 340 U.S. 36, 39–41 (1950).

FN45 Sheffield, 25 NRC at 898–99.

FN46 Kerr–McGee Opposition to State and City Motion to Terminate and Vacate (Nov. 13, 1990) at 2 (citing Illinois, CLI–90–11, 32 NRC at 334).

FN47 Id. at 3 (citing Illinois, CLI–90–9, 32 NRC at 216–17, and id., CLI–90–11, 32 NRC at 334).

FN48 Id. at 3, 7–15.

FN49 NRC Staff Response to Joint Motion to Terminate Proceeding and to Vacate Initial Decision (Nov. 19, 1990).

FN50 See generally Illinois, CLI–90–9, 32 NRC 210; id., CLI–90–11, 32 NRC 333.

FN51 Id., CLI–90–9, 32 NRC at 215–17.

FN52 "Criteria for Guidance of States and NRC in Discontinuance of NRC Regulatory Authority and Assumption Thereof by States Through Agreement" [[[hereinafter State Agreement Policy], 46 Fed.Reg. 7540, 7543 (1981) (emphasis added).

FN53 It cannot reasonably be disputed that "the processing of license applications" necessarily includes any hearing held thereon.

FN54 See 55 Fed.Reg. 46,591. The original agreement with Illinois (see supra note 39) is similarly silent in this regard. See 52 Fed.Reg. at 22,864. Nor do the Commission's "Agreement State" regulations shed any light on what happens to proceedings pending at the time a section 274 agreement is executed. See 10 C.F.R. Part 150.

FN55 See Illinois, CLI–90–11, 32 NRC at 334.

FN56 340 U.S. at 39–40. The Court applied this principle to unreviewed administrative decisions in A.L. Mechling Barge Lines, Inc. v. United States, 368 U.S. 324 (1961).

FN57 Powell v. McCormack, 395 U.S. 486, 496 (1969).

FN58 See County of Los Angeles v. Davis, 440 U.S. 625, 631 (1979) (quoting United States v. W.T. Grant Co., 345 U.S. 629, 632–33 (1953)).

> Because our decision in Sheffield, 25 NRC 897, represents a straightforward application of Munsingwear, it does not dictate a different outcome here. The State and the City cite to only one other case as support for their view that, in and of itself, a transfer of jurisdiction from one authority to another, prior to the completion of appellate review, renders a case moot and thereby requires the vacation of the underlying decision. Their reliance on excerpts taken out of context from our decision in Kerr–McGee Chemical Corp. (Kress Creek Decontamination), ALAB–867, 25 NRC 900 (1987), however, is misplaced. We concluded there that the agreement in question had not transferred jurisdiction to Illinois over the particular type of nuclear material at issue in that proceeding. Thus, it was not necessary for us to decide how the proceeding should be terminated and if vacation was appropriate, and we explicitly declined to do so. Id. at 911 & n. 15.

FN59 340 U.S. at 40. The "happenstance" that led to the mootness in Munsingwear was the decontrol of the price of the commodity sold by the respondent in that case. This contrasts with the case at bar, in which the regulation of the mill tailings at Kerr–McGee's West Chicago site has not been eliminated, but rather transferred to another authority.

FN60 484 U.S. 72, 83 (1987).

FN61 848 F.2d 1307, 1310 & n. 6 (D.C.Cir.1988).

FN62 We note, however, that the City—also an appellant before us (see supra p. 7 & note 21)—was not a party to the State's request for the transfer of regulatory authority.

FN63 See infra pp. 121–22.

FN64 In this regard, the Court made explicit reference to the fact that the decision mooted on appeal was "only preliminary." 340 U.S. at 40. Although the Licensing Board's initial decision before us on appeal is also "preliminary," it nonetheless became "immediately effective" insofar as it provided the authority for license issuance, which latter action is considered final for purposes of judicial review. See supra note 27; Massachusetts v. NRC, No. 89–1306, slip op. at 17–19 (D.C.Cir. Jan. 25, 1991); Oystershell Alliance v. NRC, 800 F.2d 1201 (D.C.Cir.1986).

FN65 13A C. Wright, A. Miller, & E. Cooper, Federal Practice and Procedure § 3533.10, at 430 (2d ed. 1984). See also Pickus v. United States Bd. of Parole, 543 F.2d 240, 242 (D.C.Cir.1986).

FN66 Motion to Vacate at 1 (emphasis in original).

FN67 See supra pp. 2–3.

FN68 Motion to Vacate at 2.

FN69 For a more in-depth discussion of UMTRCA and the Appendix A criteria promulgated thereunder, see infra pp. 65–79.

FN70 See People of the State of Illinois'[s] Additional Contentions at 2–3, attached to Motion for Leave to Amend Contentions (May 15, 1989); People's Reply to the NRC Staff's and Kerr–McGee's Responses to the People's Motion for Leave to Amend Contentions (June 16, 1989), Exhibit B at 6–7; LBP–89–16, 29 NRC at 515, 517; July 12 Order at 4.

FN71 See, e.g., Opposition to State Motion for Summary Disposition and Kerr–McGee Cross–Motion for Dismissal or Summary Disposition (Aug. 22, 1989) [[[hereinafter Kerr–McGee Cross Motion] at 37; NRC Staff Response in Opposition to Illinois'[s] Motion for Summary Disposition (Aug. 22, 1989) [hereinafter Staff Summary Disposition Response] at 16–17.

FN72 Motion to Vacate at 3. See LBP–89–35, 30 NRC at 686–88.

FN73 Motion to Vacate at 3–4.

FN74 LBP–89–35, 30 NRC at 683–84.

FN75 Criterion 1, as well, states that "[t]he general goal or broad objective in siting and design decisions is permanent isolation of tailings and associated contaminants by minimizing disturbance and dispersion by natural forces, and to do so without ongoing maintenance." See infra pp. 85–102.

FN76 LBP–89–35, 30 NRC at 682–83. But see infra pp. 103–10, concerning the Licensing Board's reliance on this definition.

FN77 10 C.F.R. § 61.2.

FN78 LBP–89–35, 30 NRC at 687.

FN79 See id. at 685.

FN80 American Meteorological Society, Glossary of Meteorology 446 (1959).

FN81 LBP–89–35, 30 NRC at 688.

FN82 Id. at 689, reconsideration denied, Licensing Board Memorandum and Order of Feb. 13, 1990 (unpublished) [hereinafter Feb. 13 Order].

FN83 Motion to Vacate at 4–5. See EPA Brief at 7–12.

FN84 Motion to Vacate at 5–6. See id. at 11–12.

FN85 Id. at 9–10, 12.

FN86 Id. at 12 (emphasis in original), 14.

FN87 Id. at 14. As the staff notes, the actual relief that the State and the City mean to seek through their motion is a vacation of the Licensing Board decision authorizing the license amendment. NRC Staff Response to State of Illinois and City of West Chicago Motion to Vacate or to Reopen the Record (Sept. 17, 1990) [hereinafter Staff Response to Motion to Vacate] at 3 n. 2.

FN88 42 U.S.C. § 2239.

FN89 Motion to Vacate at 15 n. 9, 19 n. 13.

FN90 Id. at 16–18 & n. 11. The State and the City also note that EPA expressed concerns about radiation dose and groundwater pollution and that even the staff concedes that this latter issue has not yet been resolved. Id. at 5, 10–11, 15–16. See infra pp. 120–21.

FN91 Kerr–McGee Opposition to Motion to Vacate (Sept. 10, 1990) [hereinafter Kerr–McGee Opposition] at 1.

FN92 See "Erosion Evaluation: West Chicago Disposal Cell" (July 23, 1990) [[[hereinafter Erosion Evaluation], enclosed with Board Notification 90–05.

FN93 Kerr–McGee Opposition at 14–15, 19. Indeed, Kerr–McGee unabashedly claims that it has made an "unrebutted and unchallenged showing that [its] design can withstand a PMP" event. Id. at 28 (emphasis in original).

FN94 Id. at 21–29.

FN95 Staff Response to Motion to Vacate at 3.

FN96 See NRC Staff Brief at 38.

FN97 This staff report is attached to the NRC Staff Brief.

FN98 Staff Response to Motion to Vacate at 7–8. The State, the City, and Kerr–McGee each filed such reply briefs on October 5, 1990.

FN99 Tennessee Valley Authority (Browns Ferry Nuclear Plant, Units 1, 2 and 3), ALAB–677, 15 NRC 1387 (1982).

FN100 Id. at 1389.

FN101 Id. at 1391.

FN102 15 NRC 1 (1982).

FN103 ALAB–677, 15 NRC at 1392.

FN104 Id. at 1393.

FN105 Ibid.

FN106 Id. at 1393 n. 5. See id. at 1389.

FN107 CLI–82–26, 16 NRC 880, 881 (1982) (emphases added).

FN108 Ibid. See ALAB–711, 17 NRC 30 (1983).

> Similarly, in Delmarva Power & Light Co. (Summit Power Station, Units 1 and 2), ALAB–516, 9 NRC 5 (1979), while the Licensing Board's decision approving the issuance of a limited work authorization was pending before us on appeal, the applicant indicated it intended to alter its plans substantially. On the applicant's suggestion and without objection from any other party, we vacated the Licensing Board's decision without prejudice. Although the facts of Summit suggest a basis for distinguishing that decision from the instant case, the fundamental principle pertains: when circumstances change so as to alter effectively the evidentiary record supporting a decision on appeal, that decision should be vacated.

FN109 Klapprott v. United States, 335 U.S. 601, 614–15 (1949).

FN110 Browns Ferry, ALAB–677, 15 NRC at 1391.

FN111 See Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB–123, 6 AEC 331, 345 (1973).

FN112 See Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB–728, 17 NRC 777, 807, review declined, CLI–83–32, 18 NRC 1309 (1983). As Diablo Canyon notes, however, the adequacy of the staff's environmental review can be challenged in a hearing. In the instant case, it would be extremely difficult to characterize the issues as solely relating to either radiological health and safety matters under the AEA and UMTRCA, or the adequacy of the staff's environmental review under NEPA. See generally Limerick Ecology Action, Inc. v. NRC, 869 F.2d 719, 729–30 (3d Cir.1989).

FN113 LBP–89–35, 30 NRC at 687 (emphasis added).

FN114 Ibid.

FN115 Ibid. (emphasis added).

FN116 Id. at 688 & n. 17.

FN117 NRC Staff Brief at 35. See Affidavit of T.L. Johnson [hereinafter Johnson Affidavit], attached to NRC Staff Brief, at 5.

FN118 NRC Staff Brief at 36. See Johnson Affidavit at 5.

FN119 STP at 7–8, 11–12, 13–14, 17. The STP was transmitted to the parties and us with a Memorandum from J.J. Swift to C.J. Haughney (June 12, 1990).

FN120 See, e.g., Erosion Evaluation at 18–22, 33–37; Board Notification 90–06, Enclosure 2 (Letter from Kerr–McGee to C.J. Haughney (July 31, 1990), providing additional information and calculations).

FN121 NRC Staff Brief at 36. See STP at 9–10, 18–19, concerning scrutiny of rock durability, quality, and placement.

FN122 NRC Staff Brief at 36, 38; Affidavit of R.M. Bernero [hereinafter Bernero Affidavit], attached to NRC Staff Brief, at 4; Affidavit of J.J. Swift [[[hereinafter Swift Affidavit], attached to NRC Staff Brief, at 9.

FN123 LBP–89–35, 30 NRC at 687.

FN124 Indeed, at the time the State submitted its contentions, it did so on the basis that Kerr–McGee and the staff both viewed the vegetative cover as the primary erosion protection. Thus, it is not surprising that the State's contentions did not focus on "engineering details of the specificity [now] involved in Kerr–McGee's Erosion Evaluation." NRC Staff Brief at 38 n. 17.

FN125 See id. at 35.

FN126 LBP–89–35, 30 NRC at 682–83.

FN127 10 C.F.R. Part 40, App. A, Criterion 3.

FN128 See LBP–89–35, 30 NRC at 686–87.

FN129 Id. at 689. The Board cited its "active maintenance" definition in summarily disposing of yet another issue, human intrusion. Id. at 690. For additional discussion of this contention, see infra pp. 116–20.

FN130 NRC Staff Brief at 35.

FN131 STP at 3.

FN132 Ibid. (emphasis in original).

FN133 Any doubt that the staff has applied its generic STP to Kerr–McGee's proposal is dispelled by a Letter from J. Swift to Kerr–McGee (June 25, 1990) [[[hereinafter Swift Letter], attached to Board Notification 90–04.

FN134 Johnson Affidavit at 5.

FN135 See infra pp. 113–16, concerning whether the Licensing Board erred, in any event, in granting summary disposition of this issue.

FN136 LBP–89–35, 30 NRC at 688.

FN137 Id. at 688–89.

FN138 Id. at 688.

FN139 NRC Staff Brief at 35; LBP–89–35, 30 NRC at 689; Feb. 13 Order at 1–4.

FN140 STP at 5.

FN141 Johnson Affidavit at 4. See NRC Staff Brief at 34–35.

FN142 NRC Staff Brief at 35; Johnson Affidavit at 3.

FN143 NRC Staff Brief at 36; Johnson Affidavit at 4.

FN144 See supra pp. 12, 33–34.

FN145 ALAB–677, 15 NRC at 1391.

FN146 CLI–82–26, 16 NRC at 881.

FN147 Bernero Affidavit at 1–2. We wonder how the staff position could "lag behind," inasmuch as a draft version of the STP was apparently in preparation by NMSS at about the same time as the SFES on Kerr–McGee's proposal (also prepared under the auspices of NMSS), and was made available for public comment about three weeks before the staff filed its response to the State's motion for summary disposition of the involved contentions and three months before the Licensing Board issued its summary disposition decision. See 54 Fed.Reg. 33,101 (1989). At a minimum, the staff was seriously remiss in the fulfillment of the long-established obligation imposed on all parties in NRC adjudicatory proceedings to call to the attention of both the Licensing Board and other parties "new information which is relevant and material to the matters being adjudicated." Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB–143, 6 AEC 623, 625 (1973). Had the staff done so, it is quite likely that this proceeding would now be in a different posture entirely.

See infra note 189, concerning the State's effort to bring the draft STP to the attention of the Licensing Board.

FN148 NRC Staff Brief at 38 (emphasis added).

FN149 Ibid. As Kerr–McGee notes, NRC staff theology has long maintained that only "significant" design changes require a license amendment. Kerr–McGee Opposition at 20 n. 24 (citing Pacific Gas & Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), DD–82–10, 16 NRC 1205, 1207 n. 4 (1982)).

FN150 Swift Letter, Enclosure 3 at 1 (emphasis added).

FN151 Ibid.

FN152 Kerr–McGee Opposition at 26.

FN153 Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), CLI–74–40, 8 AEC 809, 811 (1974); Petition for Emergency and Remedial Action, CLI–78–6, 7 NRC 400, 406–07 (1978).

FN154 Consumers Power Co. (Big Rock Point Nuclear Plant), ALAB–725, 17 NRC 562, 568 n. 10 (1983).

FN155 Kerr–McGee Opposition at 11.

FN156 Id. at 1.

FN157 See Board Notification 89–6 (noting that "EPA staff ... wanted their comments brought effectively to the attention of the decision-makers, i.e., to the Atomic Safety and Licensing Board"); EPA Comments on SFES at 6–9

(concerning active maintenance, erosion, the 1000–year standard, compliance with NRC regulatory criteria, etc.).

FN158 LBP–90–9, 31 NRC at 154.

FN159 Id. at 153.

FN160 NRC Staff's Response to Memorandum and Order of August 24, 1989 (Sept. 8, 1989) at 3.

FN161 Kerr–McGee's Response to the Board's Questions (Sept. 8, 1989) at 3–4.

FN162 Id. at 5 (emphasis added).

FN163 Browns Ferry, CLI–82–26, 16 NRC at 881.

FN164 LBP–89–35, 30 NRC at 680–90, 701–02; LBP–90–9, 31 NRC at 190.

FN165 See infra pp. 121–24.

FN166 10 C.F.R. § 2.734(a).

FN167 Id. § 2.734(b).

FN168 Kerr–McGee Opposition at 24–25. None of Kerr–McGee's arguments with respect to the motion to reopen addresses the active maintenance and vegetative cover issues. For its part, the NRC staff does not challenge the timeliness of the motion to reopen or object to reopening for consideration of certain information provided by Kerr–McGee and the staff. Staff Response to Motion to Vacate at 7.

FN169 Kerr–McGee Opposition at 24–25 (citing Feb. 13 Order at 4).

FN170 Id. at 25.

FN171 See LBP–89–35, 30 NRC at 685, 688–89.

FN172 Id. at 688–89. As will be seen, infra pp. 56–58, 113–16, 103–10, the Licensing Board erred on all three counts.

FN173 One of those references was the August 1989 version of the STP. See infra note 189.

FN174 Feb. 13 Order at 4.

FN175 In this regard, Kerr–McGee argues that the staff's request for further information and reevaluation of Kerr–McGee's cell design "merely reinforces the validity of the Licensing Board's decision," that the STP has "no binding regulatory significance," and that, in any event, Kerr-of the ability of its design to withstand a PMP event. Kerr–McGee Opposition at 25, 26, 28. We have already disposed of the first two arguments supra pp. 48, 49, and we address the third infra pp. 59–62.

FN176 Swift Letter, Enclosure 3 at 1.

FN177 LBP–89–35, 30 NRC at 688.

FN178 EPA Brief at 7. See also the Statement of Consideration for EPA's final rules on "Environmental Standards for Uranium and Thorium Mill Tailings at Licensed Commercial Processing Sites" (which are codified at 40 C.F.R. §§ 192.30–.43), 48 Fed.Reg. 45,926, 45,936–37 (1983).

EPA also criticizes, correctly in our view, Kerr–McGee's reliance on, and the Licensing Board's acceptance of, precipitation estimates lower than a PMP event because the Department of the Interior's Bureau of Reclamation permits the use of such lower magnitude events in designing small dams. EPA points out that the Bureau of Reclamation permits the use of less than a PMP event

> when property damage is the relevant consideration ..., but allows no such modification when there is a potential for loss of life. As the princip[al] purpose of the Mill Tailings Standard is to protect human health and the environment, not to limit property damage, modifications to the PMP based upon criteria designed to protect against property loss do not appear to be appropriate to demonstrate compliance with the standard.

EPA Brief at 7–8.

FN179 STP at 5; NRC Staff Brief at 34; Johnson Affidavit at 4.

FN180 See supra pp. 37–52.

FN181 Compare Consolidated Edison Co. of New York (Indian Point Station, Unit No. 2), ALAB–209, 7 AEC 971 (1974). An intervenor moved to reopen a closed record based on a staff "working paper" that the intervenor alleged was " "diametrically opposed" to the position [the staff] took in this proceeding." Id. at 971. The staff, however, characterized the document as simply " "a mechanism for exploring and formulating a possible new approach to the regulatory process," " and resisted the notion that it "present testimony on the contents of the working paper in this adjudicatory proceeding." Id. at 972–73 (emphasis added). We denied the motion to reopen, finding that the working paper alone had no regulatory significance. Id. at 973–74. In contrast to the case at bar, we also found "no conflict between the staff expert testimony in this proceeding and the content of the draft working document." Id. at 975 (footnote omitted). We noted in this regard, however, that, "in the event the staff expert testimony in this proceeding appeared to be impeached by subsequent staff expert opinion[,] ... obviously the issue of the continuing validity of the staff expert testimony should be explored." Ibid. n. 16.

See also Commonwealth Edison Co. (Byron Nuclear Power Station, Units 1 and 2), ALAB–770, 19 NRC 1163 (1984). While the case was pending on the applicant's appeal from a licensing board decision that denied its license request due to quality assurance (QA) problems, the applicant completed its QA reinspection program and the staff concluded its evaluation thereof. We granted applicant's request to reopen the evidentiary record for consideration of this new information and for further hearing on whether there was reasonable assurance that the facility had been constructed properly.

FN182 Kerr–McGee Opposition at 28.

FN183 Response of Illinois to the NRC Staff Brief (Oct. 5, 1990) [hereinafter Illinois Reply Brief] at 3–4; Affidavit of Dr. G.R. Thiers [hereinafter Thiers Oct. 5, 1990, Affidavit], attached to Illinois Reply Brief, at 4–5.

FN184 Illinois Reply Brief at 4–6; Thiers Oct. 5, 1990, Affidavit at 5–8.

FN185 Thiers Oct. 5, 1990, Affidavit at 8.

FN186 Illinois Reply Brief at 6–8; Thiers Oct. 5, 1990, Affidavit at 9–12.

FN187 See Affidavit of G.B. Levin, attached to West Chicago's Response to NRC Staff's August 10, 1990 Brief

(Oct. 5, 1990), at 13–20.

FN188 10 C.F.R. § 2.734(a)(3).

FN189 As noted previously, supra note 173, in its motion for reconsideration of the PMP issue, the State called the Licensing Board's attention to the August 1989 version of the STP. Observing that it was entitled to "no regulatory force," the Board considered the draft STP anyway and concluded that it provided no basis for reconsidering its earlier decision. Feb. 13 Order at 5. The Board noted that the draft STP allowed vegetative covers to serve as the primary erosion barrier. Id. at 5–7. It also concluded "without further inquiry that the minimum design objective of Appendix A to assure isolation for 200 years is self evidently met by a wide margin under the PMP–B [i.e., less than a PMP magnitude event] design criterion." Id. at 8.

The Licensing Board's consideration of the draft STP does not affect our conclusion that the State's and the City's motion satisfies the third reopening criterion, i.e., likely materiality. In the first place, at the time the Board was presented with the draft STP, the staff had not yet applied the STP to this particular proceeding, as the staff has now done in its brief on appeal. Second, the Licensing Board's decision on reconsideration assumes that the vegetative cover is still the staff's preference, and that some maintenance thereof is acceptable under Appendix A—both of which have subsequently been eschewed by the staff. Finally, as we explain infra pp. 115–16, the Board erred in concluding that isolation for 200 years is the minimum design objective of Appendix A. In these circumstances, it cannot be reasonably argued that the Licensing Board has already considered and rejected the STP and thus that a materially different result would not be likely.

FN190 See infra pp. 110–11.

FN191 As the Board Notifications themselves state, "[i]n conformance with the Commission's policy on notification of Licensing Boards, Appeal Boards, or [[[the] Commission," they provide "new, relevant, and material information." See, e.g., Board Notification 90–04.

FN192 Motion to Vacate at 18 n. 11. In the circumstances here, to require additional affidavits directly from the movants that would merely repeat information already contained in existing materials in the docket of this proceeding would burden the record unduly, elevate form over substance, and over-judicialize the agency's public hearing process.

FN193 It cannot be argued that these affidavits are untimely because they were not filed with the motion to reopen. The staff recognized that the State and the City must be given a reasonable opportunity to respond to the new material in the staff's appellate brief, and it thus urged us not to rule on the motion to vacate/reopen until those responses were filed. NRC Staff Brief at 38; Staff Response to Motion to Vacate at 8. Hence, the Thiers and Levin Affidavits were timely filed with the State's and the City's reply briefs approximately five weeks after the motion to vacate/reopen, in accordance with a filing schedule set by order after soliciting input from all the parties. See Appeal Board Order of Sept. 19, 1990 (unpublished). Neither Kerr–McGee nor the staff sought leave to respond to the new Thiers and Levin affidavits.

FN194 Although, as Kerr–McGee and the staff point out, we have the authority to hear evidence and decide matters in the first instance, the exercise of that authority has always been solely a matter of our discretion, dependent upon the particular circumstances of the case and available resources.

FN195 See supra p. 52 & infra pp. 122–24.

FN196 UMTRCA, Pub.L. No. 95–604, § 2(a), 92 Stat. 3021–22.

In explaining the need for UMTRCA, the House Report—the only report accompanying the legislation—relied upon the description of the public health hazard of mill tailings in the testimony of then NRC Chairman, Dr. Jo-

seph M. Hendrie:

> The NRC believes that long-term release from tailings piles may pose a radiation health hazard if the piles are not effectively stabilized to minimize radon releases and prevent unauthorized use of the tailings.
>
> Unlike high-level radioactive waste from the back end of the nuclear fuel cycle, which contains products of the fission reaction, mill tailings contain only naturally occurring radioactive elements, in small quantities. The radioactive decay of these elements leads to production of radon, a radioactive gas with a halflife of about four days, which can diffuse from a tailings pile into the atmosphere and subsequently expose persons to radiation far away from the pile. The increased exposure compared to exposure from radon already in the atmosphere from other sources is exceedingly slight, but this increase is in effect permanent. This is because radon production in mill tailings continues for times of the order of a hundred thousand years, so the tailings pile becomes a perpetual source injecting a small amount of radon into the atmosphere, unless some action is taken to keep the radon from escaping.
>
> The health effects of this radon production are tiny as applied to any one generation, but the sum of these exposures can be made large by counting far into the future, large enough in fact to be the dominant radiation exposure from the nuclear fuel cycle. Whether it is meaningful to attach significance to radiation exposures thousands of years in the future, or conversely, whether it is justifiable to ignore them, are questions without easy answers. The most satisfactory approach is to require every reasonable effort to dispose of tailings in a way that minimizes radon diffusion into the atmosphere.

H.R.Rep. No. 1480, 95th Cong., 2d Sess., pt. 2, at 25 (1978) (ellipsis in original).

FN197 Pub.L. No. 95–604, § 2(b)(1), 92 Stat. 3022.

FN198 Id. § 2(b)(2), 92 Stat. 3022.

FN199 Id. §§ 101–115, 92 Stat. 3022–33.

FN200 Id. §§ 201–206, 92 Stat. 3033–41.

FN201 Id. § 206, 92 Stat. 3040.

FN202 Id. §§ 203, 205, 92 Stat. 3036, 3039.

As described in the House Report, the dual EPA and NRC standard-setting regime contemplated that

> [t]he EPA standards and criteria should be developed to limit the exposure (or potential exposure) of the public and to protect the general environment from either radiological or nonradiological substances to acceptable levels through such means as allowable concentrations in air or water, quantities of the substances released over a period of time, or by specifying maximum allowable doses or levels to individuals in the general population.

H.R.Rep. No. 1480, supra note 196, pt. 1, at 16–17. The NRC, on the other hand,

> must set all standards and requirements relating to management concepts, specific technology, engineering methods, and procedures to be employed to achieve desired levels of control for limiting public exposure, and for protecting the general environment. The Commission's standards and requirements should be of such nature as to specify, for example, exclusion area restrictions on site boundaries, surveillance requirements, detailed engineering requirements, including lining for tailings ponds, depth, and types of tailings covers, population limitations or institutional arrangements such as financial surety requirements or site security measures.

Id. at 16.

FN203 Pub.L. No. 95–604, § 206, 92 Stat. 3040.

FN204 See 45 Fed.Reg. 65,521 (1980).

FN205 See NUREG–0706, "Final Generic Environmental Impact Statement on Uranium Milling" (Sept. 1980) [hereinafter Final GEIS].

FN206 Kerr–McGee Nuclear Corporation challenged the Commission's 1980 regulations on several grounds, including whether the NRC had exceeded its statutory authority in issuing regulations prior to the promulgation of EPA's general standards. The court of appeals upheld the regulations. Kerr–McGee Nuclear Corp. v. NRC, 17 Env't Rep.Cas. (BNA) 1537 (10th Cir.1982), vacated and reh'g en banc granted (Oct. 6, 1982). After the Commission issued amended mill tailings regulations in 1985, the court found that the 1980 regulations had been superseded and vacated the en banc setting.

FN207 Act of Jan. 4, 1983, Pub.L. No. 97–415, §§ 18–22, 96 Stat. 2067, 2077–80 (1983) (codified in scattered sections of 42 U.S.C.). In large measure, Congress amended UMTRCA to resolve the confusion that arose when EPA failed to meet the legislative deadlines and the NRC nevertheless went ahead and issued its mill tailings regulations before EPA acted. See H.R.Conf.Rep. No. 884, 97th Cong., 2d Sess. 45–47 (1982).

FN208 Pub.L. No. 97–415, § 18(a), 96 Stat. 2077.

In the event of a further EPA default in publishing standards for active sites, the amendments additionally provided that EPA's standards-setting authority would terminate and thereafter be exercised by the NRC. In order to give EPA time to meet the new statutory deadlines for promulgating general standards and, if necessary, to provide the NRC with the opportunity to conform its regulations to those of EPA or issue its own standards, the amendments suspended the Commission's 1980 mill tailings regulations until the beginning of 1983. The amendments also suspended certain additional provisions that likely would be affected by EPA's standards until early 1984. Id. § 18(a), 96 Stat. 2077–78.

FN209 Id. § 22, 96 Stat. 2080.

FN210 42 U.S.C. § 2114(a)(1) (emphasis added).

FN211 42 U.S.C. § 2114(c).

FN212 48 Fed.Reg. 590 (1983) (codified at 40 C.F.R. §§ 192.00–.23).

With one exception, EPA's inactive site standards were upheld against numerous challenges from industry and environmental petitioners (including Kerr–McGee Corporation and Kerr–McGee Nuclear Corporation) in American Mining Congress v. Thomas, 772 F.2d 617 (10th Cir.1985), cert. denied, 476 U.S. 1158 (1986) [hereinafter AMC I]. That exception concerned groundwater, where, instead of setting specific contaminant levels as the court deemed necessary, the invalidated portion of the EPA standard directed that groundwater contamination should be dealt with on a site-specific basis. Id. at 638–39.

FN213 See 48 Fed.Reg. 45,926 (1983) (codified at 40 C.F.R. §§ 192.30–.43).

As in the case of the inactive site standards, EPA's active site standards also were upheld against numerous challenges by industry and environmental petitioners in a second case of the same name, American Mining Congress v. Thomas, 772 F.2d 640 (10th Cir.1985), cert. denied, 476 U.S. 1158 (1986). Many of the arguments in the first case were repeated in the second. For example, petitioners again argued that UMTRCA and its legislative history required EPA to find that mill tailings piles posed a significant risk before it could promulgate standards, and that EPA failed to consider costs in comparison with what petitioners perceived as the limited risk to public health. The court held, however, that in UMTRCA Congress itself had determined that radon emissions from mill tailings posed a significant enough health risk to warrant regulation, and that EPA had properly considered cost-benefit factors in promulgating standards. See id. at 646.

FN214 40 C.F.R. § 192.32(b)(1)(i).

FN215 See 49 Fed.Reg. 46,418 (1984) (to be codified at 10 C.F.R. Part 40, App. A) (proposed Nov. 28, 1984).

FN216 50 Fed.Reg. 41,852 (1985). The Commission's groundwater criteria were further amended in 1987. See 52 Fed.Reg. 43,553 (1987).

FN217 10 C.F.R. Part 40, App. A, Criterion 6. See 50 Fed.Reg. at 41,857–58.

FN218 See supra pp. 71–72.

FN219 10 C.F.R. Part 40, App. A, Introduction. See 50 Fed.Reg. at 41,856.

FN220 See supra p. 71.

FN221 10 C.F.R. Part 40, App. A, Introduction. See 50 Fed.Reg. at 41,855.

FN222 866 F.2d 1246 (10th Cir.1989).

FN223 Id. at 1251–58.

FN224 Id. at 1250 (citing AMC I, 772 F.2d at 632). See supra note 212.

In Quivira, the court then reviewed the criteria that remained essentially identical to the Commission's 1980 regulations (i.e., Criteria 2, 3, 4, 7, 8A, and portions of each of the others) and found that the Commission's underlying generic environmental impact statement upon which the criteria were based established the necessary reasonable relationship between costs of controls and benefits. 866 F.2d at 1252–57. See supra p. 69 & note 205. It also reviewed the 1985 criteria that the Commission revised to conform to EPA's general standards (i.e., parts of the Introduction, Criteria 1, 5, 6, and 8) and found that the NRC's reliance on EPA's cost-benefit analysis for these requirements was sufficient. 866 F.2d at 1257–58.

FN225 Id. at 1254.

FN226 Ibid.

FN227 Id. at 1259–60.

FN228 Id. at 1260 n. 17.

FN229 Id. at 1260.

FN230 See LBP–90–9, 31 NRC at 155.

FN231 10 C.F.R. Part 40, App. A, Criterion 1.

FN232 See supra p. 2.

FN233 LBP–90–9, 31 NRC at 155.

FN234 Id. at 184, 194.

FN235 Id. at 163–64 (footnotes omitted; ellipses in original).

FN236 See Brief of the People of the State of Illinois (Apr. 19, 1990) [[[hereinafter Illinois Brief] at 1, 6–9, 14–18; West Chicago's Memorandum in Support of its Appeal of the ASLB's Decision Granting License Amendment (Apr. 19, 1990) [hereinafter West Chicago Brief] at 5–19.

FN237 West Chicago Brief at 1 (citing SFES at 4–32).

FN238 10 C.F.R. Part 40, App. A, Criterion 1.

FN239 Illinois Brief at 8 (emphasis in original).

FN240 See Brief of Kerr–McGee Chemical Corporation (May 21, 1990) [hereinafter Kerr–McGee Brief] at 14–33; NRC Staff Brief at 10–14.

FN241 Kerr–McGee Brief at 31–32; NRC Staff Brief at 13–14.

FN242 Kerr–McGee Brief at 19.

FN243 Id. at 25.

FN244 Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB–900, 28 NRC 275, 288, review declined, CLI–88–11, 28 NRC 603 (1988); 1A Sutherland, Statutory Construction § 31.06 (4th ed. 1984).

FN245 See Mountain States Tel. & Tel. Co. v. Pueblo of Santa Ana, 472 U.S. 237, 249–50 (1985); 2A Sutherland, supra note 244, § 46.06.

FN246 Shoreham, ALAB–900, 28 NRC at 288.

FN247 See supra pp. 75–76.

FN248 See Natural Resources Defense Council v. EPA, 822 F.2d 104, 113 (D.C.Cir.1987). See also supra note 245.

FN249 App.Tr. 184.

FN250 Indeed, in light of its argument in this regard, we assume Kerr–McGee would have presented us with an alternative argument in support of the Licensing Board's decision, if below it had intended to proffer permanent onsite disposal as a licensee-proposed alternative to the requirements of Criterion 1.

FN251 See LBP–90–9, 31 NRC at 163–64.

FN252 Kerr–McGee Brief at 25.

FN253 As originally promulgated in 1980, Criterion 1 did not articulate this "goal" as clearly as it does now. Instead, reference was made simply to "the broad objective of isolating the tailings and associated contaminants from man and the environment during operations and for thousands of years thereafter without ongoing active mainte-

nance." 45 Fed.Reg. at 65,533 (codified at 10 C.F.R. Part 40, App. A, Criterion 1 (1981)). When the Commission amended Appendix A in 1985, it clarified the first paragraph of Criterion 1 "to emphasize that it states a goal and not a standard, and to delete any specific time frame." 50 Fed.Reg. at 41,856. It also changed "shall" in the fourth paragraph to "should." Ibid. Criterion 1 now states affirmatively and at the outset what the "general goal or broad objective" of the Commission's mill tailings siting and design decisions will be.

> Kerr–McGee seizes on the Commission's brief explanation of this clarification to support its view that the entirety of Criterion 1 now reflects simply a regulatory goal, not a standard. Kerr–McGee Brief at 25 n. 33. That strained reading of the regulatory history of the provision, however, is at odds with both the language of Criterion 1 itself and logic. Quite simply, had the Commission intended in 1985 to relegate the three specified siting features to a lesser role than they had served up to that time, it would not have directed that these features "must be considered." That the regulation means exactly what it says and commands that the three siting features be considered in selecting a disposal site is confirmed by the Statement of Considerations accompanying the final mill tailings regulations. There, the Commission notes that it is adopting "the standard convention on imposing an obligation" in the regulations, and that " "must" is used as the mandatory form when the subject is an inanimate object." 50 Fed.Reg. at 41,860.

FN254 866 F.2d at 1252 n. 8.

FN255 10 C.F.R. Part 40, App. A, Criterion 1 (emphasis added).

FN256 LBP–90–9, 31 NRC at 163 (emphasis added).

FN257 Ibid.

FN258 866 F.2d at 1260 & n. 17. See supra pp. 78–79.

> As the Tenth Circuit noted, no UMTRCA provision explicitly requires a distinction between new and existing sites, and the legislative history suggests only that the NRC consider possible differences in the applicability of requirements to existing versus new tailings sites. 866 F.2d at 1260 n. 17. See H.R.Rep. No. 1480, supra note 196, pt. 1, at 16.

FN259 866 F.2d at 1260.

FN260 See supra pp. 88–89.

FN261 10 C.F.R. Part 40, App. A, Criterion 1 (emphasis added).

FN262 Obviously, in judging the adequacy of an existing tailings site against the three siting features of Criterion 1 and then comparing that site to alternative sites measured against the same siting requirements, the differences between sites become matters of degree; they are nonetheless to be measured by the same yardstick. In ignoring the requirement of Criterion 1 that existing sites, like new sites, must be judged against the three site features, the Licensing Board erroneously shortened the yardstick for existing sites. When the Commission originally promulgated its mill tailings regulations in 1980, it rejected suggestions that less strict criteria be developed for existing sites. It explained that the

> [r]egulations were developed recognizing that it may not be practicable to provide the same measures of conservation at existing sites as can be done at new sites where alternatives are not limited. Certain requirements in the regulations represent minimum levels of protection of public health, safety, and the environment. These requirements can and must be met in all cases. For example, requirements for minimum tailings cover, erosion protection, financial surety provisions, and the broad requirement that no ongoing active maintenance be needed to preserve the tailings isolation are mandatory in all cases. It would not be possible, on the other hand, to line the bottom of an existing tailings impoundment. Also, objectives concerning remoteness from people, providing

below-grade burial, and transferring ownership of sites, may not be met to the same degree at an existing site as at a new site.

At some point, a determination, based on how a site measures up against all of the criteria, must be made as to whether the tailings should be relocated from an existing to a new site....

45 Fed.Reg. at 65,523 (emphasis added).

FN263 10 C.F.R. Part 40, App. A, Criterion 1 (emphasis added).

FN264 See supra pp. 89–91.

FN265 LBP–90–9, 31 NRC at 163–64 (footnotes omitted).

FN266 10 C.F.R. Part 40, App. A, Introduction (emphasis added). In the Statement of Considerations accompanying the final mill tailings rules, the Commission stated that it "views the mandate in section 84a(1) as applying to all aspects of its uranium recovery program.... The insert to the Introduction to Appendix A that paraphrases section 84a(1) will explicitly emphasize this point." 50 Fed.Reg. at 41,855.

FN267 866 F.2d at 1251–52.

FN268 Id. at 1250.

FN269 Id. at 1254.

FN270 Id. at 1253–58.

FN271 45 Fed.Reg. at 65,525 (emphasis added). See supra note 196.

FN272 SFES at 2–12, 5–45. In terms of common human experience, time periods of this magnitude are unfathomable. Even the relatively short 1000–year longevity design standard of Criterion 6 has much more meaning when it is recognized, for example, that Columbus sailed to America only 500 years ago and the United States became a nation just over 200 years ago.

FN273 H.R.Rep. No. 1480, supra note 196, pt. 1, at 17.

FN274 This weighting of factors in assessing the sufficiency of a mill tailings disposal site in Criterion 1 is also driven by the difficulty and imprecision inherent in predicting health effects over the very long term. In the Statement of Considerations of the 1980 mill tailings regulations, the Commission explained this problem in rejecting, as unreasonable and likely misleading, a strictly quantitative, incremental cost-benefit methodology in favor of a less rigorous cost-benefit rationalization approach for establishing tailings cover requirements:

Given the long term nature of the mill tailings hazards, and the complexity and uncertainty associated with predicting actual levels of radon emissions and impacts over the long term, it is concluded that the problem of determining tailings containment requirements cannot be reduced to the purely mathematical formulations required for the quantitative cost-benefit optimization methodology. The mathematical process grossly oversimplifies the problem and, thus, while it appears to offer a "rational approach" to decisionmaking, it can be misleading and quite arbitrary.

One of the obvious problems with this methodology is that arguments can easily be made for virtually opposite positions (little or no control, versus absolute control or radon releases) merely by measuring potential health impacts over short or long time periods. In fact, commenters did this. The monetary worth of averting a health effect ("life loss" or "life shortening" due to cancer) is another highly subjective factor which can vary widely

and, thus, make more uncertain the level of control which should be required. While arbitrary decisions might be made concerning these factors, there is no practicable way to correlate long term containment performance uniquely with costs.
45 Fed.Reg. at 65,524–25.

FN275 Webster's Third New International Dictionary 1609 (1971).

FN276 See Farmers Reservoir & Irrigation Co. v. McComb, 337 U.S. 755, 764 (1949).

FN277 45 Fed.Reg. at 65,524. See also Final GEIS at 15 ("good siting is of overriding importance in isolating the tailings and associated hazards; inadequate siting cannot be overcome by design").

FN278 See LBP–89–35, 30 NRC at 686–90.

FN279 See supra p. 27.

FN280 See supra p. 25.

FN281 See supra pp. 25–26.

FN282 LBP–89–35, 30 NRC at 683.

FN283 See Kerr–McGee Cross–Motion at 43–44.

FN284 10 C.F.R. § 61.2 (emphasis added).

FN285 LBP–89–35, 30 NRC at 683.

FN286 Ibid. Section 61.44 provides that "[t]he disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care [is] required." In relying on this section, however, the Board apparently was unaware that 10 C.F.R. § 61.59(b) prohibits reliance on such surveillance or "minor custodial care" for "more than 100 years," a period an order of magnitude shorter than the 1000–year longevity design standard for mill tailings.

FN287 See Kerr–McGee Cross–Motion at 43–44.

FN288 10 C.F.R. § 61.1(b)(2).

FN289 Id. § 61.2 (emphases added).
As we have already noted (supra note 147), the staff was, at a minimum, seriously remiss in not calling to the Licensing Board's attention its view of the meaning of active maintenance contained in the draft STP that was made available for public comment weeks before the staff filed its responses to the State's and Kerr–McGee's motions for summary disposition. The staff's silence on the inapplicability of the Commission's Part 61 low-level waste regulations to mill tailings governed by Part 40 is even more puzzling in light of several of its answers to comments on the draft SFES in which the staff specifically acknowledges this very point. Consider, for example, the following comment on the draft SFES and question posed to the staff:
[T]he Code of Federal Regulations set by the NRC—Code 10 CFR, Vol. 10, Part 61 ... in general, states that the licensing of any new low level nuclear dump site should not be carried out in a densely populated

area due to the inherent risk of possible adverse effects on the populous and the environment. Why, then, is the West Chicago site not covered under your agencies [sic] own set of federal safety regulations, and why the inconsistency of the NRC?

SFES at H–58. In response, the staff stated that "[t]he West Chicago site does not fall under the regulations contained in 10 CFR Part 61 because of the type of material involved." Id. at H–60. See also id. at H–78, H–79.

FN290 See LBP–89–35, 30 NRC at 683.

FN291 Affidavit of G.R. Thiers [hereinafter Thiers Sept. 11, 1989, Affidavit] at 13–14, attached as Exhibit A to People's Opposition to Kerr–McGee's Cross Motion for Summary Disposition (Sept. 21, 1989) [hereinafter State's Opposition]. See also State's Opposition at 45–46, 48; 48 Fed.Reg. at 597.

FN292 Kerr–McGee's counsel conceded as much at oral argument. App.Tr. 83.

FN293 10 C.F.R. § 2.749 (d). See, e.g., Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units Nos. 3 and 4), ALAB–660, 14 NRC 987, 1003 (1981) (citing Virginia Electric and Power Co. (North Anna Nuclear Power Station, Units 1 and 2), ALAB–584, 11 NRC 451, 453 (1980)).

A material fact is one that affects the outcome of the litigation or tends to resolve any of the issues raised by the parties. See generally 10A C. Wright, A. Miller, & M. Kane, Federal Practice and Procedure § 2725, at 93–95 (1983).

FN294 See, e.g., Public Service Co. of N.H. (Seabrook Station, Units 1 and 2), ALAB–924, 30 NRC 331, 345–47 (1989).

FN295 See, e.g., Adickes v. S.H. Kress & Co., 398 U.S. 144 (1970).

FN296 LBP–89–35, 30 NRC at 687. As discussed supra p. 38, at the time of the Board's ruling on the summary disposition motions, neither Kerr–McGee nor the staff considered the intrusion barrier as the primary means to assure that the disposal cell met the erosion protection and longevity design standards.

FN297 LBP–89–35, 30 NRC at 687–88.

FN298 Thiers Sept. 11, 1989, affidavit at 5–6, 16–17. See infra pp. 113–16, concerning the design storm.

No party challenges Dr. Thiers's credentials. He is the Principal Geotechnical Engineer at M–K Environmental Services, San Francisco, California, and he holds B.S., M.S., and Ph.D degrees in civil engineering from the University of California, Berkeley, where the primary emphasis of his graduate studies was on geotechnical engineering. He has substantial experience with the reclamation of radioactive mill tailings sites, including supervising the consolidation, seepage, and seismic analyses for a major tailings deposit near Uravan, Colorado. He also has developed criteria, as well as design and analysis procedures, for the design of 24 uranium repositories in 10 states under Title I of UMTRCA. In addition, Dr. Thiers has supervised the preparation of construction drawings and specifications for three tailings reclamation sites and managed engineering during construction at three sites. See Affidavit of G.R. Thiers [hereinafter Thiers July 21, 1989, Affidavit] at 1, attached as Exhibit C to People's Motion for Summary Disposition (July 31, 1989) [[[hereinafter State Summary Disposition Motion].

FN299 LBP–89–35, 30 NRC at 687.

FN300 Ibid.

FN301 10 C.F.R. Part 40, App. A, Criterion 4(d).

FN302 The Board's ruling in this regard is also inconsistent with its earlier rejection of the State's challenge to the sufficiency of the vegetative cover. See LBP–89–35, 30 NRC at 686–87. As we have already seen, however, in finding the vegetative cover adequate, the Board erroneously relied upon the definition of active maintenance in section 61.2.

FN303 Thiers Sept. 11, 1989, Affidavit at 5. See also id. at 7.

FN304 Id. at 4.

FN305 LBP–89–35, 30 NRC at 689.

FN306 Ibid.

FN307 Feb. 13 Order at 8.

FN308 As has been observed, "[e]xpert opinion is admissible and may defeat summary judgment if it appears the affiant is competent to give an expert opinion and the factual basis for the opinion is stated in the affidavit, even though the underlying factual details and reasoning upon which the opinion is based are not." Bulthuis v. Rexall Corp., 789 F.2d 1315, 1318 (9th Cir.1985). See also Fed.R.Evid. 703, 705.

FN309 50 Fed.Reg. at 41,856.

FN310 Id. at 41,858.

FN311 Additionally, the Licensing Board granted Kerr–McGee's motion for summary disposition on Contentions 2(k), 2(p), 2(s), and 2(u) by relying upon its findings and reasoning in disposing of Contentions 4(c) and 4(d), or by finding them duplicative of those contentions. LBP–89–35, 30 NRC at 701–02. In light of our reversal of the Board's grant of summary disposition of Contentions 4(c) and 4(d), its ruling on Contentions 2(k), 2(p), 2(s), and 2(u) must also be reversed.

FN312 Id. at 689. See also Criterion 4(d), which requires that final rock covers be designed "to avoid displacement of rock particles by human and animal traffic"; Criterion 1, which specifies remoteness from populated areas as a siting feature; and Criterion 3, which identifies below-grade disposal as the preferred option. 10 C.F.R. Part 40, App. A, Criteria 4(d), 1, and 3.

> The concern of the Commission's regulations that the design of tailings disposal sites effectively resist human intrusion can be traced, in part, to the EPA mill tailings regulations that are intended to inhibit the "misuse" of tailings. See 40 C.F.R. § 192.20(a)(1); AMC I, 772 F.2d at 632–33.

FN313 LBP–89–35, 30 NRC at 689–90.

FN314 Id. at 690.

FN315 State's Opposition at 48.

FN316 Ibid.

FN317 See State's Summary Disposition Motion, Exhibit F.

FN318 Thiers July 21, 1989, Affidavit at 7.

FN319 Ibid.

FN320 The SFES itself casts even more doubt on the Board's ruling:

> Although it is not possible to calculate precisely the probability of human intrusion into any of the sites, the two most important factors that are believed to increase this probability are population density (in particular whether there are schools and parks nearby) and degree of isolation. The precise trade-offs of population density vs. isolation cannot be determined; however, because it is generally believed that intrusion is more likely under conditions of higher population density, the potential for human intrusion into the site area is considered higher for the West Chicago alternative in comparison to any of the alternative sites.

SFES at 5–7. See also id. at 5–9.

FN321 In a subsequent ruling, the Licensing Board granted, on the basis of its ruling on Contentions 4(e) and (g), Kerr–McGee's motion for summary disposition of the State's Contention 2(h), which also dealt with human intrusion. LBP–90–9, 31 NRC at 190. In light of our holding, that ruling on Contention 2(h) must also be reversed.

FN322 See Board Notification 90–08, where the staff acknowledges that its environmental review of the impacts of Kerr–McGee's proposal on groundwater was inadequate.

FN323 LBP–90–9, 31 NRC at 194–95.

FN324 See Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB–902, 28 NRC 423, 434, review declined, CLI–88–11, 28 NRC 603 (1988).

> Rendering the instant decision before the date on which the State has indicated it intends to terminate Kerr–McGee's license (see supra pp. 14–15) makes it unnecessary for us to rule on Kerr–McGee's motion for a protective order. We therefore deny the motion, without prejudice, of course, to the pursuit of other appropriate relief from the Commission.

FN325 Swift Letter, Enclosure 3 at 1.

FN326 See Illinois, CLI–90–9, 32 NRC at 216–17; id., CLI–90–11, 32 NRC at 334.

FN327 NRC Staff Brief at 36, 38; Bernero Affidavit at 4; Swift Affidavit at 9.

FN328 42 U.S.C. § 2239(a)(1). See Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB–785, 20 NRC 848, 884 n. 163 (1984); id., ALAB–778, 20 NRC 42, 48 (1984), aff'd sub nom. Anthony v. NRC, 770 F.2d 1066 (3d Cir.1985).

FN329 This, of course, does not foreclose requests for Commission review of our decision.

FN330 Cf. Farmers Union Cent. Exch. v. FERC, 584 F.2d 408, 410, 416–17, 421–22, 424 (D.C.Cir.) (in rare oil pipeline ratemaking proceeding—where there was an absence of established administrative precedents in that area of ratemaking, the record was found to be incomplete, and regulatory jurisdiction over oil pipelines was transferred to another agency while the case was pending on appeal—court grants request for remand made by agency now having jurisdiction, so that it can begin its regulatory duties on a clean slate; court also concludes that any examination of issue on which record was found incomplete would be premature), cert. denied, 439 U.S. 995 (1978).

FN331 42 U.S.C. § 2021(o)(3). See State Agreement Policy, 46 Fed.Reg. at 7544; 10 C.F.R. § 150.31(b)(3)(i). It is interesting to note that these statutory requirements for byproduct material licensing proceedings conducted by an agreement state seem to be more formal than those held to be required for byproduct material licensing proceedings conducted by the NRC. See West Chicago, CLI–82–2, 15 NRC at 247–56, aff'd, 701 F.2d at 645.

33 N.R.C. 81, 1991 WL 204282 (N.R.C.)
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