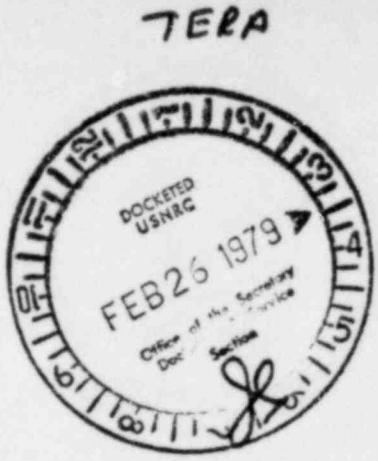
TERA

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION



BEFORE THE

ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matters of:

Rochester Gas and Electric Corporation, et al. (Sterling Power Project Nuclear Unit No. 1)	Docket No. STN 50-485
Northern States Power Company (Minnesota), et al. (Tyrone Energy Park, Unit No. 1)	Docket No. STN 50-484

RESPONSE OF ECOLOGY ACTION OF OSWEGO AND NORTHERN THUNDER, INC, TO ALAB -509

Procedural history. Effective April 14, 1978, the NRC amended Table S-3 which follows 10 CFR §51.20(e) so as to delete the value assigned to effluents from Radon-222 related to the uranium fuel cycle. The NRC also declared the environmental effects of Radon litigable in individual licensing proceedings. Earlier, in anticipation of the NRC's decision, the appeal board in ALAB-464 had authorized the Tyrone intervenor, Northern Thunder, Inc. ("NT"), to move the Tyrone licensing board to reopen the Tyrone construction permit proceeding on the Radon issue. Subsequently, in ALAB-480, the Tyrone Radon proceeding was withdrawn from the Tyrone licensing board and "consolidated" with 16 other proceedings before the appeal board on the Radon issue. One of such other proceedings was Sterling.

ALAB-480 also devised the Perkins "lead case" method of dealing with the Radon issue. The method devised involved serving each party with a copy of the record on the Radon issue in Perkins. In addition, the record in each of the 17 proceedings was deemed automatically re-opened for receipt of the Radon evidence in Perkins. The appeal board then directed as follows:

> Within 14 days after his receipt of the Perkins evidentiary record, any party may request in writing that the appeal board assigned to the particular proceeding (a) receive additional written evidence on the redon question; (b) call for a further hearings on the Perkins record; or (c) consider objections to any aspect of the Perkins radon proceeding. The request shall set forth with specificity the respects in which the Perkins record is deemed to be incomplete, inaccurate, or objectionable, as well as precisely how such defects should be reedied. Response to such requests may be filed by any other party to the proceeding within 10 days thereafter.

ALAB-480 also provided that when the licensing board's decision on the radon question in Perkins was rendered it should be served on each party to the 17 proceedings. ALAB-480 then went on to order:

> Within 14 days following that service, a party may file a memorandum with the appropiate appeal board addressed to two questions: (a) whether the Perkins evidentiary record supports the generic findings and conclusions of the Licensing Board respecting the amount of the radon emissions in the mining and milling process and resultant health effects; and (b) whether the radon emissions and resultant health effects are such as to tip the NEPA balance against construction (or operation) of the particular facility in question. (A party who has earlier filed a request to supplement in his proceeding

> the evidentiary record adduced in Perkins might, of course, choose to defer the submission of a memorandum on these two questions pending outcome of his request and any supplementation of the record which might be ordered.)

NT and the Sterling intervenor, Ecology Action of Oswego ("EA"), each submitted a response as contemplated by paragraph 3 on page 18 of ALAB-480. In addition, both NT and EA choose to defer the submission of the memorandum contemplated by paragraph 4 on page 19 of ALAB-480.

There followed a several month period during which representatives of the Staff, EA and NT discussed the possibility of consolidating the Tyrone and Sterling (and possibly other proceedings) for the purpose of resolving the radon issue. These discussions culminated in a motion to consolidate the proceedings on radon submitted by EA to the appeal board on October 3, 1978. This motion was joined by NT by letter from counsel to NT to the appeal board dated October 10, 1978. In response to, among other things, the EA motion to consolidate, the appeal board issued ALAB-509. ALAB-509 directed EA and NT to submit by January 5, 1979 a memorandum setting forth:

> (1) not only the respects in which they believe the radon release data and concentration levels in Perkins are inaccurate or otherwise deficient, but also the basis for their assertion and the potential significance of the deficiencies (i.e., the degree of impact that any corrections might have upon Perkins figures); (2) whether, and if so why, they believe a hearing is necessary on those topics or whether some other procedure for considering the matter is appropriate; and (3) what evidence, either written or oral as the case may be, they are prepared to offer.

In addition, ALAB-509 provided any party in any of the proceedings could submit a brief by January 15, 1979, on the licensing board's so called "de minimus" theory employed in the Perkins decision. NT, joined by EA, moved the appeal board for an extension of time, to

February 19, 1979, to submit the filings contemplated by ALAB-509. The motion for an extension of time was granted by ALAB-512.

This submission is made on behalf of NT and EA. Written confirmation of the joinder of EA in this submission will be submitted by an authorized representative of EA.

Introduction. As we read ALAB-509 (in particular the second full paragraph on page 5 of ALAB-509), at this time the Board is not interested in all of EA's and NT's objections to the Perkins decision. In particular ALAB-509 does not request a response to Perkins' quantification of health effect, the validity of the Staff's view health effect beyond 1000 years need not be considered (except as such view my underlie the de minimus theory), impacts of uranium mining and milling in the locality of the mines and mills, consideration of radon effects on non-U.S. populations, and cumulative effects of radon related to "front end" fuel cycle activities for the entire nuclear industry.

In a footnote on page 10 of the April 11, 1978 order amending Table S-3, the NRC indicated "it remains up to the licensing board, however, to determine in the first instance whether the evidence actually presented to it by the parties and the NRC Staff is sufficient to support an environmental analysis which meets NEPA standards." That the purpose of the testimony in Perkins was to provide a basis for a NEPA environmental analysis is reflected in Dr. Jordan's remarks at pages 2485 through 2488 of the transcript. As will be detailed below, EA and NT do not believe the Perkins record adequately explores radon releases and concentration levels.

As a result, at this time the board is without adequate information to perform an environmental assessment of radon as it relates to the nuclear fuel cycle. NT and EA object to the burden which the board nas placed on EA and NT to organize the information necessary to fill the gaps in the board's knowledge of radon. Full compliance with the four requirements of the "particularized memorandum" set forth on page 8 of ALAB-509 is beyond the meager resources of either intervenor. In this regard it is not inappropiate to note the errors in the NRC's prior position with respect to radon were not caused by the negligence or oversight of anti-nuclear intervenors. Rather the errors resulted from deficiencies in various analyses performed by the U.S. Atomic Energy Commission, as related in the affidavits of Mr. Rothfleisch and Mr. Lowenberg. The Staff and the Commission persisted in their errors for three years after the errors were drawn to their attention by a petition from the New England Coalition Against Nuclear Pollution. It is not very gracious for the appeal board to now ask intervenors to prove the Commission wrong. EA and NT submit it should be enough to cast reasonable doubt on the Perkins record and decision, and that Staff and applicants should have the responsibility of responding to the deficiencies identified by EA and NT.

There is a fundamental legal defect in the use of the Perkins record to assess the environmental impact of radon releases and concentration levels from the fuel cycle related to Sterling and Tyrone. This defect is the Perkins record does not contain a sufficiently <u>detailed</u> consideration of the environmental impact of radon. See, 42 U.S.C. §4232(20(C). There are two related but distinct respects in which Perkins consideration of the impacts of radon is not

sufficiently detailed. First, the testimony in Perkins relates data based on model mines and mills. The Perkins record makes no explicit showing of the manner in which the models employed reflect actual mines and mills. As will be shown below, actual experience has resulted in radon emission which are predicted by the models employed by the Staff in its Perkins testimony. At the very least, a detailed environmental assessment (even a quasi-generic assessment such as is involved Perkins) requires an examination of data derived from actual mines and mills. Second, to date no evidence has been adduced concerning the actual mines and mills which will supply uranium to Sterling and Tyrone. NEPA requires that if plant specific information is available with respect to Sterling andTyrone, such information must be used in making the environmental assessment. See, Sierra Club v. Morton, 510 F.2d 813 (5th Cir. 1975); EDF, Inc. v. Corps of Engineers, 492 F.2d 1123 (5th Cir. 1974); East 63rd Street Ass'n. v. Coleman, 414 F. Supp. 1318 (SDNY 1976); Nelson v. Butz, 377 F. Supp. 819 (MN 1974). Even if the sources of uranium for Sterling and Tyrone are not yet known, there is nothing in the Perkins record to indicate such lack particularized information. Since, as will be shown, the amount of radon emitted is site specific, at the very least NEPA requires a determination of the extent to which it is possible to obtain information which is specific to Sterling an Tyrone.

"Particularized memorandum" requested by ALAB-509 with respect to radon released and levels of radon concentration. There follows an enumeration of 26 deficiencies in the Perkins record with respect to radon releases and concentration levels. This enumeration may not be comprehensive, since EA and NT expect their continuing investigation

of the radon issue to bring additional deficiencies to light. EA and NT are in the process of substantiating and quantifying the deficiencies. To the extent information regarding the deficiencies has been obtained, it has been indicated. EA has instituted informal discovery procedures which have not yet been completed. EA and NT anticipate further discovery.

Deficiencies in Perkins with respect to mining:

1. Staff testimony, e.g., affidavit of R.M. Wilde, assumes a fixed correlation between uranium ore mined and curies of radon released. As per Wilde, the release per MT of ore is 1.48×10^{-2} curies Rn-222. In fact, it is not possible to demonstrate a fixed correlation between ore mined and radon released. A report dated August 4, 1978, from Battelle Pacific Northwest Laboratories to Dr. Harry Landon of the NRC states:

> It is evident that there is a much closed relationship between approximate areas of the mine ventilated and radon 222 emitted than between ore production and radon 222 emission. Thus, a simple estrapolation on the basis of curies per ton of ore could lead to erroneous conclusions about the total emission rate from mines.

other report to Mr. Landon from Battelle, this one dated February 6, 1978, and entitled Literature Review of Radon 222 Emission Rates from United States Uranium Mines, indicates the radon release rate from mining varies from 1.8 curies to 48 curies per ton of yellow cake. Using Magno's formula of 245 MT yellow cake per AFR, the higher figure would result in a release rate from mining in excess of 10,000 curies per AFR. The February 6, 1978, Battelle report includes a paper entitled Radon and its Daughter Products in Uranium Mining

Ventilation Exaust Air, by Walter Enderlin. This paper states:

> To date there are not sufficient data available to correlate mine production rates with the concentration of radon daughters in the ventilation exhaust plume.

The paper goes on to list the following nine factors which influence radon emissions: (1) grade of ore, (2) fluxuations in atmospheric pressure, (3) rate of advance and size broken ore, (4) quantity of ground water entering mine, (5)quantity of exposed rock surface which varies with type of mining method and age of mine, (6) resident time of ventilation air, (7) amount of ore handling underground, (8) type of ventilation system, and (9) poracity and permeability of mine rock. The Perkins record at pages 2541 and 2542 also suggest the difficulty in correlating radon releases to ore production. This is a specific instance of a deficiency in Perkins which results from using models than data from actual mines. The evidence referred to above indicates radon emission from mining can only be determined on a mine by mine basis. The environmental assessment for Sterling and Tyrone cannot be completed until inquiry is made into the actual mines which will produce their uranium.

2. Staff testimony assumes 2.72×10^5 MT of ore are needed to produce one AFR. This assumption is based on an assumed rate of fuel effiency in a reactor. With respect to Sterling, a plant identicle to Tyrone, P.M. Wood of the Staff testified in the construction permit proceeding. The rate of fuel efficiency testified to by Mr. Wood, at page 17 of his testimony, is in terms of a duty factor of 26.7×10^6 KwH per ST of yellow cake. Figure 6 in Mr. Wood's testimony gives the duty factors achieved by Westinghouse PWRs. Of the reactors listed,

only one achieved a duty factor greater than 26.7×10^6 KwH per ST of yellow cake. All other WH PWRs exhibited a lower duty rate. As the duty rate goes down, the amount of uranium required to fuel the reactor for one year increases. Thus, since Tyrone and Sterling will, if constructed, have WH PWR, it is questionable whether 2.72×10^5 MT of uranium ore will be sufficient to supply an AFR. To the extent additional ore is needed to fuel the reactors for one year, the radon releases per AFR are increased. In this regard, note also an article in the December 1975 Bulletin of Atomic Scientists. This article refers to WASH 1242 which indicates at one time the NRC assumed a duty factor of 50×10^6 KwH per ST yellow cake. But between January 1, 1971 and December 31, 1973, the actual dury factor achieved was 14×10^6 KwH per ST yellow cake.

3. In the long run, rador emissions depend on the extent to which underground are sealed and open pit mines are reclaimed. The NRC has no jurisdiction over mines. In Perkins Staff and Applicant wittnesses refered to state laws which require sealing and reclamation as adequate to insure the cessation of emissions after mine's useful lives. In testimony on June 27, 1978, before the House Subcommittee on Energy and Environment, Betty Perkins from the New Mexico Energy and Mineral Department, indicated in New Mexico abandoned mines have been improperly sealed, have contaminated the soil, and have left ore storage piles exposed. Measurment at abandoned mines shows gamma radiation levels 10 to 100 times above background, a fact which demonstrates the existence of radiologic pathways for radon. In view of the actual facts regarding abandoned mines, it is incumbant upon the NRC to make a detailed examination of the statutory standards

imposed on the operators of mines, the penalties fro failure to comply with such standards, and each state's enforcement experience before leaping to unwarranted conclusions regarding the efficacy of state regulation of mines.

4. The testimony in Perkins regarding emissions from open pit mines is extremly sketchy. Mr. Wilde at page seven of his affidavit states, "For open pit mines ... there is just no reliable information available upon which to base estimates of radon release." Pages 2543 through 2558 0f the transcript enumerate many of the uncertainities regarding emissions from open pit mines. Nevertheless, at page 2610 of the transcript, Mr. Wilde performs a "quick and dirty" computation of emissions using a model open pit mine. He makes what is an apparently completely arbitrary choice of a mine which covers one square mile. He computes a release of 100 curies/yr/AFR. Apparently the Board in Perkins was somewhat skeptical about Mr. Wilde's calculation since in paragraph 13 of the Perkins decision the rate of emission from open pit mines was doubled to 200 curies/yr/AFR.

The Sweetwater DES indicates a release rate of 6090 curies per year. The Sweetwater mine will have a capacity sufficient to produce 410 MT yellow cake per year during its estimated 15 year life. Using the Staff figure of 245 MT yellow cake per AFR would result in an annual release rate for the Sweetwater mine of approximately 250 curies/yr/AFR. This is another example of the actual facts deviating from the Staff's assumptions regarding radon emissions.

5. Also with respect to open pit mines, the Perkins record gives no consideration to emissions from over burden. Testimony before the Senate Subcommittee on Energy Production and Supply on July 24 and 25,

1978, indicates the overburden has a volume of 8 to 35 times the volume of the mine. Therefore all of the overburden cannot be returned to the mine. The overburden has as much as 10% of the radioactive concentration of mill tailings. South Dakota, with a mine reclamation law on the books, has former mining areas that are now sterile and bare. The overborden has been indiscriminately piled on the landscape just like mill tailings.

6. Mine test holes are another source of radon. Persons from the South Dakota Resource Coalition could testify that in South Dakota there are thousands of unsealed or improperly sealed test holes. These holes are a source of unknown quantities of radon emissions via atmospheric and hydrologic pathways.

7. Perkins considers only the atmospheric pathways for radon emissions from mining. However, it is possible for there to be releases to streams or the ground water. Improperly sealed or unsealed mine test holes could fill with rain or ground water. As EPA report, Water Quality Impact of Uranium Mining and Milling Activities in the Grants Mineral Belt New Mexico, EPA 906/9-75-001 Sept. 1975, found radioactive contamination of drinking water in mining facilities and ground water contamination exceeding EPA limits for certain chemicals by 740%. This report demonstrates the existence of hydrologic pathways for radon contamination.

8. Perkins gives no consideration to the increase fuel costs which will result from the need to seal and reclaim mines. Traditionally, the nuclear industry has much ballyhooded the lower fuel cost associated with nuclear power. This is a factor which has been taken into consideration in striking cost benefit balances in connnection with the

environmental assessments of Sterling and Tyrone. Thus, fuel costs attributable to the expense of reducing the potential for radon emissions must be considered.

9. A very important factor in calculating the radon emissions from mining during the first 1000 years (the period the Staff thinks significant), is the success of the uranium mining industry in sealing or reclaiming mines. Success is predicated on state laws mandating sealing and reclamation. However, it is projected a substantial portion of the uranium to supply reactors located in the United States will come from foreign countries. Indeed, in recently completed hearings before the Wisconsin Public Service Commission, Northern States Power Company, one of Tyrone applicants, suggested foreign uranium may be used to power the Tyrone plant. The possibility foreign uranium will be use to power either Sterling or Tyrone requires consideration be given to the radon emissions which might be attributable to foreign mines.

Deficiencies in Perkins with respect to milling:

10. The affidavit of P.G. Magno calculates radon emissions of 1,130 curies per AFR through the inactive milling period. Following stabalization, Magno's affidavit indicates an emission rate of between 1 and 100 curies per year. NT and EA are prepared to submit evidence, based on government documents, that measured emissions at actual mills are greater than computed in Mr. Magno's affidavit.

11. Staff testimony in Perkins assumed an emmanating power of radon from tailings of 20%. A study by Ford, Bacon and Davis Utah, entitled Emmanating Power and Diffusion of Radon Through Uranium Mill Tailings indicates the emmanating Power is site specific. Therefore,

there is no justification for the 20% emmanating power used in Perkins, and with respect to Sterling and Tyrone it is necessary to determine the precise mill from which uranium will be obtained so that an accurate emmanating power can be used.

12. In Perkins the Staff admits (see transcript pages 2502 and 2559) no consideration was given to emissions from uranium which is stockpiled at the mill. This proceeding in intended to cover all radon emissions in the fuel cycle. Therefore, it is necessary to reopen the record to receive evidence regarding emissions during the stockpiling phase of the cycle.

13. Mr. Kerr for the Staff testified the licensing restrictions for mills imposes a requirement on mill operators that tailing be stabilized so the radon emissions are no greater than 2X background. However, the record contains no information concerning what will be necessary to accomplish the desired objective. Untill evidence is obtained which indicated precisely what must be done to reduce tailings emissions to 2X backgroaund, it is not possible to conclude that as a practical matter the Commission's objective is attainable. In addition, Mr. Kerr did not indicate where the background is to be measured. Is the background baseline a national average, or an average in the vicinity of the mill?

14. In computing the long range emissions from mill tailings, the Staff assumes gradual deterioration of the vegatative cover. However, no consideration is given to the effect of spatial diffusion of the tailings piles which is likely to follow upon erosin or the cover. As the surface area of the piles increases, the radon released also increases. Evidence should be obtained indicating the release rate

of piles as their surface area increases.

15. Perkins does not consider the radon emissions which will result from the process of "heap leaching." The Sweetwater DES , NUREG 0304, describes this process whereby water is allowws to percolate through piles of low grade ore. Each pile contains 360,000 MT or ore and is 25 feet high, by 1,000 feet long, by 300 feet wide. The operators of the Sweetwater mill intend to erect one such pile per year for 12 years. Ostensibly, radon emissions will be reduced by piling the ore on sheets of plastic. The DES admits radon will be released from the sides of the piles. If heap leaching mills are a possible source of uranium for Sterling and Tyrone, an investigation into the possible emissions from such mills must be conducted.

16. Staff testimony indicates that in agreement states mill tailings will be adequately isolated and stabalized. However, a notice on page 17 of V.143 #81 of the Federal Register (April 26, 1978) captioned Assessment of Environmental Impact of Uranium Mills in Agreement States, suggests concern on the part of the NRC as to the environmental review procedure used in agreement states and the capability of such states to insure the isolation and stabilization of tailings.

17. The uranium industry is already turning to lower and lower grades of ore. This means higher volumes of tailings than assumed by Perkins. Although the number of potential curies may remain the same, larger piles will be more expensive and difficlut to isolate and stabilize. EA and NT are prepared to present testimony on this point.

18. The NRC is considering underground burial of mill tailings. Although this method of disposal seems preferable from the point of view of preventing erosin by wind and water of above surface piles, buried tailings are more likely to be leached by groundwater. In fact, one could imagine a below grade quanity of mill tailings might represent a prefered location for collecting groundwater. Hence, people drilling for water wells may be attracted the burial sights, and thus be exposed to large radiation exposures through radium 226. This exposure pathway ought to receive careful attention before a decision is made to dispose of mill tailings in this way.

19. Perkins does not consider the cost of adequately isolating and stabilizing tailings. As pointed out above with respect to the cost of sealing and reclaiming mines, the cost of isolating and stabilizing tailings will be reflected in the cost of fuel. Information regarding these costs is contained in the White Mesa DES.

20. As pointed out above with respect to mining, some of the uranium to fuel Sterling and Tyrone may come from foreign sources. If so, it is reasonable to assume the uranium would be milled in a foreign country. Since the United States has no jurisdiction of foreign mills, it has no control over the stabilization and isolation of tailings located in foreign countries. Thus, to the extent uranium for Sterling or Tyrone is milled in foreign countries may be increased. Information regarding this point should be obtained.

21. Mill tailings will constitute a massive amount of material. EA and NT are prepared to submit testimony that with respect to lesser amounts of radioactive materials the experience of the federal government has been that radioactive materials migrate to a much greater extent

than originally anticipated and that there is every reason to believe this problem will be worse with the larger volume represented by mill tailings.

Miscellaneous deficiencies in Perkins with respect to radon emissions and concentration levels:

22. Perkins gives no consideration to radon emitted from enrichment tailings. In comments by Dr. William Lochstet on NUREG 0332, which compares the health effect of coal and nuclear power, there is a table one which indicates 1.74×10^{13} curies of radon would be released from the disintegration of the uranium in the tailings result-from the enrichment of sufficient uranium to produce .8 gigawatt years of electricity. Using a NRC formula, Dr. Lochstet computes 400,000 early deaths over the full period of toxicity of such enrichment tailings. Using an EPA formula, Dr. Lochstet computes 8,000,000 early deaths over the full period of toxicity.

23. Perkings does not compute the radon released from UF-6 coversion;however, at page 2382 of the transcript there is an indication radon is emanated from the UF-6 conversions process. Information quantifying this release should be supplied to the record.

24. At pages 2284 and 2386 of the transcript there is an indication other portions of the fuel cycly result in releases of radon. Information must presented quantifying such realeses.

25. Morton Goldman presented testimony regarding radon releases from the fly ash of coal which might be used as an alternative to nuclear fuel. There are at least two deficiencies in Mr. Goldman's analysis which require the submission of further information. First, Goldman testified radon per AFR from coal fly ash piles would result

in emissions of between 2 and 15 curies per year on the average, and 73 to 79 curies per year for the maxium case. However, in response to interrogotories submitted to the Stereling applicant, Goldman admitted there are no reports of measurments made from actual emissions of radon from fly ash piles. Goldman's response indicates the emmation fractions for radon from fly ash are extremly variable. Therefore, site specific information must be obtained with respect to radon from fly ash. Second, Goldman testified coal has a uranium content of up to .7%. In response to interrogories propounded by EA to the Sterling applicant, Mr.Goldman submitted a report entitled Occurance of Uranium. This report indicates that usually the uranium content of coal is musct less than 7%. In any event, the uranium content of coal, although always minimal, is variable. Therefore, it is necessary to obtain site specific information with repsct to coal which might be used to power an alternative to Sterling or Tyrone.

26. Morton Goldman, at page 2342 of the transcript, indicates some uranium is being recovered commercially from the slag which is a byproduct of the production of phosphate fertilizer. Iformation should be obtained whether radon is released from the recovery of uranium by this process. If this process results in radon emissions, such emissions should be quantified.

In our view, the deficiencies in thePerkins record and decision can only be remedied by holding a hearing which is preceeded by discovery. Only by examination and cross examination of Staff, applicant and intervenor wittnesses can a record be establish which will permit the Sterling and Tyrone boards to make a reasoned decision with respect to radon. NT and EA are in the process of engaging experts to testify

on various aspects of radon emissions.

De minimus theory. For purposes of analyzing the de minimus theory, footnote 11 of ALAB-509 indicates the parties should assume arguendo the levels of radon exposure set forth in Perkins are accurate. Therefore, this analysis of the de minimus theory assumes the exposure levels mentioned in paragraph 25 of the Perkins decision. These levels are 1 X 10^8 curies due to the 110 AFR require for Perkins. As indicated in paragraph 41 of Perkins, such an exposure level would result in 132 deaths during the first 1000 years. Since the relationship between radon emissions attributable to Perkins and background will hold for all time, this analysis does not assume the 1000 year cutoff favored by the Staff. Therefore, as indicated in paragraph 42 of Perkins, we recognize 4,800 deaths during the 10,000 year period and 230,000,000 deaths during the billion year period. We also assume a background radon level of 165 millirads per year as is indicated in paragraph 44 of Perkins.

The de minimus theory is employed to assist the board in performing that portion of the environmental assessment known as the cost benefit balance. Ostensibly, the board compared deaths attributable to Perkins related radon to deaths related to background radon for purposes of determining whether deaths attributable to Perkins related background are a significant cost. We believe the comparison of costs to costs is arbitrary and absurb. It is arbitrary in the sense it fails to consider other approaches to assessing the costs attributable to Perkins related radon. Another approach to assessing such costs would be to examine the effects of Perkins related radon on

people living in the vicinity of uranium mines and mills. Still another appraoch would be to compare the long range toxicity of Perkins related radon to the toxicity of other nuclear wastes, e.g., spent fuel. The Perkins decision offers no justification for the appraoch selected. The de minimus is absurb is that is assessing the significance of deaths attributable to Perkins related radon it makes no sense to use as a comparable deaths associated with some other activity, namely, living in an environment which has a certain background level of radon. The comparison should not be between costs and costs, but rather between costs and benefits. In this case, we have, on the one hand, 230,000,000 ultimate deaths, and, on the other, the perceived benefits of generating electicity. If when the situation is viewed in this fashion, the NRC want to say the benefit outweighs the cost, it is free to do so. But there is no justification for obfuscating the analysis by introducing the red herring known as the de minimus theory.

That the de minimus theory is in appropiate is also demonstrated by the fact it is not used in any other context. For example, nuclear proponents are fond of mentioning the health hazards of coal power. ey do not mention that when compared to the background level of particulates and SO_x, the health effect attributable to a particular plant are de minimus. Nor is the de minimus theory used on the benefits side of the analysis. As Dr. Kepford has pointed out, The benefit of from Perkins of generated elecricity is de minimus when compared to the energy which strikes the Earth in the form of sunlight.

It is possible to imagine a situation in which an economy would

produce radon for the sake of producing radon. The question might arise whether such activity presents any significant costs. If the analysis employed the de minimus theory, one would conclude there are no significant costs. However, that conclusion would be absurb unless there were some demonstrable benefit to be derived from peoducing radon. This analysis further demonstrates the true comparision is between costs and benefits , and not one cost and another cost.

The de minimus theory flys in the face of at least two significant theories embodied in NEPA. These policies are set forth in 42 U.S.C. § 4331 as a recognition of the responsibility of each generation as trustee of the environment for succeeding generations, and the congressional recognition each person should enjoy a healthful environment, and each person has a responsibility to contribute to the preservation and enhancement of the environment. In addition, 42 U.S.C. §4332(2)(F) direct federal agaencies to consider the long range character of environmental problems. Any theory which leads a decision maker to conclude 230 million future deaths are not significant environmental cost is inconsistent with concern for future generations, individuals who will inhabit this planet in years to come, and the long range nature of environmental problems.

Deminimus theory is inconsistent with a fundamental principle of the environmental movement which gave rise to NEPA. This principle is that beneficiaries of resource development should bear all of the costs of such development. By ignoring future deaths, this generation is, in effect, being given a free ride on the back of generations to come. Even the economic costs are being deferred when the Perkins board so glibly states that if human beings are alive in the future

they can tend to stabilization of tailings piles. Another fact which demonstrates the chronological displacement of costs and benefits, is the fact that in approximately 1,000 years mill tailings will more toxic than spent nuclear fuel. Yet no one is suggesting we should dump spent fuel on the ground because the health effects to future generations will be de minimus. Whatever the health effects of coal generation might be, they at least have the virtue of being visited upon the persons who receive the "benefits" of coal power. In addition to chronological displacement of costs and benefits, radon emissions presents a geographic displacement in that a major portion of the health costs will incurred by persons living in the vicinity of the mines and mills who will not even use the electricity generated.

Footnote 14 to ALAB-509 requests the parties to discuss whether an analogy might be drawn to the NRC's Appendix I regulations to 10 CFR Part 50 and the de minimus theory. It is the position of EA and NT that the de minimus theory as employed in Appendix I is as arbitrary and absurb as when employed with respect to radon emissions.

One fact which makes it easier for the board to induldge the de minimus theory is the comparison of the radon emissions attributable to Perkings with the national background level. Although we reject any comparision with background, if there is to be a comparison it would be more appropiate to compare the radon attributable to the entire nuclear industry with background. Such a comparison would at least demonstrate the manner in which the nuclear industry is contributing continual increases in the background level. With the background level "on the rise" any comparision between radon

attributable to a particular installation and background will always be de minimus. How convenient for the industry.

EA and NT object to ALAB-509's requirement that discussion of the de minimus theory be carried out at this time. ALAB-480 provided for consideration of the Perkins decision after consideration of the the defects in the Perkins record. Among the defects in the record identified in the initial ALAB-408 filing by both EA and NT was the failure to consider evidence of other appropriate appraoches to the cost benefit analysis with respect to radon. NT and EA believe it is incumbent upon the board to conduct a hearing for the submission of such evidence.

Richard Ihrig
Lawyer for Northern Thunder, Inc.

Richard Ihrig states he mailed a copy of this submission to the persons of the Tyrone service list and to Sue Reinert and Lex Larson on February 19, 1979.

Ricahrd Ihrig