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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION



Before the Atomic Safety and Licensing Appeal Board:

In the Matters of

PHILADELPHIA ELECTRIC COMPANY et al.  
(Peach Bottom Atomic Power Station,  
Units 2 and 3)

Docket Nos. 50-277  
50-278

METROPOLITAN EDISON COMPANY et al.  
(Three Mile Island Nuclear Station,  
Unit 2)

Docket No. 50-320

PUBLIC SERVICE ELECTRIC AND GAS CO.  
(Hope Creek Generating Station,  
Units 1 and 2)

Docket Nos. 50-354  
50-355

INTERVENORS' RESPONSE TO DETAILS OF NRC STAFF'S REPLY BRIEF

The Three Mile Island Unit 2 (TMI-2) and Peach Bottom Intervenors have previously adopted the proposed Findings of Fact and Conclusions of Law submitted by Ecology Action of Oswego. We hereby adopt Ecology Action's recent Reply to the NRC Staff's Proposed Findings. We supplement these materials by further responding to the Staff's filing as follows:

1. The record does not indicate the extent to which abandoned underground mines are likely to be sealed or reclaimed. The record also fails to demonstrate that the sealing techniques which the Staff has described will generally succeed in permanently eliminating radon emissions from underground mines. Although Staff witness Wilde testified that short-term reductions in radon emissions could be achieved by sealing mine openings, he did not indicate that techniques for permanently controlling radon emissions are generally feasible or in use. His discussion of actual reclamation techniques that are being applied suggests that mine operators will attempt to cut corners to reduce expenses even where sealing occurs. For example, mine operators typically use crude methods such as dropping a telephone pole down a vent hole while trying to fill the remainder of the hole with dirt (TR. 416). This would seal the mine opening only for the relatively short period it would take for the telephone pole to decay. In addition, federal law does not require reclamation of abandoned underground mines, and many states likewise do not compel the operator to practice reclamation (TR. 416, and see Staff Proposed Finding 8).

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Proper reclamation is lacking even in the few jurisdictions where formal regulatory requirements exist, because the laws currently on the books are not being enforced (TR. 416).

2. Since radon production from underground mines will increase as additional tons of ore are extracted from the mines (TR. 391), decreases in ore grade will produce corresponding increases in the amount of radon emissions resulting from underground mining per Annual Fuel Requirement (AFR).

3. To stop radon emissions from underground mines, it is necessary virtually to eliminate the flow of air from the mines.

4. The underground mining calculation adopted by Staff witness wilde were based upon a sample of only a small percentage of the underground uranium mines which presently exist. The first draft Battelle Report, which formed the basis of Wilde's initial prepared testimony, described measurements taken at seven under-ground mines (TR. 420, 432). The second draft Battelle Report, which led to Wilde's revised prepared testimony, included measurements taken from twenty additional underground mines (TR. 432). Wilde estimated, however, that there are "hundreds...or maybe more" unsealed underground mines, within an order of magnitude (TR. 408). Witness Goldman admitted that approximately 2100 abandoned underground uranium mines exist in the United States (TR. 464). In view of the comparatively small number of underground mines which Battelle sampled, the Appeal Board should await publication of the final Battelle Report, at a minimum. Following publication of this report, the parties should be requested to address the questions of 1) disposition of alleged Deficiency No. 1, and 2) the magnitude of radon releases which may be expected to result from underground mining of uranium ore. At present, the TWI-2 and BeachBottom Intervenor do not foresee the need for a further evidentiary hearing on these two issues. Nevertheless we specifically reserve the right following publication of the final Battelle Report and the issuance by the Board of a request to the parties to address these two issues.\* Furthermore, no reliance should be placed upon any affidavits filed by the licensees or the Staff on these issues unless an opportunity for cross-examination is provided.

5. The underground mines sampled by Battelle represent a so-called "mature" mining population only in the very narrow sense that the 1978-1979 average age of the mines sampled by Battelle was roughly halfway between the youngest and the oldest of these mines (TR. 413). Previous Staff calculations assumed a twenty-year mine life, which was subsequently increased to thirty years in Wilde's revised testimony, p. 12). As long as the apparent trend toward extending the life of underground mines rather than resorting to the more expensive procedure of opening up new mines is followed, the present mine population has not "matured," and the total radon releases per mine will continue to escalate. Furthermore, given the enormous number of abandoned underground mines, the "average" underground mine is nearly completely worked out, rather than only partly worked out, as the Staff model assumes.

A. The record does not support the Staff's unwarranted assumption

\* In this respect we apparently do not agree with the position of Ecology Action. In all other respects, however, we adopt the positions and statements which Ecology Action articulated in their June 20, 1980,

that a model open pit uranium mine bearing any resemblance to reality would be as much as 85% reclaimed. The record does not demonstrate that laws requiring reclamation of open pit uranium mines have been adopted, or would be enforced if adopted. The Battelle Report open pit mine calculations were based upon a miniscule sample of only eight mines. By comparison, there are already nearly 1,000 open pit uranium mines in the United States (TR. 464). In addition, the record neither demonstrates nor even suggests that the open pit mine emissions observed by Battelle are in any way representative of the emissions which will result from the open pit mining that will occur to fuel the reactors affected by this proceeding.

7. The record does not support the Staff's naive assumption that reclamation of open pit mines by conventional earth-moving methods will assure reduction of radon emissions over long periods of time. Because surface mining pulverizes the overburden material, there is a substantial likelihood, probably a certainty, that massive reclamation failures will develop due to the long-term influence of weathering and erosion. In most areas of the country where uranium is presently mined the natural rainfall is insufficient to sustain a vegetative cover capable of retarding weathering and erosion. Even where vegetative cover can be established without the constant and continuing intervention of man, the overburden material (which is itself a toxic emitter of radon) will erode away, uncovering additional toxic material, long before the period of toxicity has expired. The reclaimed open pit mine is especially vulnerable to the constant onslaught of weathering and erosion because of the unnatural and disorderly manner in which the overburden is placed in the reclaimed mine.

8. The record provides no assurances, and no basis of assuming or anticipating, that many worked-out uranium mines, either surface or underground, will eventually be properly reclaimed.

9. The Intervenor's were prejudiced by the Staff's failure to provide timely notice of the changes which were incorporated into witness wilde's revised prepared testimony. Although wilde acknowledged receiving the second draft Battelle Report at least one full week prior to his appearance at the hearing (TR. 421), the Staff did not even attempt to inform the Intervenor's that the second draft of the report was available at that time, and did not in any other way try to mitigate the substantial resulting prejudice to the Intervenor's.

10. The glib assurances of Staff witness Miller, that one foot of cover erodes away in arid regions each 4,000 years (Staff Proposed Findings, p. 63), have no probative value and will do nothing to minimize the human suffering and premature deaths which will result if the Staff is allowed to continue to ignore the radon emissions problem. In the first place, Miller is neither qualified nor competent to make such statements (see TMI-2 and PeachBottom Intervenor's Proposed Findings). Second, if Miller knew anything about the subject, he would have at least realized that rates of erosion are highly variable and site specific and cannot be cavalierly applied to some general arid region. Third, estimated erosion rates on the order of the one which Miller postulated are applicable to rocks and certain strata which have been compressed continuously by enormous pressures over geological periods of time. Such erosional rates bear no relationship whatsoever to the far more rapid and unpredictable rates that would be applicable to the broken-down rock fragments and soil materials of which mill tailings piles and their associated cover

are composed (compare paragraph 7, above).

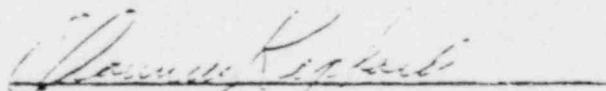
11. The Staff's Proposed Finding No. 65 is in error because Dr. Goldman never specified his view of the comparative likelihood of a "complete erosion of earth cover over natural ore bodies." The Staff's suggestion (also in paragraph 65) that radon emissions should not be attributed to the nuclear fuel cycle because radon is also sometimes emitted as a result of the erosion of earth covering natural ore bodies is insulting to the intelligence, pathetic, legally irrelevant, and without support in the record.

12. The Staff concedes that subsequent developments in the Battelle sampling program have directly contradicted sworn statements made by Licensees' witness Dr. Goldman (Staff Proposed Finding 32, at footnote 24).

13. Once mill tailings piles begin to destabilize as a result of erosion, it will be impossible for anyone, now or in the future, to determine whether the rates of radon emission from the piles are increasing without sophisticated monitoring equipment capable of detecting such changes (TR. 456-462).

Ecology Action of Oswego also joins in this filing.

Respectfully submitted,



Chauncey Kefford  
Representative of the TMI-2 and  
Peach Bottom Intervenors

Dated this 23<sup>rd</sup> day  
of July, 1980.