



ADJUDICATORY ISSUE

March 31, 1983

(Affirmation)

SECY-83-117

COMMISSION LEVEL
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For: The Commission

From: Herzel H. E. Plaine
General Counsel

Subject: REVIEW OF ALAB-701 -- IN THE MATTER
OF PHILADELPHIA ELECTRIC CO., ET
AL.

Facilities: Peach Bottom Atomic Power Station,
Units 2 and 3; Three Mile Island
Nuclear Station, Unit 2; Hope Creek
Generating Station, Units 1 and 2.
Consolidated proceeding involving
the significance of fuel cycle
radon releases for the reactor
environmental cost-benefit balance.

Purpose: To advise the Commission of an
Appeal Board decision [which, in the
General Counsel's view,

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In addition, this
paper addresses the intervenor's
motion to recuse Chairman
Palladino,

*P
Recuse*

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PDR FOIA
GILINSK92-436 PDR

Review Time Expires: April 28, 1983, as extended.

Contact:
Richard L. Black, OGC
X-41465

Information in this record was deleted
in accordance with the Freedom of Information
Act, exemptions 5
FOIA 92-436

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Petition for Review:

Dr. Judith L. Johnsrud, a representative of the Peach Bottom - Three Mile Island intervenors, petitioned for review. The petition was opposed by the NRC staff and the respective licensees. In addition, the intervenors filed a motion to recuse Chairman Palladino from the Commission's deliberations and decision-making process, and a supplemental affidavit of Dr. Chauncey Kepford concerning his qualifications as an expert witness. The licensees filed responses in opposition to the motion to recuse, and the Peach Bottom - Hope Creek licensee filed a motion to strike the supplemental affidavit.

Discussion:

This is the last decision in a long line of Appeal Board decisions which have evolved from the Commission's deletion in 1978 of the value for radon-222 from Table S-3.* 43 Fed. Reg. 15613 (April 14, 1978). At that time the Commission opened for case-by-case litigation in reactor licensing proceedings the question of what contribution tailings pile radon releases made to the environmental impact of the uranium fuel cycle. In ALAB-701, the Appeal Board has determined that even if the mill tailings piles are not stabilized, the radon effluent as a result of uranium mining and milling would

* 10 CFR Part 51, Table S-3, "Table of Uranium Fuel Cycle Environmental Data."

result in an insignificant human health effect which could not tip the cost-benefit balance against the operation of any of the reactors under review. The procedural and decisional history of the radon issue in these consolidated proceedings has been well-documented by the Appeal Board in several of its decisions. See e.g. ALAB-701, slip op. at 3-10; ALAB-640, 13 NRC 487, 490-93 (1981).

The matters addressed by ALAB-701 are complex and controversial. We discuss the decision and its ramifications in an expanded analysis attached to this paper,

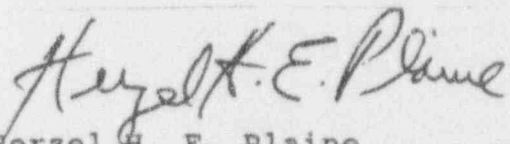
believe, We

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The principal issue addressed by ALAB-701, the health and environmental significance of tailings pile radon releases, is a major issue in the ongoing controversy over the Commission's Uranium Mill Licensing Requirements, 45 Fed. Reg. 66521 (1980), and the judicial review of those requirements, now pending rehearing en banc in the 10th Circuit on May 19, 1983. Kerr-McGee Corp. v. NRC, No. 80-2043. Pursuant to the Commission's Authorization Act of 1982, Pub. L. 97-415, the Commission will have to review its mill tailings regulations and if necessary amend them to achieve

conformance with standards which EPA is supposed to promulgate by October 1, 1983. The Commission's decision on ALAB-701 should be consistent with the rationale and the results of its reconsideration of the mill tailings regulations. Accordingly, OGC recommends that

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Herzel H. E. Plaine
General Counsel

Attachments:

1. Analysis
2. Memo. & Order

Commissioners' comments should be provided directly to the Office of the Secretary by c.o.b. Friday, April 15, 1983.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT Friday, April 8, 1983, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional time for analytical review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

This paper is tentatively scheduled for affirmation at an Open Meeting during the Week of April 18, 1983. Please refer to the appropriate Weekly Commission Schedule, when published, for a specific date and time.

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ATTACHMENT 1

Attachment A

OGC EXPANDED ANALYSIS OF ALAB-701

Background

ALAB-701 concludes the Appeal Board's lengthy inquiry triggered by the Commission's 1978 notice of amendments to the fuel cycle rule, which took radon out of Table S-3 and left to the licensing boards the job of determining the amount and significance of fuel cycle radon releases associated with a nuclear power plant, even though the Commission recognized that the issue was a generic one. 1/ See 43 Fed. Reg. 15613 (April 14, 1978). The Commission instructed the licensing and appeal boards to reopen records in pending cases "to receive new evidence on radon releases and on health effects resulting from radon releases." 43 Fed. Reg. at 15615-16. At that time there were 17 cases pending before the Appeal Board involving the radon question. Rather than ordering repeated evidentiary hearings on a generic issue, the Appeal Board adopted a "lead case" approach by using the evidentiary record and Licensing Board decision in the Perkins proceeding. 2/ After holding an evidentiary hearing, the Appeal Board issued a decision which determined the amount of radon which would be released in the mining and milling of the uranium necessary to provide fuel for a typical reactor. ALAB-640, 13 NRC 487 (1981). Consideration of the health effects question was deferred. No party sought Commission review of ALAB-640 and the Commission declined to review it. 3/ Thereafter, the Appeal Board

1/ The Commission's notice suggested that it might be helpful to have the experience of different perspectives from licensing boards as a background for considering a revised rule.

2/ Duke Power Co. (Perkins Nuclear Station, Units 1, 2 and 3), LBP-70-25, 8 NRC 87 (1978).

3/ On October 24, 1981, Dr. Kepford on his own behalf filed a petition for review of ALAB-640 with the D.C. Circuit. Kepford v. USNRC, No. 81-2111. The case is being held in abeyance pending completion of the consolidated radon proceeding.

established procedures for the further consideration of the health effects aspect of the radon issue. ALAB-654, 14 NRC 632 (1981). In essence, the intervenors were given the burden of showing the need for a further evidentiary hearing, given the Appeal Board's conclusion that the radon issue had already been thoroughly explored in Perkins through expert witnesses. In particular, the Appeal Board cited testimony by Dr. Leonard Hamilton of Brookhaven National Laboratory that radon from mining and milling makes "an additional negligible contribution to annual background radiation and consequently, a similarly negligible impact on the health effects associated with the fuel cycle." Appeal Board's emphasis. The Appeal Board ruled that entitlement to a hearing depended on a "concrete threshold showing that there is a difference in competent expert opinion on the health effects issue" which would "not be satisfied by anything short of the documented opinion of one or more qualified authorities to the effect that the incremental fuel cycle-related radon emissions will have a significant effect in terms of human health." Id. at 635 (emphasis in original). The Appeal Board specifically imposed the obligation on any such expert opinion to take into account "the comparative relationship" between fuel cycle radon emissions and both the amount of natural radon background radiation and the fluctuation in natural emissions from one locale to another.

No party sought review of ALAB-654. OGC recommended no sua sponte review of ALAB-654 but expressed concern that the intervenors would be burdened unreasonably if the Board intended to reject out of hand any objection the intervenors might raise against Dr. Hamilton's conclusions on the significance of the health effects for NEPA purposes unless the argument was presented by some recognized expert.

In response to ALAB-654, the intervenors filed a memorandum on the health effects issue, supported by the affidavit of Dr. Chauncey Kepford, one of their representatives. In this memorandum the intervenors argued among other things that the relevance of background radon emissions to the significance of fuel cycle radon emissions had never been demonstrated or explained and rested "upon mere affirmation rather than scientific argument." Dr. Kepford's accompanying affidavit noted that in the vicinity of tailings piles "there has been little opportunity for radon emissions to become diluted" so that nearby persons bear a greater risk than the general population. He further stated that even if radon emissions attributable to nuclear plant operation were found small compared to background radon, "one could not conclude that these emissions or their effects are insignificant in any absolute sense." The three licensees and the NRC staff submitted replies which asserted that Dr. Kepford lacked the necessary qualifications to be an expert authority on the issue of health effects, and that on this basis alone his affidavit should be rejected. They additionally argued that Dr. Kepford's statements were thoroughly explored in the Perkins proceeding, lacked

scientific basis and, accordingly, did not establish any genuine issue of fact which would require a further hearing. 4/

Decision

In ALAB-701, the Appeal Board determined that "no basis has been provided by the intervenors for a finding that, by experience or education, Dr. Kepford has acquired knowledge or skill sufficient to qualify him as an expert on the health effects question to which his affidavit is assertedly addressed." 5/ Slip op. at 14.

In addition to holding that Dr. Kepford failed to qualify as an expert on the human health aspects of the radon issue, the Appeal Board also determined that his submission "made no mention of, let alone discussed, the matter of the significance of the amount and distribution of natural background radon" on the fluctuations from place to place in the amount of natural radon in the environment that had been developed through expert testimony on the Perkins record. Id. at 14-16. Finally, it noted that the positions espoused in Dr. Kepford's affidavit were essentially the same as those he advanced before the Perkins Licensing Board several years ago as a witness for the intervenors in that proceeding. The Appeal Board concluded that since the Perkins record had been incorporated in the record in this consolidated proceeding it would serve no useful purpose to hear those arguments again. The totality of the above reasons led the Appeal Board to conclude that no sufficient challenge to the Perkins record had been set forth to justify a further hearing and therefore that record was complete for the purpose of deciding the health effects issue.

After finding that the record was complete for decision-making, the Appeal Board went on to decide the radon health effects issue. The Appeal Board noted that the fuel cycle radon release rates

4/ In the Perkins proceeding Dr. Kepford was permitted to cross-examine Dr. Leonard D. Hamilton, the principal applicant witness in Perkins, and was also allowed to present testimony himself. Kepford, fol. Perkins Tr. 2819.

5/ The Appeal Board has explicitly adopted the expert witness standard set forth in Rule 702 of the Federal Rules of Evidence which requires qualification by "knowledge, skill, experience, training or education." Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453, 475 (1982).

determined in ALAB-640, 6/ and the associated radiological doses developed on the Perkins record, 7/ were tiny compared with natural background radon concentrations and corresponding doses and concluded that the fuel cycle contribution to the radon in the environment was therefore negligible and would not tip the NEPA balance against the operation of any of the three facilities under review. Id. at 21. In addition, the Appeal Board rejected L. Kepford's argument that the health risk from radon was significant if projected over the long period for which this risk persists. 8/

6/ The long term release of radon associated with the 30-year operation of a single 1000 MW(e) reactor could vary from 630 to 6900 curies per year as compared to the natural release of radon in the United States from 1 to 2.4 hundred million curies. ALAB-701, Slip op. at 19.

7/ The Appeal Board concluded from Dr. Hamilton's Perkins testimony that radon releases from a single 1000 MW(e) nuclear power plant would result in a worst-case radiation exposure of 0.005 millirem/yr. which would add less than one part in 100,000 to the average bronchial epithelium dose due to natural sources (1650 millirem/yr.). Id. at 21. The worst-case approach involved unsealed and unreclaimed mines, and uncovered tailings (Case 3, ALAB-640).

8/ According to the Appeal Board, Dr. Kepford concluded that radon from unreclaimed tailings attributable to one of the Perkins reactors would result in approximately 1/6 death per year for many thousands of years and that "[b]y extending his calculations over tens of thousands, hundreds of thousands, millions and even billions of years, Dr. Kepford arrives at his conclusion that radon emissions over these various time intervals will cause extremely large numbers of cancer fatalities." Id. at 22. Dr. Kepford would add up fuel cycle radon impacts over 4.5 billion years (the period of activity of uranium-238) to obtain one hundred million premature deaths from cancer per reactor. Kepford, fol. Perkins Tr. 2819, at pp. 2-3 and Table 4. The Appeal Board noted that the per-reactor radon release value used by Dr. Kepford "is in fact quite close" to the value determined in ALAB-640. OGC notes that the uranium milling GEIS, NUREG-0706, gave six deaths per year as the "continuing annual rate of premature deaths" from uncovered tailings generated by full operation of mills in existence in the U.S. in the year 2000. NUREG-0706, at 6-74. Assuming that the number of reactors associated with those mills is greater than 36 but probably not much more than 100, it appears that Dr. Kepford's estimate of 1/6 death/year/reactor is higher than the NUREG-0706 figure but of the same order of magnitude.

This argument was rejected on the grounds that the incremental health risk to the population from fuel cycle emissions is "vanishingly small" when compared to the health risks from natural background radon. Id. at 24. This rationale by which fuel cycle radon releases are deemed insignificant on the basis of their comparison to natural background radon has become known as the "de minimis approach."

A. Petition for Review and Replies

The petition for review has raised two allegations of error concerning ALAB-701: 9/

- (1) The Appeal Board erred in finding Dr. Kepford unqualified as an expert to testify on the health effects of radon;
- (2) The Appeal Board erred in adopting the de minimis approach which was relied upon in Perkins to conclude that the uranium fuel cycle radon emissions are insignificant because they are small compared to naturally occurring radon emissions.

With respect to the first allegation of error, the Appeal Board concluded, as noted above, that Dr. Kepford's affidavit noting his education and experience provided no basis for a finding that he had acquired knowledge or skill sufficient to qualify him on the health effects issue. The intervenors seek review of this finding by essentially pointing out that Dr. Kepford is a radiation chemist who has devoted substantial time and effort on the problem of fuel cycle-related radon emissions and, in fact, was allowed to testify in Perkins on this issue. Additional support for Dr. Kepford's qualifications were submitted in a Supplemental Affidavit by Dr. Kepford on January 6, 1983. This affidavit furnished further details concerning his education and work experience.

The licensees and the NRC staff urged that this first exception did not warrant Commission review because the Appeal Board

9/ It is difficult to discern specific allegations of error because the petition for review did not set forth a concise statement as to what action in ALAB-701 is erroneous and why review is sought, as required by 10 CFR § 2.786(b)(2).

properly concluded that Dr. Kepford did not establish that he possessed the requisite qualifications to become an expert witness on health effects. The replies noted that even Dr. Kepford acknowledged his lack of formal education or experience in medicine, health physics or any other related discipline pertaining to health effects of radiation. Although Dr. Kepford was allowed to testify in Perkins on the radon issue, the licensees submit that it was accepted because of his calculations regarding radon emissions -- not for any testimony regarding human health effects. 10/ The replies also agreed with the Appeal Board's conclusion that, notwithstanding any decision regarding Dr. Kepford's qualifications to proffer testimony on human health effects, his affidavits did not identify or present any new evidence which he did not previously advance in Perkins with respect to this issue. 11/ Thus, any alleged error regarding Dr. Kepford's disqualification was inconsequential because the intervenors failed to show any genuine issue of fact in dispute calling for further evidence on the issue. The replies also urged the Commission to uphold the Appeal Board's decision with respect to the second allegation of error -- the de minimis theory.

It is virtually uncontested by all parties that the radon releases from the uranium fuel cycle are negligible when compared to natural background, and fluctuations in the natural background radon emissions. The point of departure is a "philosophical" difference of opinion on the significance of this fact.

As a general proposition, the intervenors first contend that natural background radon is irrelevant to the determination regarding the health consequences attributable to uranium fuel cycle radon emissions. Under this theory, the required NEPA cost-benefit analysis should only compare the health consequences

10/ The Appeal Board also noted that even if a licensing board determined that Dr. Kepford was a qualified expert on the subject at hand, that determination would not have been binding on the Appeal Board. ALAB-701, Slip op. at 13, n.10.

11/ The Peach Bottom - Hope Creek licensees also filed a motion to strike the supplemental affidavit of Dr. Kepford which was submitted after the petition to review was filed. The NRC staff filed a response in which it indicated it did not join in the motion to strike because the subject matter of the supplemental affidavit had been considered by the Appeal Board.

of the viable energy options, e.g. coal and nuclear. The health consequences attributable to natural radon would be the same in each comparison and, hence, irrelevant. The logical extension of the intervenor's general proposition is that the absolute magnitude of the discrete, incremental and cumulative health impacts from uranium fuel cycle radon emissions must be considered. When this is done, Dr. Kepford's calculations show that the long-term release attributable to one reactor will result in 0.16 (i.e., 1/6th) of a fatality per year and, when extended over hundreds of thousands or more years, would result in extremely large numbers of cancer-induced fatalities. 12/ These fatalities, the argument concludes, necessarily tip the NEPA cost-benefit balance against operation of each of the reactors in question.

The licensees and the NRC staff have countered this argument against the de minimis theory by simply stating that the Appeal Board's conclusion that the uranium fuel cycle radon health impacts are negligible in comparison to natural background radon effects was proper and in full compliance with NEPA requirements. The licensees point to the underlying purpose of NEPA and pertinent case law to the effect that negligible or de minimis effects need not be considered in a NEPA analysis. 13/ In addition, licensees argue that the cumulation of fractional health risks over hundreds of thousands of years is unrealistic,

12/ As noted above, Dr. Kepford's calculations yield numbers consistent within an order of magnitude with numbers calculated by the NRC. Note 8. Also, Dr. Hamilton in an "Affidavit of Leonard D. Hamilton, M.D. Concerning the Health Effects of Radon Releases From Uranium Mining and Milling," dated January 29, 1982 and submitted February 1, 1982 in the consolidated radon proceeding, obtained numbers consistent with Kepford's. Dr. Hamilton's position, adopted by the Appeal Board, was that these calculated fatalities, even if they should turn out to be actual fatalities, are nevertheless insignificant because they will be undetectable against the much larger number of cancer deaths that will result from radon naturally present in the environment.

13/ The Three Mile Island licensees submit there is ample evidence in the Perkins record to support the de minimis conclusion. Particularly, they cite evidence that fuel cycle radon releases would result in a risk of 1.6×10^{-8} per individual (or, one in sixty million) per thirty years of reactor operation for contracting fatal lung cancer.

meaningless and speculative. NEPA mandates the consideration of only reasonably foreseeable environmental impacts. Accordingly, the licensees and the NRC staff submit that the petition for review should be denied.

B. Motion for Recusal and Replies

On January 10, 1983, intervenors filed a motion requesting Chairman Palladino to recuse himself from further participation in this proceeding on the grounds that (1) the Department and/or College of the Pennsylvania State University with which Chairman Palladino was associated had received "substantial financial contributions" from "Applicants or Licensees" in this proceeding; (2) Chairman Palladino served on the Advisory Committee on Reactor Safeguards (ACRS) and "may have engaged in deliberations and made recommendations pertaining to TMI and/or Peach Bottom"; (3) Chairman Palladino was a member of various advisory committees to the Governor of Pennsylvania and "may have offered recommendations pertaining to the reactors under consideration in this proceeding"; and (4) Chairman Palladino has served in "advisory positions" to "the Pennsylvania Governor, NRC, and/or other agencies which have required him to render judgments and recommendations concerning the TMI-2 reactor here in question." These allegations were not supported by affidavits or other evidence relied on as required by 10 CFR § 2.730(b). 14/

The licensees submitted replies which urged denial of the motion because it was not timely filed, it was not supported by the required affidavits, and the allegations did not assert adequate grounds for disqualification because there was no specification of facts indicating prejudgment of the issue at hand (i.e., radon health effects).

C. Analysis of the Petition for Review

As indicated above, the petition for review has raised allegations of error concerning (a) the Appeal Board's disqualification of Dr. Kepford as an expert witness, and (b) application of the de minimis theory.

14/ See also 10 CFR § 2.704(c) which specifies that a party seeking the disqualification of a licensing board member or presiding officer must file a motion supported by affidavits setting forth the grounds for disqualification.

D. Other Relevant Actions

1. EPA Standard on Inactive Piles

On December 18, 1982 EPA issued "Final Standards for Remedial Actions at Inactive Uranium Processing Sites." 48 Fed. Reg. 590 (January 5, 1983). |

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22/ A lengthy comment from the American Mining Congress (AMC), filed with the Commission on January 13, 1983 in support of Union Carbide's petition of September 29, 1982 for reconsideration of the mill tailings regulations, cites ALAB-701 as a substantiation of the industry's position that tailings pile radon risks to the general population are insignificant. The AMC comment also cites conclusions by Dr. Leonard Hamilton that risks to maximally exposed hypothetical persons living near uncontrolled tailings piles are "negligible." As for risks from misuse of tailings, AMC argues that prevention of misuse does not require control measures as stringent as those in the 1980 regulations.

EPA's final standard for inactive piles establishes a maximum radon emanation rate ten times that of the proposed standard (20 pCi/meter²/second instead of 2 pCi/meter²/second).

It is noteworthy that in its statement of consideration for the inactive pile rules EPA cited several necessary functions served by limiting radon emissions: "reducing the risk to nearby individuals and individuals at greater distances; and furthering the goals of reliable long-term deterrence of misuse of tailings by man and control of erosion of piles by natural processes." 48 Fed. Reg. 598, Col. 2. However, it appears that risk reduction to nearby individuals was of greater importance than the reduction of adverse effects well beyond the immediate site vicinity. Ibid.

2. Petition for Rulemaking

On September 29, 1982, the Union Carbide Corporation petitioned the Commission to reconsider and revise the Commission's requirements on the length of time over which tailings piles must be stabilized, the limits on the seepage of toxic chemicals into groundwater, the minimum thickness of three meters of earth as a tailings cover and reduction of the radon emanation rate to 2pCi/meter²/second, and the minimum cost of long-term surveillance. The NRC staff is currently considering this petition. 23/

3. DOE Commingled Tailings Study

The Department of Energy has issued a report entitled Commingled Tailings Study (June 1982). This report concludes that the incremental health risk associated with radon from tailings is miniscule, if there is any incremental risk at all. Further, in

23/ See note 22 above.

recent hearings before the Nuclear Procurement Subcommittee of the House Armed Services Committee, numerous experts, including Dr. William Mills, Dr. George Voelz, Dr. Melvin Carter, and Dr. Robley Evans, testified that the risk posed by radon from tailings is not significant.

4. NRC Staff Task Force

| 24/

5. NRC Proposed Changes to 10 CFR Part
20

24/ See Memorandum for Chairman Palladino, from William J. Dircks on Uranium Mill Tailings Regulations, dated December 20, 1982.

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F. Motion to Recuse

As indicated above, intervenors filed a motion after their submission of the petition to review seeking the disqualification of Chairman Palladino. The motion was based on four grounds generally involving the Chairman's past academic and professional activities and relationships with (1) Pennsylvania State University, (2) the ACRS, (3) the Governor of Pennsylvania, and (4) other agencies involved in the TMI-2 accident.

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ATTACHMENT 2