

ENVIRONMENTAL COALITION ON NUCLEAR POWER

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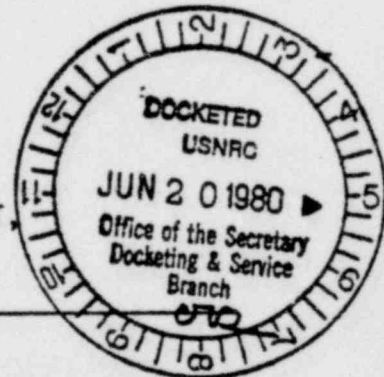
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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

THE ATOMIC SAFETY AND LICENSING APPEAL BOARDS

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| In the Matters of |) | |
| |) | |
| PHILADELPHIA ELECTRIC COMPANY <u>et al.</u> |) | Docket Nos. 50-277 |
| (Peach Bottom Atomic Power Station, |) | 50-278 |
| Units 2 and 3) |) | |
| METROPOLITAN EDISON COMPANY <u>et al.</u> |) | Docket No. 50-320 |
| (Three Mile Island Nuclear Station, |) | |
| Unit No. 2) |) | |
| PUBLIC SERVICE ELECTRIC AND GAS CO. |) | Docket Nos. 50-354 |
| (Hope Creek Generating Station, |) | 50-355 |
| Units 1 and 2) |) | |
| NORTHERN STATES POWER COMPANY <u>et al.</u> |) | Docket No. STN 50-484 |
| (Tyrone Energy Park, Unit 1) |) | |
| ROCHESTER GAS AND ELECTRIC |) | Docket No. STN 50-485 |
| CORPORATION <u>et al.</u> |) | |
| (Sterling Power Project, |) | |
| Nuclear Unit 1) |) | |

PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND
RESPONSE TO APPEAL BOARD QUESTIONS ON BATTELLE REPORT,
SUBMITTED BY THE TMI-2/PEACHBOTTOM INTERVENORS



1. The period over which mill tailings will remain a hazard is much longer than any human institution can be relied upon to endure (Miller testimony, p. 11). It is not possible to predict quantitatively the performance of tailings impoundments over the period that the tailings will remain a hazard (Miller testimony, p. 15).
2. The Staff's program for reducing radon emissions from the mill tailings is at an early and preliminary stage (tr. 180-183). The proposed Staff regulations, which constitute the most advanced generic rules to control radon emissions from the mill tailings piles which the Staff has issued to date, are vague and rather general (see Miller cross-examination generally, e.g., tr. 194-196, 198-200, 242, 254, 257). These ambiguous proposed regulations would be unenforceable even

if issued in final form. They allow the Staff virtually unbridled discretion to accept any proposed solution to the mill tailings disposal problem as long as the proposal seems reasonable to the Staff and would reduce short-term emissions of radon to the level of two picocuries per square meter per second.

3. The proposed Staff regulations do not require remedial work when the calculated rate of radon releases exceeds two pico-curies per square meter per second (tr. 168). The proposed Staff regulations do not require that mill tailings sites be identified by putting a sign up or a marker on them to indicate the toxic nature of the tailings piles, nor would fencing of the area of the piles be required (tr. 175). At present, there are no requirements that radon emissions from the mill tailings piles be measured periodically (tr. 185). The proposed regulations do not prevent licensed mill tailings piles from eroding away with the passage of time (tr. 75-76). Nor do the regulations require placement of the mill tailings in permanent, secure repositories to isolate radon emissions from the biosphere for the full period of toxicity of the wastes, despite the fact that permanent repositories may be available (tr. 114-115, 288).

4. The permanent costs associated with continued monitoring and any remedial work on the mill tailings piles which becomes necessary after the operator and surety have departed from the site will be paid by posterity (tr. 191-194).

However, institutional controls capable of monitoring and maintaining the piles cannot be assumed to persist for the duration of the period of toxicity of the tailings wastes, and may only survive as long as our present form of political system exists (tr. 192, 204). If radon releases are to remain reduced, a certain amount of continuing, permanent institutional control will be necessary from the moment the mill tailings are first created, to monitor and maintain the mill tailings piles in a stabilized form. Rather than compel present users of nuclear power to locate a truly permanent repository for these wastes or stop using nuclear power entirely, the Staff has adopted the expedient solution of refusing to acknowledge that a problem exists, while unilaterally bequeathing to all future societies on earth a permanent legacy--that the mill tailings piles must either be monitored periodically and any problems which develop must be continually corrected, or people will be living alongside a permanent source of genetic mutation and premature death for as long as there are people remaining on earth.

5. Even if data were systematically accumulated and studied through monitoring the mill tailings piles for the next 100 years, it would not be possible to predict whether massive failures leading to unacceptable releases of radon will result with the passage of additional time (tr. 299).

6. Staff witness Miller tried to present the novel (and completely unsubstantiated) Staff position that the mill tailings piles will not erode away with the passage of time, except after an unpredictable and unspecified number of thousands of years (tr. 193, 277). His adherence to this position wavered at times, however. For example, after insisting at one point that no remedial work would ever be required (tr. 193), he inadvertently acknowledged that there is "more uncertainty" as to whether future remedial work will become necessary at some sites (tr. 194). He also acknowledged that current Staff policy (which allegedly is more stringent than the proposed regulations) does not even require mill operators to place an initial layer of cover which exceeds the thickness necessary to achieve a short-term emissions rate of two picocuries per square meter per second, to provide a margin for error. Rather, the Staff will wait until a pile is found to be exhaling radon in excess of the allowable two pico-curie rate, and then will "make the operator turn around and put another foot of dirt on the pile, another two feet of dirt" (tr. 188).

7. Staff witness Miller conceded that reclamation of the mill tailings piles in the manner which the Staff advocates faces a substantial hurdle, in that it involves "probably the biggest quality assurance problem that anybody has ever faced" (tr. 310). Nevertheless, the NRC does not itself inspect ongoing reclamation efforts to determine whether the plans approved by the Staff are being implemented. This function has instead been delegated to consultants (tr. 315-316). Staff witness Miller agreed that 25, 50, or 100 years from now the mill tailings piles might not be inspected very carefully, for example, where a pile initially was reported to have been covered by 40 or 50 feet of cover (tr. 177).

8. Staff witness Miller is qualified to testify on behalf of the Staff that the Staff believes in has a regulatory program to control radon releases (see tr. 158) ("I think what the Staff is seeking to do here is...to describe the program that they have..."). However, Staff witness Miller is not a competent witness on the principal subject that is at issue in this proceeding--whether the techniques which the Staff says it is applying are in fact adequate to ensure protection of the public health and safety as required by law. Staff witness Miller is an engineer (tr. 298) whose formal education ended when he received a Master's degree in 1976

(Perkins tr. 2393). The record nowhere demonstrates that Mr. Miller is qualified to predict the long-term effects of erosion and weathering on the mill tailings piles, during the coming decades, centuries, or millennia. The record nowhere suggests that Mr. Miller is qualified to testify about the rates and direction of future geologic and climatological trends and their effects on the integrity of the temporary, quick-fix solutions which the Staff has advanced. Consequently, he lacks the requisite expertise and is not competent to speak with authority about the duration or ultimate extent to which radon emissions would be reduced if Staff policy as to the procedures which mill operators should utilize were being implemented.

9. Staff Witnesses Gotchy and Magno discussed in prior testimony the then Staff position that all of the protective layer of cover could erode away in 500 years. They estimated the radon releases which would occur in this event (or which would occur if no cover at all were ever placed on the piles, for that matter)(tr. 212). The willingness of these witnesses to concede that the protective cover could erode away in the short-term does not make their estimates of radon releases conservative (except in comparison to the estimates of Staff Witness Miller). Far greater releases than Gotchy and Magno discussed will result as the piles themselves, rather than just the protective cover, erode away. Furthermore, no witness qualified to testify on the subject appeared to substantiate their claim that the protective cover, if any, could endure for as long as 500 years. That Staff witness Miller now believes it is necessary to retreat from prior Staff admissions that the mill tailings piles cannot be isolated from the elements in the long-term, by postulating that the Staff suddenly has learned to reduce radon emissions for "thousands" of years, demonstrates that the Staff has decided to ignore the public health and safety by refusing to acknowledge that a problem exists.

10. The reclamation techniques which Staff witness Miller now says will reduce radon emissions from the mill tailings for thousands of years are essentially the same reclamation techniques which Staff witness Gotchy said in Perkins would work for 500 years. Gotchy and Miller also gave contradictory testimony regarding the time period for which credible predictions over the disposition of the mill tailings could be made. Gotchy stated that no credible predictions could be made beyond 1000 years, whereas Miller claims that credible predictions can cover a span of (an undefined) "thousands" of years.

11. The NRC Staff has repeatedly attempted to conceal the magnitude of the radon emissions problem (see, e.g., the TMI-2 Intervenor's June 12, 1978, Appeal From An Appeal Board Order On The Grounds of Fraud and on Other Grounds, Docket No. 50-320). There is a serious lack of compliance by the Staff and reactor operators with numerous legal requirements established to regulate the commercial nuclear industry. Effective regulation has been thwarted in many cases, creating major quality assurance problems (see, e.g., tr. 310). With its present Staff and attitudes, the NRC is unable to assure protection of the public health and safety (see Finding number 12 of the President's Commission's Report on Three Mile Island). In view of these factors, the only conclusion as to future emission rates which it is reasonable for this Board to assume is that any release rates established and enforced by the NRC Staff as it is presently constituted can and will be violated with absolute impunity. Nothing in the record demonstrates that the current two pico-curie per square meter per second standard is being achieved at any mill tailings disposal site. More important, though, is that the record nowhere demonstrates that the existing allowable release rates for radon will not be formally relaxed, if not abolished entirely, as soon as it becomes politically expedient to do so. The Staff's preposterous assumption that its own internal review procedures (even if subjected to the NEPA process) will suffice to guarantee that the public will not be exposed to dangerous levels of radon releases in the coming decades, centuries, and millennia is without adequate foundation in the record and completely untenable.

12. There is no basis in the record for assuming that the mill tailings piles will in fact be stabilized, monitored, and maintained to achieve the emissions rates described by the Staff. No competent testimony was presented to support the Staff's speculative assumption that radon releases can theoretically be reduced for thousands of years by adoption of the Staff's proposals. But even if such reductions theoretically are possible, all that matters is: What in fact will be done? Even if the Staff sobers up and transcends its rosy and arrogant assumptions about the effectiveness of its quality assurance program, even if the Staff tightens up its proposed regulations to make them enforceable, and affirmatively begins to seek public input in its decisionmaking process, who will ultimately assume the permanent obligation of monitoring and maintaining these mill tailings sites? The record in this proceeding nowhere demonstrates that people of the future will be willing and able to assume this awesome responsibility. What if future people dig up the mill tailings sites or sink wells in them (tr. 73, 89-90, 117)? What if the mill tailings sites are viewed as relics of a

past civilization and become tourist attractions for young families with small children? What if future societies will not be highly technological, and the rip-rap cover is removed to construct stone dwelling huts on the mill tailings piles (compare tr. 38-39)?

13. Even if one were to assume that the makeshift, unenforceable policies of the Staff would, if properly implemented, reduce radon emissions for "thousands" of years, this would reduce only a minute fraction of the total radon releases which result from milling uranium ore to fuel commercial nuclear reactors. See Table 1 of the June 8, 1978, prepared testimony of Dr. Kepford submitted on behalf of the Intervenors in the Perkins 1, 2, and 3 proceeding.

14. The last 100,000 years have been a period of (1) major climatic changes with associated changes in erosion rates and processes, vegetation density and type, major extinctions of pleistocene fauna, and the formation of large lakes in presently arid areas; (2) major glacial modifications of the northern part of the continents and the western mountains of North America; (3) major sea level fluctuations with accompanying river incision and deposition; and (4) continuing displacement of the earth's surface by faulting and isotactic adjustment to the addition and removal of ice loads. If the past is indeed a guide to the future, and there is no reason to believe that it is not, then long-term erosional stability cannot be assumed. Even where glacial activity and faulting are improbable, climatic change and the resulting change in river behavior, as well as change in the rates and mechanics of hill slope erosion, prevent secure storage of earth materials near the earth's surface (tr. 271-273).

15. Uncontrolled, permanent, high levels of radon emissions will result in many cases if major climatic changes occur in the areas in which the mill tailings piles are located, assuming that the mill tailings are covered up in the manner which the Staff proposes (tr. 210).

16. Unless future human beings happen to understand the toxic nature of uranium mill tailings, they will not recognize the need to perform remedial work to compensate for the erosion which occurs at the piles with the passage of time (tr. 456, 459-462).

17. The Commission is presently involved in examining worst-case scenarios in the case of high-level transuranic wastes because their long half-life necessitates the long-term isolation of these wastes from the biosphere (see tr. 117). Considering the long-term period of toxicity of the mill tailings (tr. 89-90, 113-114, 117), the Staff proposal of throwing a little dirt over the tailings and

hoping the problem will go away is irresponsible in the extreme. During the Perkins proceeding, Staff witness Gotchy was asked why there should be short-term treatment of mill tailings, whose radon emissions will continue virtually forever, while the Commission is actively considering proposals intended to isolate high-level transuranic wastes for periods ranging from 100,000 to 500,000 years (Perkins tr. 2583-2584). Gotchy attributed this disparity to the fact that high-level transuranic wastes are easier to manage because they are not spread out in several million cubic yards of dirt (Perkins tr. 2583-2584). This disparity of treatment by the Commission is an arbitrary, capricious, and illegal one, is not designed to protect the health and safety of the public, and is inconsistent with NEPA.

18. The difficulties inherent in monitoring and maintaining the mill tailings piles permanently in a manner which protects them from the elements increases as the volume of tailings increases. The average ore grade has been declining steadily with time (tr. 475). This trend is important because radon emissions are directly proportional to the amount of uranium in the ore which is being mined, and are essentially independent of tailings volume. Witness Goldman initially stated that the relationship between ore grade and percentage uranium recovery is linear (tr. 475). There is, however, no fundamental reason why it should be linear (tr. 475). Goldman later agreed that other curves representing a much larger increase of tailings volume with decreasing ore grades can be drawn through the existing data, and may in fact more accurately reflect the underlying function which determines the data (tr. 486-490). Upon still further questioning, Goldman admitted that the less conservative linear relationship which he initially advanced would apply only if new technology was applied throughout the industry to reduce tailings volumes (tr. 490-493).

19. The discussion by Dr. Goldman of Indian mounds is irrelevant and has no probative value in the present proceeding. The mounds about which Dr. Goldman claimed to have knowledge were not constructed in the regions in which uranium milling is presently taking place (tr. 445-446), and are constructed of the kinds of soils natural to the areas in which the mounds are located (tr. 485). Many of the Indian mounds have been covered by varying kinds of vegetation for periods of over a thousand years (tr. 445). Unlike mill tailings piles, Indian mounds were not constructed of sandstone which had been ground up by man-made machinery (tr. 484). Nor were these Indian mounds constructed of ground-up sandstone which has been soaked in sulfuric acid, a process which severely retards the growth of vegetation

on mill tailings piles (tr. 484). The observed rate of erosion in areas of uranium mill tailings greatly exceed the erosion rates which can be calculated for Indian mounds (tr. 450-455). There is also no basis in the record for assuming that modern man understands the technology used to build the Indian mounds. Nor do we have any idea how many Indian mounds in the aggregate have disappeared due to erosion, compared to the number which were originally constructed (tr. 446-447).

20. The record nowhere demonstrates that Dr. Goldman, witness for the Applicant, is qualified on the basis of formal training or subsequent experience to predict the long-term effects of erosion and weathering on the mill tailings piles, during the coming decades, centuries, or millennia. The record nowhere suggests that Dr. Goldman is qualified to testify about the rates and direction of future geologic and climatological trends and their effects on the integrity of the temporary, quick-fix solutions which the Staff has advanced. Consequently, he lacks the requisite expertise and is not competent to speak with authority about the duration or ultimate extent to which radon emissions would be reduced if Staff policy as to the procedures which mill operators should utilize were being implemented.

21. No evidence was introduced concerning the actual depths of the mill tailings piles which are being produced to fuel the reactors which are subject to this proceeding. No evidence was introduced to suggest that the Staff assumptions concerning the depths of these piles are even remotely representative of the actual depths of the piles themselves. The Staff decision to base their calculations on an average of a small sample of existing piles is also deficient in that it results in a substantial underestimation of short-term radon releases, due to the shielding effect of piles which exceed certain depths (see tr. 53-54). Nor was any evidence supported by a competent witness introduced in defense of the Staff's assumption that the tailings piles would withstand the effects of weathering forces during, say, the next one hundred to five hundred years. About the only thing that was determined on the record about the actual depths of the mill tailings piles is that no regulations, not even the Staff's proposed ones, require that the piles be constructed to be of the depths which the Staff calculations assume (tr. 166-167). Staff witness Miller's criticism of Dr. Pohl's estimate of 330 Ci/AFR-yr (Miller testimony, p. 28) is therefore not supportable by the record in this proceeding.

22. As in every other NRC licensing proceeding, the myth of Staff conservatism must be put to rest. Miller alleged that Magno's estimates were conservative because Magno multiplied the total release rates which he calculated by a factor of ten (Miller testimony, p. 16). The Staff did not, however, attempt to project scenarios to cover erosion over time (tr. 213). The Staff instead simply assumed a perfect

world in which failure is impossible, and noted that the release rates calculated for this model would be small (by comparison with the maximum possible release rates of 1000 curies per AFR per year). Since multiplication of one small number by another generally produces another small number, Magno multiplied his calculated emissions rate by ten so that the Staff could hide under an umbrella of alleged conservatism. The procedure used by Magno is arbitrary and capricious (tr. 212-213). There is no basis in the record for determining what the proper multiplier should be. What Magno's arbitrary selection of ten as a multiplier is designed to avoid is the fact that the world which we live in abounds with failures, and is far from perfect.

23. The record does not support the conclusion that the predictions by the Staff and Applicant of future radon emissions from the mill tailings piles are conservative. The undisputed testimony of Dr. Pohl that releases of 1000 curies per AFR per year can occur (tr. 57) demonstrates the extent to which Staff and Applicant predictions are based upon self-interest and wishful thinking, and do not reflect the concern for protecting the health and safety of the public which the law requires.

24. The Appeal Board should adopt verbatim in its Findings of Fact all of the statements made by Dr. Pohl in his prepared testimony.

25. The matter concerning the impacts of the Battelle report upon the disposition of alleged deficiency one reached in ALAB-562 should be held in abeyance until the final report is available to the parties and this Board, to avoid the need for submitting comments on an interim product (tr. 527).

26. The Intervenors in this proceeding were prejudiced and prevented from adequately preparing for the 1980 radon hearings by the failure of the Staff to serve any of its prepared testimony on Dr. Kepford within the allotted time period (tr. 153, 229-230).

27. The Intervenors were prejudiced in two important respects by the way in which the Appeal Board conducted this proceeding. The Appeal Board illegally attempted to mold the 1980 radon proceeding in a manner which was inconsistent with the requirement of objectivity and the legal obligation of protecting the health and safety of the public. The key witness in this proceeding was Staff witness Miller. Repeatedly, as soon as Staff witness Miller's responses to cross-examination began to stray from the "party line" that the Appeal Board was intent upon upholding, Dr. Kepford's questioning of Mr. Miller was interrupted so that the Appeal Board could divert attention towards testimony which it considered to be less damaging to the Staff's and Applicant's position. In addition, the Appeal Board constantly threatened that it would truncate Dr. Kepford's cross-examination of Mr. Miller

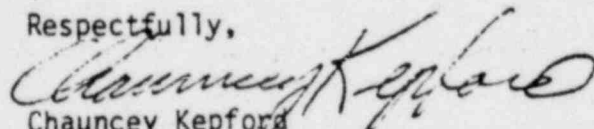
after an arbitrary time period, despite the gravity of the issues in this proceeding.

28. Because the Appeal Board had scheduled the TMI-2 aircraft impact hearings for late February 1980, and due to other scheduling conflicts arising from other NRC licensing proceedings, the Intervenors requested during a telephone conference call that the Appeal Board postpone the 1980 radon hearings. The Intervenors' involvement in these several ongoing NRC proceedings stems from the abysmal failure of past and present NRC actions to protect the health and safety of the Central Pennsylvania public. The public health dangers (potentially on the order of millions of premature deaths from cancer per AFR per reactor) posed by the permanent releases of radon which Staff policy would allow, the fraudulent concealment by the NRC Staff and TMI-2 Applicant in the past of the magnitude of these dangers, and the literally several years' time which this Board has allowed the Staff and Applicant to prepare testimony for the 1980 radon proceedings highlight the crucial importance of allowing the public's representatives adequate opportunity to prepare for the proceedings. The Board's refusal to grant even a modest extension of time to prepare for the hearings constituted an arbitrary and illegal denial of due process and equal protection, and was inconsistent with the fundamental obligation of this Board to conduct its proceedings in a manner which will ensure protection of the public health and safety.

29. The applicable law has been explained on numerous previous occasions in filings by the TMI-2 and Peachbottom Intervenors on this subject. Due to the Staff's failure to abide by NEPA and protect the health and safety of the public, and for the other reasons stated in our prior filings, the Appeal Board must issue an order immediately suspending the operating licenses of all reactors subject to this proceeding in view of the prodigious, long-term releases of radon which are attributable to the nuclear fuel cycle.

Ecology Action also adopts the above proposed findings. In addition, the TMI-2/Peach Bottom Intervenors adopt the proposed findings of Ecology Action.

Respectfully,



Chauncey Kepford
Representative of the TMI-2/Peach Bottom
Intervenors

June 18, 1980.

CERTIFICATE OF SERVICE

I hereby certify that copies of PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW AND RESPONSE TO APPEAL BOARD QUESTIONS ON BATTELLE REPORT, SUBMITTED BY THE TMI-2/PEACH BOTTOM INTERVENORS have been servrd on the following by deposit in the U.S. Mail first class postage paid on this 12 day of June, 1980:

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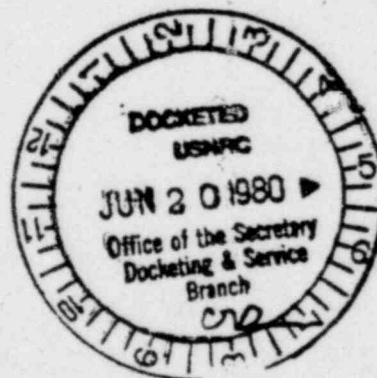
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