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IN THE
UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

No.

YORK COMMITTEE FOR A SAFE ENVIRONMENT
AND CITIZENS FOR A SAFE ENVIRONMENT,
Petitioners,

v.

UNITED STATES NUCLEAR REGULATORY COMMISSION,
METROPOLITAN EDISON COMPANY, PENNSYLVANIA
ELECTRIC COMPANY, AND JERSEY CENTRAL
POWER AND LIGHT COMPANY,
Respondents.

PETITION TO REVIEW AN ORDER OF THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

Motion
~~BRIEF~~ REQUESTING IMMEDIATE EMERGENCY
INJUNCTIVE RELIEF TO BE FOLLOWED BY
A MORE PERMANENT INTERLOCUTORY INJUNCTIVE RELIEF

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York Committee for a Safe
Environment and Citizens
for a Safe Environment

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CERTIFICATE REQUIRED BY RULE 3(c) OF THE GENERAL RULES OF THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT:

The undersigned, duly authorized representative of Petitioners certifies that the following listed parties have an interest in outcome of this case. These representations are made in order that judges of this Court may evaluate possible disqualification or recusal.

1. York Committee for a Safe Environment

2. Citizens for a Safe Environment.

The majority of members of these two public-interest citizen groups reside within about 20 miles of Three Mile Island Unit 2. As a result of the filing of a timely "Petition for Leave to Intervene" in June, 1974, wherein the interest of the groups was described, these two groups were granted status as full parties to the operating license proceeding in July, 1974, by the U.S. Atomic Energy Commission according to the provisions of 42 USC 2239(a) and the Commission's Rules of Practice, 10 CFR 2.714(a) and (b) The two groups have been full parties in good standing in these proceedings since that date.

Authorized Representative of record for Petitioners,

Chauncey Kepford
Representative of the Petitioners
York Committee for a Safe
Environment and Citizens for a
Safe Environment

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STATEMENT OF ISSUES

I. Should not this Court issue immediate emergency injunctive relief to prevent irreparable injury to Petitioners, their descendants, and members of the public generally, resulting from the illegal issuance of an operating license to the Three Mile Island Nuclear Generating Station, Unit 2?

II. Should not this Court issue such immediate emergency injunctive relief without the need for a hearing and as soon as possible, under the authority of 5 USC Section 705?

III. Should not this Court issue soon thereafter interlocutory injunctive relief which shall remain in effect until completion of all administrative and judicial review of the legality of the issuance of an operating license to the Three Mile Island Nuclear Generating Station, Unit 2, pursuant to 28 USC Section 2349(b) and 5 USC Section 705?

REFERENCE TO PARTIES AND RULINGS

Three official agency decisions relevant to Petitioners' request for a stay have been issued. The Initial Decision was issued on December 19, 1977, by the Atomic Safety and Licensing Board panel, composed of Edward Luton, Chairman, Gustave A. Linenberger, and Ernest O. Salo.

Petitioners appealed for stay of this Initial Decision, and this request for a stay was denied by the Atomic Safety and Licensing Appeal Board panel, composed of Alan S. Rosenthal, Chairman, W. Reed Johnson, and Jerome E. Sharfman, in Memorandum and Order of January 27, 1978, ALAB-456. Excerpts from the Initial Decision and full text of ALAB-456 will be contained in an Appendix which Petitioners will be filing with the Clerk of this Court.

The third relevant official agency decision was a decision of February 8, 1978, granting an operating license to TMI-2. Petitioners are unable to include a copy of this most important agency order of February 8, 1978, because the Commission has illegally withheld this order from Petitioners in order to deprive them of their opportunity to appeal to this Court prior to the initiation of irreparable injury.

STATEMENT OF THE CASE

Three Mile Island, Unit 2 (herein referred to as "TMI-2"), is a 900 MW(e) nuclear power reactor of the pressurized water type, owned jointly by Metropolitan Edison Company, Jersey Central Power and Light Company, and Pennsylvania Electric Company, all subsidiaries of General Public Utilities (collectively referred to as "Applicant"). The reactor is built on Three Mile Island, located in the Susquehanna River, in Dauphin County, Pennsylvania, approximately nine miles southeast of the state capital, Harrisburg.

First publicly announced in February, 1967, this reactor was originally designated as Oyster Creek, Unit 2, to be built in New Jersey, and was transferred to the Three Mile Island site, as announced in December, 1968.

Application for a construction permit was submitted to the Atomic Energy Commission ("AEC") in April, 1968, and a construction permit was issued in November, 1969. During construction of the plant, the Three Mile Island site was inundated by flood waters of "Hurricane Agnes" in June, 1972.

In April, 1974, Applicant requested authorization to possess, use and operate TMI-2, noticed for public hearing in the Federal Register May 28, 1974. Two public-interest citizen groups, the York Committee for a Safe Environment and Citizens for a Safe Environment of Harrisburg, Pennsylvania (herein referred to as "Petitioners" or "Intervenors"), filed a joint petition for leave

to intervene in operating license proceedings before the AEC's Atomic Safety and Licensing Board ("ASLB" or "Board"), in June, 1974, and were accepted as full parties to the proceeding in July, 1974. Subsequent to a May, 1975, prehearing conference, the parties identified eleven contentions.

Commencing April 5, 1977, the Board conducted an evidentiary hearing to consider (1) issuance of a full-term or a conditional operating license for TMI-2, and (2) continuation or modification of the provisional construction permit, with requirement for a "full NEPA review" covering both contested and uncontested issues. See Initial Decision of December 19, 1977 at para. 85. The full environmental review was to be of the variety required under the National Environmental Policy Act of 1969 (NEPA). TMI-2 is subject to the provisions of Section C of Appendix D of the Commission's regulations, 10 CFR Part 50, which requires a full environmental review.

During the course of these hearings, witnesses were presented by the Applicant, the Staff of the Nuclear Regulatory Commission (NRC), and the Commonwealth of Pennsylvania to address each of the Intervenors' contentions, plus questions from the Board and an NRC Staff Testimony introduced into the proceeding on May 21, 1977, as a Supplement to the Final Supplement to the Final Environmental Statement (FSFES). The Intervenors, representing persons who reside within approximately a twenty-mile radius of the plant and others, were financially unable to present witnesses in support of their contentions, nor were Intervenors financially able to avail themselves of legal counsel, let alone expert legal counsel, to represent and protect their interests

in this proceeding. Intervenors' request to the Commission for financial assistance, which accompanied the intervention petition, was denied by the Board. Thus, the authorized representative of the Intervenors in this hearing and in all subsequent filings has been a person who holds a doctorate in chemistry but is unschooled in the law. He served also as the Intervenors' sole witness in the entire proceeding, in order to address the enormous deficiencies in the May 21st supplemental testimony introduced by the NRC Staff in order to complete the FSFES,

In these hearings, as is more fully described below and in the accompanying brief, dated January 30, 1978, which was submitted in support of Intervenors' exceptions to the Initial Decision, the Intervenors raised questions -- that were not answered by witnesses or the Board -- concerning the inadequacies of certain testimonies presented by the NRC Staff and Applicant on matters in contention and on other issues.

Especially pertinent to this petition for injunctive relief is information on the magnitude of the health effects attributable to the nuclear fuel cycle, elicited from the testimony and cross-examination of the NRC Staff witness, Dr. Reginald L. Gotchy, June 7 and 8 and July 5, 1977, and from testimony and a brief cross-examination of the Intervenors' witness, Dr. Chauncey Kepford, July 5, 1977. The NRC Staff generic testimony on the comparative health effects of the coal and nuclear fuel cycles had been introduced in order to comply with an Atomic Safety and Licensing Appeal Board ("Appeal Board") ruling in the case of Tennessee Valley Authority Hartsville

Nuclear Plant (ALAB-367, 5 NRC 92 (1977)). In response to NRC calculations of minimal health effects from the uranium fuel cycle, the Intervenors' witness showed that the Staff had failed to include any long-term health effects in its analysis. Witness Kepford's testimony on the long-term nature and quantity of the radioactive emissions from the nuclear fuel cycle was not only undisputed but was in fact corroborated by NRC Staff Witness Gotchy.

A second major issue in controversy was the consequences to the plant, as well as the probability, of the crash into the TMI-2 reactor of an aircraft heavier than the plant was designed to withstand. The Board prevented full testimony and cross-examination on the risks to the public of the aircraft crash impact, after misleading Intervenors into believing the issue would be fully examined, and then delaying more than two and one-half months to supply written justification of the denial of Intervenors' motion to compel the Applicant to produce a witness to discuss the consequences to the plant of such a crash, by which time the hearing record had been closed.

A third major issue uncovered during the proceedings was that there is no reason to believe that personnel charged with responsibility for safe evacuation of the public in the event of a serious reactor accident will be able to respond adequately to a radiological emergency. It was also shown during the evidentiary proceeding that there is no well-defined authority to insure that monitoring of radiation doses to the public in the event of a radiological emergency at TMI-2 will actually take place.

The fourth major issue was the denial by the NRC of financial assistance to the Intervenors. This denial produced a lopsided record and has deprived the public-interest Intervenors of their right to a fair hearing, guaranteed by the due process and equal protection clauses of the U.S. Constitution.

The evidentiary hearing concluded July 5, 1977. Findings of Fact and Conclusions of Law were filed by the Applicant on August 4, 1977; by Intervenors and the Commonwealth of Pennsylvania on August 15, 1977; and by the NRC Staff in a filing dated August 19, 1977, but not served upon the Intervenors until September 2, 1977. Timely response to proposed findings of both NRC Staff and the Intervenors was filed by the Applicant on September 30, 1977.

A memorandum relating to the health effects issue raised during this case was filed with the Appeal Board on September 21, 1977, by an ASLB panel member, Dr. Walter Jordan, identifying a 100,000-fold underestimation of radon-222 releases from the thorium-230 in uranium mill tailings, a further corroboration of Intervenors' testimony on health effects.

The Supplement to the FSFES (the "Gotchy testimony") had not been circulated for public and agency comment as required, as was pointed out in Intervenors' Findings of Fact; it was thereafter noticed for comment in the Federal Register on September 29, 1977, under the title "Health Effects Attributable to Coal and Nuclear Fuel Cycle Alternatives," NUREG-0332. Subsequently, a Staff document relating to these issues, identified only as "Appendix," was served on Intervenors January 28, 1978. A series of letters to the Board

followed issuance of NUREG-0332. On November 30, 1977, an NRC Staff letter conveyed the Jordan memo to the parties; on December 2, 1977, the Applicant pleaded that an Initial Decision need not await Staff evaluation of the Jordan memo; by letter of December 19, 1977, Intervenors requested the Board to withhold an operating license from TMI-2 in part on the basis of the violation of the NEPA requirement for evaluation of all costs and benefits of a project in comparison with its alternatives.

On December 20, 1977, the NRC Staff issued a letter to the Board also urging that an operating license for TMI-2 not issue until completion of Staff evaluation of the Jordan memo. The Initial Decision had been ordered by the Board on December 19, 1977, and was received by Intervenors on December 23, 1977. Only two of the 109 points raised in the Intervenors' Findings of Fact were addressed by the Board in the Initial Decision, and these two were ignored. Intervenors filed timely exceptions to the Initial Decision on December 30, 1977, and a brief in support of these exceptions on January 30, 1978.

On December 29, 1977, Intervenors moved the Appeal Board to stay the Initial Decision, and submitted a Supplemental Memorandum in further support of this motion on January 13, 1978. This motion was denied by the Appeal Board on January 27, 1978. On February 8, 1978, Intervenors appealed to the Commissioners of the NRC to reverse the Appeal Board's denial of the Intervenors' motion for stay of the Initial Decision. As of February 22, 1978, no response to Intervenors' appeal to the Commission had been received by the Intervenors.

According to an NRC press release dated, February 10, 1978, a final decision was issued on February 8, 1978, authorizing the Director of Nuclear Reactor Regulation of the NRC to issue a full-term license for the operation of TMI-2. Intervenors were informed of such a decision by a newspaper reporter the following week but have received no official notification of this issuance from the Commission. The Senior Project Manager of the NRC Staff confirmed that the Applicant was present when the license was issued at 6:00 p.m., February 8, 1978, and that fuel loading began that night. Intervenors' representative on February 17, 1978, attempted to preserve his rights in the proceeding by sending a telegram to the Commission, advising that Intervenors had not been served this final decision; and on the following day, February 18, 1978, sent a letter directly to the four Commissioners of the NRC, explaining that Intervenors had not been notified of the operating license and describing those matters in which Intervenors believe that the NRC has acted illegally, dishonestly, with bias and deceit in its disposition of the TMI-2 case. As of February 21, 1978, Intervenors had not yet been served this final decision. On this day, Intervenors' representative was informed by the Pennsylvania Department of Environmental Resources that the Applicant had completed fuel loading and initial criticality was anticipated by March 1, 1978. A second telegram requesting stay of the license was dispatched to the NRC February 22, 1978.

The Petitioners in this appeal therefore plead that the urgency for an immediate temporary restraining order is extraordinary and cannot be fully conveyed in words. The purpose of this pleading is

not to obtain a determination of the legality of the Commission's actions but rather to be granted a stay of the final decision so as not to permit the irreparable injury to the Intervenors and the general public that will result from the initial criticality in the TMI-2 reactor and from continuing operation of the plant thereafter, which would only create an expanding inventory of radioactive wastes.

Attachments which demonstrate that Petitioners have throughout the TMI-2 proceeding submitted lengthy, thorough, and timely filings in support of their arguments are appended to this brief. As quickly as is physically possible, Petitioners will supplement these attachments by filing with the Clerk of this Court an Appendix of further documentation from the record below. The attachments accompanying this brief discuss the background of the TMI-2 proceeding and the basis for Petitioners' view that the issuance of a TMI-2 operating license by the Commission is illegal. Included with these attachments is a technical affidavit on radioactivity, the nuclear fuel cycle, and a concise discussion of the irreparable injury which Petitioners, their descendants, and members of the public generally will suffer unless this Court acts immediately and issues the emergency injunctive relief requested.

ARGUMENT

I. SUMMARY OF THE EXTRAORDINARY CIRCUMSTANCES WHICH REQUIRE IMMEDIATE EMERGENCY INJUNCTIVE RELIEF.

Despite Petitioners' continued timely filing of appeals to the Commission for stay and reversal of the Initial Decision, and the fact that many of these appeals were still pending, the Commission issued a full power operating license to the Applicant on February 8, 1978. Even though the Intervenors had been a full and participating party to this proceeding for almost four years, and had even filed a timely appeal to the Commission for a stay of the Initial Decision on February 9, 1978, the Intervenors were not served a copy of this operating license by the Commission. The Intervenors learned of the issuance of the license only when a newspaper reporter asked for comments on the issuance on February 13, 1978. On February 17, 1978, the Intervenors sent a telegram to the Secretary of the Commission citing the non-service of this decision which is the culmination of the case. A letter was sent to the Chairman and to the other three Commissioners of the Commission on February 18, 1978, objecting to the withholding of service of this license and requesting that the operating license be stayed immediately. Since the license had not been received by February 22, 1978, a full two weeks after issuance, and since a telephone conversation with Mr. Thomas Gerusky, Director of the Bureau of Radiological Health of the Commonwealth of Pennsylvania revealed that fuel had already been loaded into TMI-2, and the initiation of fission operations, or criticality could occur as early as March 1, 1978, another

telegram was sent to the Secretary of the Commission. In this third request for a document to which the Intervenors were legally due timely service, an immediate stay of the license was again requested to prevent irreparable injury to the Intervenors.

When this non-service of the operating license is combined with the obvious bias against the Intervenors shown by Licensing and Appeal Boards in all previous actions, it becomes clear that the withholding of service of this license from the Intervenors has been a deliberate and intentional action by the Commission. The result desired was to stall for time for a few days so fuel could be loaded and the plant subsequently made radioactive prior to any evaluation of any of the Intervenors' very strong case against allowing this plant to ever operate. These actions serve to illustrate the finality of this operating license as an order of the Commission. These actions also illustrate the length to which the Commission will go in an effort to illegally deprive the Intervenors of a fair review of their case and to illegally expedite the occurrence of irreparable and irreversible damage to the Intervenors and to members of the public generally. The Intervenors therefore turn to this Court as the only remaining source of relief.

The issuance of the TMI-2 operating license can be compared to the release of a guillotine blade; time is short and subsequent appeals to the executioner for mercy may tend to be fruitless.

The unfortunate urgency of the moment is solely attributable to the Commission's incredible and prejudicial failure to notify Petitioners of its issuance of the operating license on February 8, 1978. This

failure to notify Petitioners was reckless and negligent in the extreme. Under the circumstances of the agency's continued refusal to reply to Petitioners' requests subsequent to the issuance of the license, and in view of the obvious bias which has permeated the entire TMI-2 proceeding, it is difficult to believe that the agency's failure to contact Petitioners is not intentional, malevolent, and motivated by a fear that Petitioners' arguments on the merits necessitate the immediate shutting down of operations at TMI-2.

The Commission is not authorized to cause irreparable injury and thereby preclude truly effective judicial relief in this manner. Under the U.S. Constitution, only Congress, and not the Nuclear Regulatory Commission, is empowered to restrict the jurisdiction of the federal courts. See Article Three of the U.S. Constitution. The Commission's abysmal withholding of knowledge of the February 8, 1978, licensing action is also illegal because it was and is motivated by extreme and patent disregard for the agency's statutory obligations, and because it had the effect of denying Petitioners their constitutional rights to due process and equal protection.

II. THE LEGAL REASONS WHY THIS COURT SHOULD EXERCISE ITS POWER TO ISSUE EMERGENCY INJUNCTIVE RELIEF.

In Virginia Petroleum Jobbers Association v. FPC, 259 F. 2d 921, at 925 (D.C. Cir. 1958), this Court has ruled that four factors must be considered to determine whether an injunction to stay agency action is required. Under this test, plaintiffs requesting injunctive relief must show that they have a substantial likelihood of prevailing on the merits, that irreparable injury would result from judicial inaction, that the inequities to the defendant which would disfavor the granting of an injunction are not excessive, and that the public interest favors the granting of injunctive relief.

The urgency of the need for injunctive relief in the case of TMI-2 has not permitted a complete briefing on each of the issues which merit the granting of the relief requested. Therefore, and in order to show that they have fully met each of the four tests of Virginia Petroleum, Petitioners refer this Court to the arguments made in the attached "Intervenors' Appeal to the Commission for a Stay of the Initial Decision," dated February 8, 1978. Pages 1-8 summarize the specific arguments which Petitioners have made and which will, they believe, demonstrate a substantial likelihood of success on the merits. Furthermore, subsections which follow this portion of section II of the brief before this Court provide a helpful index to the attached brief of January 30, 1978, which includes a more complete discussion of the legal support and factual support in the record for Petitioners' arguments on the merits.

Page 8 of the attached Appeal to the Commission of February 8, 1978, explains how irreparable injury to Petitioners, to their descendants, and to the public at large will occur unless injunctive relief is immediately forthcoming. The two sources of impending irreparable injury concern radon-222 emissions from the mill tailings piles attributable to TMI-2, and the fact that initiation of fission at TMI-2 will transform the plant itself into a heap of radioactive waste. The severity of both of these problems is related to the time and power level with which the reactor operates over time. However, unless judicial relief is available immediately and precedes initiation of a sustained chain reaction within TMI-2, the plant itself will become irretrievably and permanently radioactive. See the attached technical affidavit. Also see the discussion of irreparable harm in section III of this brief below. Also see the attached Intervenors' brief of January 30, 1978, primarily at 45-48, but also at 24-45.

Pages 9-10 of the attached Appeal to the Commission of February 8, 1978, discuss why the inequities to the Applicant (the prospective licensee) are minimal or non-existent and therefore do not justify the denial of the requested injunctive relief, and also discuss why the public interest requires issuance by this Court of the relief requested. There are no inequities to the agency itself resulting from a grant of injunctive relief.

Petitioners submit that this brief and the attachments which accompany it constitute a strong showing that the granting of the license may be declared illegal upon full judicial review on the merits. It is only necessary to prevail upon a single legal argument of reversible

error in order to succeed on the merits. However, Petitioners also believe that it is virtually certain that the granting of the TMI-2 operating license will be declared illegal by the reviewing courts.

This raises the question of the degree of likelihood of prevailing on the merits which Petitioners must show to obtain the immediate emergency injunctive relief which this brief requests. The extreme inequities and enormous magnitude of the irreparable injury which would occur if injunctive relief is erroneously denied dictate a relaxation of the need for Petitioners to demonstrate a certainty of ultimate success. One court has ruled that where there is a liklihood of irreparable injury (as in the present circumstances), a lesser standard may be imposed than probability of success on the merits. Home Products Corporation v. Finch, 303 F. Supp. 448, at 456 (D.C. Del. 1969)(relying on Virginia Petroleum to support this lowering of plaintiff's burden of proof).

A violation of NEPA in itself may constitute a sufficient demonstration of irreparable harm to justify injunctive relief. EDF v. TVA, 468 F. 2d 1164, at 1184 (6th Cir. 1972). Among other reasons, an immediate injunction is needed in the case of TMI-2 in order to implement the Congressional policy embodied in NEPA. Also see John D. Leshy, Interlocutory Relief in Environmental Cases, 6 Ecology Law Quarterly 639, at 659-661 (1977); and Sierra Club v. Froehlke, 359 F. Supp. 1289, at 1334-1335 (S.C. Texas 1973).

Petitioners wish to reiterate that they believe there is no doubt that the issuance of a TMI-2 operating license is illegal and will be reversed upon review on the merits. The purpose of this brief is to

obtain emergency and more permanent injunctive relief, and not primarily to persuade this Court of Petitioners' likelihood of ultimately prevailing on the merits. However, in order to make a more definitive showing of such likelihood, as required under the fourfold Virginia Petroleum test, the following subsections of Section II of this brief demonstrate that the agency has plainly abused its discretion.

A. THE LACK OF A FINAL IMPACT STATEMENT

One of the many reasons that the initial decision of December 19, 1977, and the licensing action of February 8, 1978, are illegal and will be reversed upon review on the merits is that they constitute major federal actions significantly affecting the environment, yet they were taken prior to completion of the final environmental impact statement required under NEPA.

Staff Witness Gotchy's prepared testimony on the comparative health effects of the coal and nuclear fuel cycles was introduced in the TMI-2 proceeding because of the Staff opinion that such a supplement to the Final Supplement to the Final Environmental Statement was required by NEPA (tr. 2096-7). The prepared Gotchy testimony was submitted to other federal agencies on September 29, 1977, for comment, and the final version of the testimony, containing reasoned responses to agency and public criticism, has not yet been issued. Meanwhile, an initial decision was issued on December 19, 1977, and an operating license was granted on February 8, 1978. Both Initial Decision and granting of a license are legally premature because NEPA requires that a final environmental impact statement be available to agency and outside

decisionmakers before the Agency takes any major federal action. See attached Brief of January 30, 1978, at 33, 40, 42-43, and 51-55.

A detailed statement of environmental impacts and alternatives must be written, circulated, and recirculated in final form in order to comply with NEPA. Council on Environmental Quality regulation 40 CFR Sec. 1500.11(b) states:

> To the maximum extent practicable no administrative action subject to section 102(2)(C) is to be taken sooner than ninety (90) days after a draft environmental statement has been circulated for comment, furnished to the Council and, except where advance public disclosure will result in significantly increased costs of procurement to the Government, made available to the public pursuant to these guidelines; neither should such administrative action be taken sooner than thirty (30) days after the final text of an environmental statement (together with comments) has been made available to the Council, commenting agencies, and the public. In all cases, agencies should allot a sufficient review period for the final statement so as to comply with the statutory requirement that the "statement and the comments and the views of appropriate Federal, State, and local agencies * * * accompany the proposal through the existing agency review processes." (Emphasis added)

The U.S. Supreme Court has supported this view that a final impact statement must accompany the licensing proposal through the existing agency review processes. In Aberdeen & Rockfish Railroad Company v. SCRAP, 422 U.S. 289, at 320 (1975), the Court stated:

> NEPA provides that "such statement . . . shall accompany the proposal through the existing agency review processes" (emphasis added). . . . The "statement" referred to is the one required to be included "in every recommendation or report on proposals for . . . major Federal actions significantly affecting the quality of the

> human environment" and is apparently the final impact statement, for no other kind of statement is mentioned in the statute. Under this sentence of the statute, the time at which the agency must prepare the final "statement" is the time at which it makes a recommendation or report on a proposal for federal action. Where an agency initiates federal action by publishing a proposal and then holding hearings on the proposal, the statute would appear to require an impact statement to be included in the proposal and to be considered at the hearing. (emphasis supplied in the Supreme Court opinion)

The final statement must be written and available for comment before major federal action is taken. In Greene County Planning Board v. FPC, 455 F. 2d 412, at 421 (2nd Cir. 1972), the court stated that this requirement is necessary because there is a "danger that the review process will bog down once an initial decision has been rendered." The Greene decision also determined that the agency cannot legally bypass its NEPA obligations by arguing that Staff testimony or the agency final adjudicatory opinion constitute compliance with the Section 102(2)(c) impact statement required under NEPA, id. at 420-421:

> Intervenors generally have limited resources, both in terms of money and technical expertise, and thus may not be able to provide an effective analysis of environmental factors. It was in part for this reason that Congress has compelled agencies to seek the aid of all available expertise and formulate their own position early in the review process. The Commission argues, however, that written testimony of its staff demonstrates that the Commission has not left the applicant and the intervenors to develop the record. It insists that its staff has undertaken field research in an effort to investigate alternatives proposed by PASNY and also any additional feasible alternatives. It is clear to us that this testimony cannot replace a single coherent and comprehensive environmental analysis, which is itself subject to scrutiny during the agency review processes. If this

> course of action we approve were not followed, alternatives might be lost as the applicant's statement tended to produce a status quo syndrome.

Furthermore, in the case of TMI-2, Gotchy's original prepared testimony cannot in good faith serve as the required Supplement to the Final Environmental Statement in view of the mill tailings problems uncovered during the TMI-2 proceeding, in view of Gotchy's own admissions under cross-examination of the incompleteness of his prepared testimony, and in view of the Kepford testimony, the Jordan memorandum, and the Staff "Appendix" of January 20, 1978. See the attached Brief of January 30, 1978, at 24-46.

In NRDC v. Morton, 337 F. Supp. 165, at 172 (D.D.C. 1972), an addendum prepared by the agency to remedy deficiencies in a previous final impact statement was not considered part of the required final environmental impact statement because it had not been subjected to the same comment and review procedures required of the original final impact statement. As in TMI-2 with respect to the Gotchy addendum, the Morton final impact statement had not contained the addendum when it was first circulated. This court should defer to the agency's own decision that a supplement on comparative health effects was necessary to comply with NEPA (tr. 2096-7), but should insist that this required supplemental statement be adequate and be issued in final form prior to the granting of an operating license by the agency. The initial decision and the licensing action are therefore illegal because they should have been deferred until a coherent and complete final impact statement was available to agency decisionmakers for consideration and to the public for comment.

The agency is required to formulate its final NEPA statement before taking a major federal action. In this way and also throughout the TMI-2 proceeding, the Commission has stubbornly resisted complying with NEPA and its other statutory obligations. Because of the irreparable injury which allowing initiation of fission in TMI-2 will cause, each of the many illegalities committed by the Staff, Applicant, Licensing Board, and Appeal Board constitute a sufficient and independent ground for immediate injunctive relief by this Court. As Mr. Justice Marshall stated as Circuit Justice in New York v. Kleppe, 50 Lawyers' Edition 2d 38, 42 (1976)(citing cases):

> It is axiomatic that if the Government, without preparing an adequate impact statement, were to make an "irreversible commitment of resources" . . . a citizen's right to have environmental factors taken into account by the decisionmaker would be irreparably impaired. For this reason, the lower courts repeatedly have enjoined the Government from making such resource commitments without first preparing adequate impact statements.

Petitioners believe that they will ultimately prevail on the merits. Irreparable injury would occur if immediate injunctive relief is not forthcoming and, as explained above, the other tests of Virginia Petroleum have been met.

This brief is concerned only with demonstrating that injunctive relief should issue immediately and should remain in effect until completion of all administrative and judicial procedures for review of the illegal licensing decision on its merits. To assist this Court in evaluating the likelihood that the licensing action will be reversed upon administrative judicial review on the merits, there follows a

short synopsis of the other major legal defects of the Commission decision to license TMI-2. The Court is urged to read carefully the attached 57-page brief of January 30, 1978 because that brief amounts to a relatively complete exegesis of Petitioners' concerns and arguments in the matter of TMI-2.

B. AIRCRAFT IMPACT

TMI-2 is located near an airport. The largest aircraft in the world, the Lockheed C-5A, flies in and out of this airport on almost a daily basis (tr. 557, 618). Staff and Applicant witnesses admitted that their aircraft impact models produced unquestionable numbers of unknown accuracy and doubtful applicability. These numbers were obtained from unverifiable mathematical models. The Board conveniently decided on the basis of these admittedly unreliable numbers that the probability of large aircraft crashing into Three Mile Island Unit 2 need not be seriously considered in the licensing action. However, risk is a product of probability and consequences. No discussion of actual consequences to the public of a large aircraft crash into Unit 2 was allowed on the record. Nor was testimony on consequences to the reactor of such a crash required by the Board. As a result, the risk to the public of the crashing of a large aircraft into TMI-2 is unknown. See Brief of January 30, 1978, pages 1-7.

C. CONCEALMENT OF INFORMATION

Two parties to this proceeding, the Commonwealth of Pennsylvania and the Applicant, withheld vital information from the other parties

and the Board. This information, made available to the Intervenors in January, 1978, would have established that the Bureau of Radiological Health of the Commonwealth of Pennsylvania could not respond acceptably to a nuclear emergency. The Bureau is the lead agency of the Commonwealth upon which the Nuclear Regulatory Commission depends to provide emergency response assistance. See Brief of January 30, 1978, pages 10 and 11.

D. INADEQUATE RADIOLOGICAL EMERGENCY EVACUATION PREPAREDNESS

The witnesses for the Commonwealth who would be involved with a radiological emergency admitted no knowledge or understanding of radiation, radiation injury, or maximum allowable radiation doses to their volunteer evacuation personnel. These witnesses had no experience with any kind of radiation emergency. Yet the Board wholly accepted the bland assurances of these witnesses that all radiation emergencies could be handled in a proper and an orderly manner, adequate to protect the public health and safety. See Brief of January 30, 1978, pages 8-10.

E. ILLEGAL DELEGATION TO THE APPLICANT OF RESPONSIBILITY TO PROTECT THE PUBLIC HEALTH AND SAFETY

The practice of the Commission of requiring the Applicant to be the sole source of information regarding radioactive releases in the event of an accident and subsequent radiation exposures to members of the public jeopardizes the ability of members of the public to sue for damages under Section 170 of the Atomic Energy Act of 1954, as amended. The Commission has illegally delegated these monitoring responsibilities to the Applicant. Section 190 of the Atomic Energy Act prevents the use in court as evidence against the licensee (the Applicant)

of any report required to be submitted by the licensee to the Commission as a result of any accident. See Brief of January 30, 1978, pages 13-17.

F. DENIAL OF RIGHT TO INTRODUCE EVIDENCE

The Board denied the Intervenors the opportunity to introduce documents into the record, in violation of the Commission's own rule, 10 CFR 2.743(a), which guarantees to every party the right to introduce documentary evidence. See Brief of January 30, 1978, page 18.

G. FINANCIAL ASSISTANCE

The Commission practice of denying financial assistance to Intervenors places a burden upon the Intervenors not borne by any other party to this proceeding. Due to previous participation in Commission proceedings, these Intervenors entered this proceeding deeply in debt. The Intervenors' rights under the Commission's own rules, 10 CFR 2.743(a), to present oral and rebuttal evidence were denied. The Intervenors' Constitutional rights to due process and equal protection were also denied by this practice. See Brief of January 30, 1978, pages 18-20.

H. BURDEN OF PROOF

In this proceeding, the Board used the issuance of a patently illegal decision to shift the "burden of proof" from the Applicant to the Intervenors. As a result, it became necessary for the Intervenors to take up this "burden of proof" to protect their rights and to prevent TMI-2 from being licensed illegally and from becoming radioactive. See Brief of January 30, 1978, pages 21-23.

Another significant way in which the Appeal Board in ALAB-456 shifted the burden of proof to the Intervenors was by ruling that the regulations of the Commission prohibited the consideration of any evidence that is contrary to the Applicant's interest in obtaining a license to operate TMI-2, regardless of the consequences to the public. Petitioners submit that the Commission's obligation to protect the health and safety of the public as required by the Atomic Energy Act and Energy Reorganization Act and to comply with NEPA requires that the Commission consider fully and in good faith all information submitted to it, even that which would undermine its pro-nuclear predisposition and its obvious bias toward the Applicant's proposal. See Brief of January 30, 1978, pages 48-52.

I. IMPROPER USE OF MODELING TO MINIMIZE RISKS TO THE PUBLIC THAT SHOULD BE CONSIDERED

The prepared testimony of Staff Witness Dr. R.L. Gotchy on the comparative health effects (a euphemism for premature death by cancer or leukemia) of the coal and nuclear fuel cycles was shown to seriously and intentionally underestimate the effects of radiation on humans. This underestimation of the cancer risk came as a result of the use of a cancer risk estimation model which underestimates the cancer risk by a factor of about seven (7) and by ignoring the recent revelations in the scientific literature showing that low doses and low dose rates of radiation are 20 to 50 times more dangerous than had been believed previously. In addition, the testimony totally ignored the health effects caused by all of the long-lived radioactive products released to the environment as a direct result of the operation of a nuclear reactor. This latter feat is accomplished by the use of a 50-year

dose commitment model which only calculates the health effects caused by one year's release of radioactive effluents to the environment for the ensuing 50 years . The use of this dose commitment model conceals the true nature and magnitude of the health effects of the many radioactive poisons with half-lives far exceeding 50 years. See Brief of January 30, 1978, pages 27-29, 32-36.

J. RADON EMISSIONS CONSIDERED IN GOTCHY'S PREPARED TESTIMONY

Staff Witness Gotchy found that the operation of a nuclear reactor would cause the death of about one person every two years. A small portion of this level of health effects was attributable by Witness Gotchy to radon-222. He used a release value of 74.5 curies of radon-222 as a result of the uranium milling process attributed by the Commission's rules to the operation of a reactor for one year. See Brief of January 30, 1978, page 28.

K. KEPFORD'S TESTIMONY ON RADON EMISSIONS

In marked contrast, the Intervenors' Witness, Dr. Chauncey Kepford, showed that, in reality, over time the appropriate quantity of radon-222 attributable to just one year's operation of TMI-2 was <u>trillions</u> of curies. See Brief of January 30, 1978, page 24.

During the cross-examination of Staff Witness Gotchy by Dr. Kepford, Witness Gotchy fully and openly corroborated the correctness of the duration and magnitude of the radon-222 releases calculated by Kepford. In addition, the memorandum prepared by a technical member of the Commission, Dr. Walter Jordan, and served upon the parties on November 30, 1977,

pointed out that the 74.5 curie number was too low by a factor of 100,000. The Jordan memorandum only considered a small but significant portion of the radon emissions attributable to the operation of a commercial nuclear reactor for one year.

L. STAFF AND APPLICANT DID NOT DISCREDIT THE KEPFORD FINDINGS

The arguments of the Staff and Applicant advanced to discredit the Kepford testimony and relied upon by the Licensing Board have not been supported by any discussion of the relevance of those arguments. The Intervenors have shown conclusively that all of these arguments advanced by the Applicant, Staff, and Licensing Board are without merit. See Brief of January 30, 1978, pages 25-32.

M. COMMISSION CONCEALMENT OF THE RADON PROBLEM

The Applicant and Staff objected to the admission of the Kepford testimony into evidence alleging that the testimony was an attack on the Commission's rules. If their position is correct, then the Commission has yet to explain why it has used its rules simultaneously to deny the existence of the radioactive decay of thorium-230 and uranium-238 as producers of radon-222 and to conceal by far the largest single source of radioactive emissions in the entire nuclear fuel cycle. See Brief of January 30, 1978, pages 33-41.

N. DEFECTIVE COST-BENEFIT ANALYSIS

By ignoring all substantial environmental costs, like the enormous magnitude of the long-term health effects directly attributable to the

operation of this plant, the Licensing Board, Appeal Board, and Commission have abrogated their responsibilities under NEPA and the Atomic Energy Act of 1954. NEPA orders Federal agencies to consider environmental effects "to the fullest extent possible." The Atomic Energy Act of 1954 requires that the Commission protect "the health and safety of the public." Refusing to even acknowledge the existence of long-term environmental effects, the agency has relied instead upon a seriously defective cost-benefit analysis. See Brief of January 30, 1978, pages 35-36.

O. STAFF "APPENDIX" ON RADON EMISSIONS

An attempt was made by the Staff to correct the glaring omission of the long-term health effects of the nuclear fuel cycle in the prepared testimony of Staff Witness Gotchy and also to respond to the memorandum of Dr. Walter Jordan. The result was the Staff "Appendix" of January 20, 1978. This document further illustrated the refusal of the Staff to consider the long-term health effects caused by radon-222. Here, the Staff assumed the mill tailings piles would be covered with up to 20 feet of dirt to reduce radon emissions. However, the Staff "Appendix" also conceded that such covering is only a short-term expedient, since the solution is designed to fail. See Brief of January 30, 1978, pages 36-39.

P. FURTHER DISCUSSION OF THE COMMISSION'S STATUTORY VIOLATIONS

A more complete discussion of the various violations of the law by the Staff and Licensing Board appears in pages 42-57 of the Brief

of January 30, 1978. Basically, the decision to license TMI-2 and the Initial Decision of December 19, 1977, are bold-faced violations of the Commission's statutory obligations and of the Commission's rules and regulations. The licensing of TMI-2 does not adequately or credibly protect the health and safety of the public, as the Commission is required to do under Sections 2(d), 2(e) and 3(d) of the Atomic Energy Act of 1954, as amended, particularly in view of the provisions of the Energy Reorganization Act of 1974 (which requires separation of the promotional from the regulatory aspects of governmental regulation of the nuclear) and of NEPA (as interpreted in Calvert Cliffs' Coordinating Committee v. USAEC 449 F. 2d 1109, D.C. Cir. 1971, and related and subsequent judicial decisions).

Q. COST OF DECOMMISSIONING

Petitioners note that the Skinner reference cited on page 4 of their February 8, 1978, Appeal to the Commission for a Stay, appended as an Attachment, provides an independent calculation of the costs of decommissioning a large nuclear reactor at the end of its operational life. Skinner concludes that between 74 per cent and 241 per cent of the costs of initial construction of the plant will be required to fully decommission such a plant. The TMI 2 facility costs of decommissioning would be similar to these large costs.

III. THIS COURT IS THE APPROPRIATE FORUM FOR THE RELIEF REQUESTED.

Under 28 USC Sec. 2342(4):

> The court of appeals has exclusive jurisdiction to enjoin, set aside, suspend (in whole or in part), or to determine the validity of:
>
> (4) all final orders of the Atomic Energy Commission made reviewable by section 2239 of title 42 . . . (emphasis added)

The licensing responsibilities of the former Atomic Energy Commission were transferred to the Nuclear Regulatory Commission under the Energy Reorganization Act. Thus, this Court has exclusive jurisdiction "to enjoin, set aside, or suspend" all final orders issued by the NRC. Under 42 USC Sec. 2239(b), any final order in a proceeding for the issuance of an operating license to a commercial nuclear reactor is reviewable under 28 USC Sec. 2342(4).

It therefore becomes incumbent upon Petitioners to show that the granting of an operating license to TMI-2 by the NRC is a "final order" of the Commission. An operating license authorizes the Applicant to initiate fission within the reactor, the crucial event which transforms the reactor irrevocably into a pile of radioactive waste in need of decommissioning at some future time. There is nothing more final in the life of a reactor than the onset of fission, which has been authorized for TMI-2 by the granting of an operating license.

Petitioners have already requested a stay of the Licensing

Board's Initial Decision of December 19, 1977, by appealing for relief to the Atomic Safety and Licensing Appeal Board Panel, pursuant to 10 CFR 2.788 (42 Federal Register 22130, of May 2, 1977). This request for a stay of the Initial Decision was rejected in ALAB-456, which is a superficial treatment of Petitioners' request that provided little or no indication that the Appeal Board either read or understood Petitioners' filings or its statutory responsibilities under the Atomic Energy Act, NEPA, and the Energy Reorganization Act. The Appeal Board decision was also illegal because it failed to disclose its reasoning, if any.[1] From ALAB-456, Petitioners appealed to the Commission itself for a stay of the Initial Decision as authorized by 10 CFR 2.788. Meanwhile, an operating license was issued, and the Commission has not acted on the request for a stay of the Initial Decision.

There remains the possibility that Petitioners' appeal to the Commission itself requesting a stay of the Initial Decision will succeed, and that there then would not have been a need for immediate injunctive relief from this Court. However, Petitioners are unable to rely upon this internal agency review procedure because an operating license has

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[1] The APA generally requires that a reasoned and articulated justification accompany agency decisions, and, further, 5 USC Sec. 557(c) of the APA requires that such justifications address each contention presented before the Appeal Board. See Intervenors' Brief of January 30, 1978, at 55-57. Even with regard to the health impacts of radon-222, the only issue which the Appeal Board deigned to address, ALAB-456 ignores many of Petitioners' contentions (e.g., the question of the Staff's legal violations) and addresses other of their contentions only indirectly (e.g., the evidence on the record that radon-222 constitutes a long-term problem).

been granted. The Commission may reject request for stay of the Initial Decision, and even if it grants a stay irreparable injury would have occurred if the granting of a stay does not precede the initiation of a fission reaction. Petitioners have pursued all of their administrative remedies but are threatened with imminent and irreparable harm.

Under these circumstances, the agency's decision to grant an operating license, notwithstanding that Petitioners were still entitled to request and did in fact request a stay from the Commission, is the equivalent of a final administrative determination reviewable under 28 USC Sec. 2342(4) in this Court. The existence of further administrative proceedings which could result in the granting of a stay or the revocation of the license by the Commission does not make the issuance of the license any less a final agency action and an impending source of irreparable harm. Compare EDF v. Hardin, 428 F. 2d 1093, at 1099 (D.C. Cir. 1970):

> But when administrative inaction has precisely the same impact on the rights of the parties as denial of relief, an agency cannot preclude judicial review by casting its decision in the form of inaction rather than in the form of an order denying relief.

In Greene County Planning Board v. FPC, 455 F. 2d 412, at 417 (2nd Cir. 1972), plaintiffs had moved that the FPC vacate a license which had already been granted until the agency fully complied with NEPA. The Circuit Court accepted jurisdiction of the case even though construction of the project was more than 80% complete, id. at 418, and administrative review of closely related

licensing proposals was still in progress. As in this situation, immediate judicial review was essential to ensure compliance with NEPA, id. at 422-423:

> We can only add our voice to that of the District of Columbia Circuit in Calvert Cliffs': Delay is a concomitant of the implementation of the procedures prescribed by NEPA, and the spectre of a power crisis may not be used to create a blackout of environmental consideration in the agency review process . . . It is far more consistent with the purposes of the Act to delay operation at a stage where real environmental protection may come about than at a stage where corrective action may be so costly as to be impossible.

Compare Lathan v. Volpe, 455 F. 2d 1111, at 1117 (9th Cir. 1971):

> In short, this is one of those comparatively rare cases in which, unless the plaintiffs receive now whatever relief they are entitled to, there is danger that it will be of little or no value to them or anybody else when finally obtained. (Emphasis in the Lathan opinion).

Immediate action by this Court is also necessary to prevent the protracted delays which undoubtedly will result, in determining the merits of Petitioners' claims at the agency level, if TMI-2 is allowed to become radioactive. Such immediate action is necessary to breathe life into the statutory framework which Congress has enacted. As stated by the U.S. Supreme Court in Flint Ridge Development Company v. Scenic Rivers Association of Oklahoma, 426 U.S. 776, at 787 (1976):

> NEPA's instruction that all federal agencies comply with the impact statement requirement -- and with all other requirements of Sec. 102 -- "to the fullest extent possible," 42 USC Sec. 4332, is neither accidental nor hyperbolic. Rather, the phrase is a

> deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle.

The granting of a license is a final agency order because it authorizes irreparable harm. The granting of a license exudes finality because it causes irreversible harm and constitutes a formal agency action issued at the termination of an agency proceeding. The current status quo will inflict injury that is certain, substantial, and irremediable. A temporary restraining order and preliminary injunction must be issued by this Court to reinstate and maintain the previous status quo pending a final review on the merits in the agency and in the courts.

This Court must nullify and void the license, pending completion of agency and judicial review of the licensing action on its merits, to prevent the Applicant from proceeding with the threatened injurious action. A judicial stay may be granted prior to exhaustion of all administrative procedures where necessary to prevent irreparable injury. Aircraft & Diesel Equipment Corporation v. Hirsch, 331 U.S. 752, at 773-774 (1947); Scripps-Howard Radio v. FCC, 316 U.S. 4, at 10-11 (1942); Note, Interim Relief and Exhaustion of Administrative Remedies: A Study in Judicial Confusion, 1973 Duke Law Journal 275-300. Petitioners are not seeking to have this Court interfere with or disrupt or enjoin the administrative review proceedings, but wish to assist and expedite completion of the agency review process. Injunctive relief to stay the operating license will protect the administrative flexibility. This flexibility is necessary to prevent

the ill-conceived decision to grant a license prematurely from causing irreparable injury and precluding achievement of a contrary result by the internal agency or judicial review procedures. Compare Standard v. Olesen, 74 Sup. Ct. 768 (Mr. Justice Douglas, Circuit Justice, 1954)("I am not asked to interfere with the agency proceeding . . ."). If this Court denies injunctive relief today, there is no likelihood that Petitioners' continuing resort to the administrative review or subsequent judicial review procedures will avert irreparable injury. Thus, the agency has acted with sufficient finality to permit the granting of a stay by this Court.

In Thermal Ecology Must Be Preserved v. AEC, 433 F. 2d 524 (D.C. Cir. 1970), an AEC order preventing admission of evidence on thermal pollution effects was not a "final" order because it could be reversed by the agency before a final order authorizing a license was issued. By contrast, here the license has been issued, and immediate and irreparable harm is probable unless this Court stays the issuance of the license and restrains the Applicant from iniating fission within the reactor. The public interest favors a final determination via review in the agency and the courts on the merits before a major and irreversible action has been taken.

In NRDC v. USNRC, 539 F. 2d 824, at 836-838 (2nd Cir. 1976), the court said that an agency order is final if the issues and record are well-focused, the impact of judicial inaction is immediate and significant, and judicial involvement will not disrupt orderly agency processes of adjudication. Under this test, the issuance of an operating license to TMI-2 is a final order of the NRC. An extensive evidentiary record and a series of lengthy and timely

filings by Petitioners before the agency have focused the issues in this case. See the Appendix in this case. The immediate consequences of judicial inaction are the significant and irreparable damage which Petitioners, their descendants who will reside near the TMI-2 site, and members of the public generally will suffer. The issuance of a temporary restraining order and a preliminary injunction by this court to nullify the operating license will assist, and will not disrupt, the processes of agency review. The impending harm which occurs once fission has been initiated will not wait for the independent completion of agency and judicial review on the merits. Furthermore, if fission is allowed to occur, the agency in its review would be further motivated to cover-up and conceal the deficiencies of the initial decision to prevent the embarrassment of an admission of an irreversible error of major magnitude. In order to prevent irreparable injury and remove further incentives towards agency bias, the issuance of a license must be viewed as a final agency order and stayed by this Court.

Furthermore, Petitioners submit that the issuance of a license is a final agency order because it is equivalent to an agency denial of the request for a stay submitted by Petitioners to the Commission itself under 10 CFR 2.788. If agency review of Petitioners' request for a stay was not in fact completed, why did the agency issue the license? A denial of a stay by the agency is a final order reviewable under 28 USC 2342(4) by this Court. Once the agency has completed review of the request for a stay and thereby authorizes irreparable injury, this Court may review the agency decision because the agency

has, in effect, issued its final order. Even if the Commission itself now decided to nullify the license pending internal agency review on the merits, a temporary restraining order and preliminary injunction issued by this Court would not disrupt the agency review process since it would at worst be superfluous and redundant of a decision by the agency to stay the Initial Decision. Petitioners also submit that the emergency relief requested may be issued on the basis of a review of issues that are predominatly legal, rather than factual, in character, because there was no dispute of the facts of this case. Resolution of legal issues is within the expertise of this Court, and further resort to the agency process will not, and is not needed to, lend additional focus to the necessity for immediate injunctive relief.

Since a final agency order has, in effect, been issued, stay orders and injunctive relief to restore the previous status quo which the license has disrupted, may be issued by this Court under 28 USC Sec. 2349, 5 USC Sec. 705, and Federal Rule of Appellate Procedure 18.

Under 28 USC Sec. 2349(b), this Court may issue interlocutory injunction to restrain and suspend the authority of the TMI-2 operating license "pending the final hearing and determination" of the merits of a petition for review. Petitioners have submitted, together with the filing of this brief, a petition to review the issuance of the operating license. This petition does not seek to upset the licensing action on its merits because the agency has not yet addressed Petitioners' appeal to the agency to reverse the Initial Decision on its merits.

However, this petition to review does seek fully to reinstate the previous status quo, by nullifying and staying the license, and by enjoining the initiation of fission, until all available review on the merits, in the agency and in the courts, has been completed. Only by such relief can this Court prevent irreparable injury until the legality of the licensing action has been resolved.

If this Court were to stay the license pending completion of agency review alone, without also staying the license until completion of any judicial review on the merits which might prove necessary, Petitioners would later find themselves again in the very predicament they face today. With the fuel already loaded, and especially considering the possibility that the agency would again wish to foreclose access to the courts by failing to notify Petitioners of its final disposition on its merits, there is little doubt that fission would be initiated before a judicial order for emergency injunctive relief sought by Petitioners should remain in effect until Petitioners have had the opportunity to exhaust all of their available administrative and judicial remedies. Petitioners also recommend that this Court order removal of the fuel from the reactor core pending such final agency and judicial review on the merits. Petitioners also request that this Court retain jurisdiction over the operational status of TMI-2, in case judicial review on the merits of the legality of any agency decision to authorize, or to uphold the authorization of, the granting of an operating license to TMI-2, becomes necessary.

The initiation of fission and the irreparable injury which would thereby result are imminent. At this late date even a single day's

delay of emergency injunctive relief could cause irrevocable and substantial injury.

28 USC Sec. 2349(b) authorizes this Court to suspend the effectiveness of the operating license on an emergency basis if the five days' notice required for a hearing for interlocutory injunctive relief of a final agency decision will not prevent irreparable injury:

> When the petitioner makes application for an interlocutory injunction restraining or suspending the enforcement, operation, or execution of, or setting aside, in whole or in part, any order reviewable under this chapter, at least 5 days' notice of the hearing thereon shall be given to the agency and to the Attorney General. In a case in which irreparable damage would otherwise result to the petitioner, the court of appeals may, on hearing, after reasonable notice to the agency and to the Attorney General, order a temporary stay or suspension, in whole or in part, of the operation of the order of the agency for not more than 60 days from the date of the order pending the hearing on the application for the interlocutory injunction . . . (emphasis added)

The statute thus authorizes this Court to nullify and enjoin the effect of the license following "reasonable notice" to the NRC and the Attorney General, and following a "hearing" on the request for such extraordinary relief. The reasonable notice required is a period of time shorter than five days, because only five days' notice is required for issuance of the less-extraordinary relief of an interlocutory injunction. Petitioners notified the agency and counsel for the Applicant of their application for extraordinary injunctive relief by personal hand delivery of the petition for review and this brief. Such personal delivery occurred on the same day that the petition for review and this brief were hand delivered to this Court.

The statutory language "reasonable notice" must be so construed in view of the agency's extraordinary failure to notify Petitioners of the issuance of the license and in view of the magnitude of the irreparable injury which even a single day's delay in the issuance of a temporary restraining order by this Court could cause. Although mill tailings piles have already been produced in order to provide the fuel which is now being loaded at TMI-2, the total radon-222 related damage may still be mitigated by using such fuel in a nuclear facility for which an operating license has been granted and all administrative and judicial appeals have been exhausted. Furthermore, initiation of fission will transform TMI-2 irrevocably into radioactive waste. See the attached affidavit. See attached brief of January 30, 1978, at 45-48.

In determining the "reasonable notice" required under 28 USC Sec. 2349(b), it must therefore be remembered that the impending irreparable injury involved here concerns both the need to decommission TMI-2 at some future time and the premature deaths which will result from the ionizing radiation produced from the mill tailings piles. See attached affidavit. The uncontroverted testimony in the record below shows that as many as one million two hundred thousand people may die prematurely from cancer from emissions from the mill tailings produced as a result of obtaining one year's reactor fuel.[2] Immediate emergency injunctive relief is necessary because the adverse consequences of

[2] One year's reactor fuel is now loaded at TMI-2 and is on the verge of achieving criticality. See attached affidavit. Prior to initiation of fission at TMI-2, this currently loaded fuel could easily be unloaded for use in another nuclear facility, thereby mitigating the total injury to the public from mill tailings emissions attributable to TMI-2.

judicial delay are truly enormous, since the irreparable injury includes initiation of the public to continuing releases of radon-222 from mining and milling operations attributable to TMI-2, leading ultimately to the premature death from cancer of 1.2 million persons for each year of fuel used. The damage is continuing and substantial and requires immediate judicial injunctive relief. Once "criticality" of the fuel has been reached, a sustained chain reaction will have rendered the plant itself increasingly a mass of radioactive waste, in addition to the enormous, continuing, and deadly health effects produced by ionizing radiation from the mill tailings piles.

If at all possible, this Court must act quickly and prevent initiation of fission; if not, an immediate injunction must nevertheless issue to guarantee that the reactor will be immediately shut down and the further production of waste and activation products will cease, pending final resolution in the agency and the courts of the legality of the agency's hasty and surreptitious decision. A phone call enjoining operation of TMI-2 is the utmost and most immediate necessity.

One final argument in support of the authority of this Court to issue the immediate relief requested under the present circumstances will be made. The Administrative Procedure Act, 5 USC Sec. 704, states that final agency action is reviewable in court even if an appeal to superior agency authority is still pending, where the agency has not stayed the effect of its initial decision:

> Agency action made reviewable by statute and final agency action for which there is no adequate remedy in a court are subject to judicial review . . . Except as otherwise expressly required by statute, agency action otherwise final is final for the purposes of this section whether

> or not there has been presented or determined an application for a declaratory order, for any form of reconsideration, or, unless the agency otherwise requires by rules and provides that the action meanwhile is inoperative, for an appeal to superior agency authority. (Emphasis added).

The NRC regulations state that a licensing action is not inoperative during pendency of an appeal to superior agency authority. 10 CFR Sec. 2.764. Under 5 USC Sec. 704, jurisdiction for purposes of staying the NRC licensing action is therefore available.[3] Furthermore, 5 USC Sec. 705 states that courts reviewing agency action under the Administrative Procedure Act may stay agency action:

> On such conditions as may be required and to the extent necessary to prevent irreparable injury, the reviewing court . . . may issue all necessary and appropriate process to postpone the effective date of an agency action or to preserve status or rights pending conclusion of the review proceedings. (Emphasis added).

The question remaining is whether 5 USC 704 and 705 provide for review which is only available in the U.S. District Court, compare Federal Rule of Civil Procedure 65, or whether exclusive jurisdiction over such requests is at the Circuit Court level.

Petitioners submit that Congress determined that jurisdiction over requests for emergency injunctive relief of the type requested here is exclusively available in the U.S. Courts of Appeal. 28 USC Sec. 2342(4) states that the jurisdiction of this Court over final orders of the Commission is exclusive. Under 5 USC Sec. 704 and 705, injunctive relief is available in some judicial forum. If agency orders which in effect

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[3] The APA is applicable to review of the NRC action because of 42 USC Sec. 2231.

constitute a final order but which in actuality precede final agency determination of the need for a stay are not viewed as "final orders" reviewable under 28 USC Sec. 2342(4), and are therefore only reviewable in the U.S. District Court pursuant to 5 USC Sec. 704 and 705, the Congressional purpose in granting jurisdiction over final Commission orders to this Court would be defeated whenever the agency determined to act with finality before processing requests for a stay of its decision.

By placing review over final NRC orders in the U.S. Court of Appeals, 28 USC Sec. 2342(4) exhibits a preference for judicial review in this Court of the premature and illegal issuance of a TMI-2 operating license. There is no need to produce an evidentiary record of the type that could most easily be compiled at the District Court level. Furthermore, this Court has been developing expertise in the field of nuclear regulation as a consequence of the many petitions for review which have been presented to it under 28 USC Sec. 2342(4). Similarly, 5 USC Sec. 703 states that "the form of proceeding for judicial review is the special statutory review proceeding relevant to the subject matter in a court specified by statute." This Court is therefore a proper forum for granting the emergency relief which Petitioners have requested.

Petitioners note that 28 USC Sec. 2349(b) authorizes this Court to issue emergency injunctive relief "on hearing, after reasonable notice to the agency and to the Attorney General." By contrast, 5 USC Sec. 705 authorizes this Court to issue "all necessary and appropriate process to postpone the effective date of an agency action or to preserve status or rights pending conclusion of the review proceedings" (emphasis added).

Petitioners submit that reasonable notice and a hearing are not a prerequisite to the issuance of the emergency relief requested, under 5 USC Sec. 705. In order to prevent irreparable injury, Petttioners therefore request that this Court act pursuant to 5 USC Sec. 705, if such would obviate the need for further reasonable notice and a hearing. Such an interpretation of 5 USC Sec. 705 is consistent with the public interest in preventing unnecessary and substantial irreparable injury, and emergency injunctive relief under 5 USC Sec. 705 would only be necessary until reasonable or five days' notice could be provided under 28 USC 2349(b). If this Court is unable to grant such emergency relief under 5 USC Sec. 705, Petitioners then request that immediate emergency relief be granted "on hearing, after reasonable notice to the agency and to the Attorney General," pursuant to 28 USC Sec. 2349(b).

Petitioners also suggest that an ex parte hearing would be an appropriate way to comply with the hearing requirement of 28 USC Section 2349(b), in the event that counsel for the Applicant or the agency or both were not able to attend a hearing scheduled at the very earliest convenience of this Court.

IV. CONCLUSION: THE EMERGENCY AND MORE PERMANENT INJUNCTIVE RELIEF REQUESTED

For the foregoing reason, the Court must grant immediate emergency injunctive relief to stay, nullify, and void the TMI-2 operating license. Such emergency relief should be granted in the first instance in the form of a telephone call conveying the terms of the order to the United States Nuclear Regulatory Commission, because at this late date a single day or even one hour's delay in obtaining such emergency relief could initiate substantial and continuing irreparable injury.

The emergency injunctive court order must prohibit, enjoin, and restrain any and all activities at TMI-2 which would tend to lead to the intentional initiation of criticality of the loaded fuel or which would permit the possibility of accidental initiation if a sustained chain reaction has not yet occurred. If, however, a sustained chain reaction or criticality has already occurred, the emergency injunctive court order must require the immediate shutting down of TMI-2, including the immediate cessation of any sustained chain reactions, and must prohibit, enjoin, and restrain any and all activities which would tend to result in the further production of radioactive waste and activation products.

The emergency injunctive order must also require the immediate unloading of the fuel at TMI-2. The importance of requiring the unloading of the fuel cannot be overemphasized. This unloading is crucial in order to prevent the accidental or intentional initiation of criticality or, in the event that criticality has already occurred, in order to guarantee that no further irreparable injury and damage will occur.

The emergency injunctive court order should be issued immediately pursuant to 5 USC Section 705, if such authority would obviate the need for reasonable notice to other parties, or if such authority would obviate the need for a prior hearing, as a prerequisite to the issuance of the requested immediate emergency injunctive relief by this Court.

If this Court is unable to grant such relief under 5 USC Section 705, Petitioners then request that the emergency relief requested be granted as soon as possible pursuant to whichever authority will provide a basis for such relief, including but not limited to the authority of 28 USC Section 2349(b) to issue such emergency relief "on hearing, after reasonable notice to the agency and to the Attorney General." See Section III of this brief above.

The emergency injunctive order must remain in effect and must continue to be renewed, until this Court has issued an interlocutory injunctive order continuing the status quo that the emergency order reinstated.

The interlocutory injunctive order must remain in effect until completion of any and all available administrative and judicial processes for obtaining review on the merits of the legality of the Initial Decision of December 19, 1977, and of any and all other orders, decisions, or actions of the Nuclear Regulatory Commission or any of its agents, which orders, decisions, or actions purport to authorize the granting of an operating license to TMI-2.

Both the emergency and interlocutory injunctive orders must prohibit, enjoin, and restrain the reloading of the fuel at TMI-2 until completion of all available administrative and judicial processes

for obtaining review on the merits of the legality of the Initial Decision of December 19, 1977, and of any and all other orders, decisions, or actions of the Nuclear Regulatory Commission or any of its agents, which orders, decisions, or actions purport to authorize the granting of any operating license to TMI-2.

The interlocutory injunctive order should be issued pursuant to whichever authority the Court believes is best adapted to preventing the irreparable injury or additional irreparable injury which Petitioners protest, including but not limited to the authority of 28 USC Section 2349(b) and 5 USC Section 705.

Petitioners also request that this Court retain jurisdiction over the operational status of TMI-2, in case judicial review on the merits of the legality of an agency decision to authorize, or to uphold the authorization of, the granting of an operating license to TMI-2, becomes necessary.

Petitioners reside within five hours driving distance of Washington, D.C. Petitioners request that they be given actual notice of at least six hours prior to any hearing which the Court might hold to verify the need and immediacy of the extraordinary injunctive relief that Petitioners have requested. Petitioners note parenthetically that Section III of this brief argues, in part, that a hearing is not a prerequisite to the issuance of emergency relief, and that an ex parte hearing might also suffice. Petitioners are willing to attend any such hearings before this Court at any time during any of the seven days of the week, including, but not limited to, weekends and evenings.

For purposes of assuring both that the fuel is immediately removed from the reactor core and that Petitioners are guaranteed their rights to full judicial review on the merits before irreparable injury, or additional irreparable injury, is allowed to accur, the remaining administrative remedies are totally inadequate; therefore, immediate injunctive relief from this Court must issue. Counsel for the government or the Applicant may attempt to claim that this appeal is premature since as of this date the Commission still has not acted on Petitioners' pending request for a stay. In reality, the date is extremely late. Fuel loading has been completely, and only the final precriticality testing remains to be done. The Applicant has its license to operate in hand.

At this extremely late date, therefore, it would be highly unlikely that the Commission, having already granted the license to operate, would now stay its own licensing action. It would be even more improbable for the Commission to order removal of the loaded fuel from the core. And it is utterly inconceivable that the Commission would order the continuation of both of these remedies necessary to the Petitioners' interests until final disposition of the merits of the licensing action by the Commission and in the courts. Yet, all such relief is an essential prerequisite to prevent the illegally authorized irreparable injury which is pending and which Petitioners protest. If a determination is to be made that the plant cannot be operated legally, then it is vital that this determination be made before the reactor goes critical. If the Commission were actually committed to an objective and good faith review of the problems inherent in the licensing action, its subordinate agents would have known better than to conduct their review of the

the licensing proposal by fraud, extreme bias, and callous disregard for the Commission's statutory obligations.

The urgency of the Petitioners' appeal to this Court is solely attributable to the Commission's incredible and prejudicial failure to notify Petitioners of its issuance of the operating license on February 8, 1978. Under these circumstances, Petitioners have been forced to appeal to this Court, which provides the last remaining forum for obtaining relief. The blade of the guillotine is descending rapidly; only this Court can grant the stay Petitioners seek.

Thus, regardless of the authority upon which the Court grants immediate emergency injunctive relief, Petitioners urge strongly that such relief issue as soon as is possible.

Respectfully submitted,

Chauncey Kepford
Representative of Petitioners
York Committee for a Safe
Environment and Citizens for a
Safe Environment

433 Orlando Avenue
State College, Pa. 16801
(814) 237-3900

Dated this 17th day of February, 1978.

ATTACHMENTS

A. Affidavit, with Statement of Qualifications, of Dr. William A. Lochstet (6 pages, with attachments)

B. Selected Portions of the Transcript of the Evidentiary Hearing for an Operating License for Three Mile Island, Unit 2, Pertaining to Dr. Reginald L. Gotchy's Testimony (11 pages)

C. Health Effects Comparison for Coal and Nuclear Power: Three Mile Island, Unit 2, Testimony of Dr. Chauncey R. Kepford, July 5, 1977 (8 pages)

D. Memorandum of Dr. Walter Jordan, Atomic Safety and Licensing Board Panel, September 21, 1977 (10 pages)

E. Memorandum and Order, Atomic Safety and Licensing Appeal Board, ALAB-456, January 27, 1978 (11 pages)

F. Intervenors'Brief in Support of Exceptions to the Initial Decision, Dated December 19, 1977, Dated January 30, 1978 (57 pages, with attachments)

G. Intervenors' Appeal to the Commission for a Stay of the Initial Decision, February 8, 1978 (10 pages)

H. Nuclear Regulatory Commission News Release Announcing Issuance of an Operating License for Three Mile Island, Unit 2, Dated February 10, 1978, in Issuance for Week Ending February 14, 1978 (2 pages)

I. Telegrams to the Nuclear Regulatory Commission from Intervenors (2 pages)

J. Intervenors' Letter to the Commision, Dated February 18, 1978 (5 pages)

ATTACHMENT A

Affidavit, with Statement of
Qualifications, of Dr. William A. Lochstet

194-A—Affidavit
Henry Hall, Inc., Indiana, Pa.

COMMONWEALTH OF PENNSYLVANIA
County of Centre } ss.

On this 23 *day of* February *A. D. 19* 78

personally appeared before me, Jean B. Harris, a Notary Public

in and for the aforesaid County and State *duly*

authorized to administer oaths, William A. Lochstet

who being duly Sworn *according to law,*

doth depose and say I have prepared the attached statement on selected aspects ionizing radiation, the nuclear fuel cycle, and initial criticality of a commercial nuclear power reactor. A statement of my professional qualifications is attached. The statements contained herein are true and correct to the best of my knowledge and belief.

Sworn to and subscribed before me, this
22 *day of* February
A. D. 19 78

William A. Lochstet

Jean B. Harris
State College, Centre County, Pa. 16801
My Commission Expires March 16, 1981

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THE PENNSYLVANIA STATE UNIVERSITY
104 DAVEY LABORATORY
UNIVERSITY PARK, PENNSYLVANIA 16802

College of Science
Department of Physics

Area Code 814

William A. Lochstet
Assistant Professor of Physics, The Pennsylvania State University

Education:

B.S. Physics, University of Rochester, 1957
M.A. Mathematics, University of Rochester, 1960
Ph.D. Physics, University of Pennsylvania, 1965

1957-58 Graduate Research Assistant, Computer Center, University of Rochester
1959-61 Graduate Teaching Assistant, University of Pennsylvania
1961-65 Graduate Research Assistant, University of Pennsylvania, Research with Tandem Van de Graaff Accelerator
1965-65 Instructor, Physics Department, The Pennsylvania State University, Research with Van de Graaff Accelerator
1966- Assistant Professor of Physics, The Pennsylvania State University, Research with Van de Graaff Accelerator (until 1973)

Publications:

$^{12}C(\gamma,n)^{11}C$ Giant Resonance with Gamma Rays. William A. Lochstet and William E. Stephens. Phys. Rev. 141 (1966) 1002

Inexpensive, Medium Performance Scaler. P.D. Georgopulos and W.A. Lochstet. Bull. Am. Phys. Soc. 14 (1969) 532

The Levels of ^{15}O Observed in the $^{13}C(^{3}He,n)^{15}O$ Reaction. H.F. Hinderliter and W.A. Lochstet. Nucl. Phys. A163 (1971)661

Spectroscopy of ^{15}O by Use of the $^{13}C(^{3}He,n)^{15}O$ Reaction. P.D.Georgopulos, W.A. Lochstet and E. Bleuler. Nucl. Phys. A183 (1972) 625

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Radioactivity is a property of certain isotopes of elements by which the nucleus will spontaneously emit a high-energy particle, or a ray, or both. The radioactivity of each isotope has unique characteristics, such as the rate at which particles and electromagnetic rays are emitted, called the decay rate, and the kind and energy, or energy distribution, of particles or electromagnetic rays, or both.

The decay rate is usually described by a quantity called the "half-life." This is the time required for one-half of the nuclei in a given quantity of a single isotope to undergo radioactive decay. The next half-life will reduce the quantity by one-half again, resulting in one-quarter of the initial quantity, and so on. Half-lives can range from small fractions of a second to billions of years.

The particles and rays emitted during radioactive decay possess energy greater than any chemical bond holding any form of matter together. As a result, when these emissions interact with matter, chemical damage and broken chemical bonds are the inevitable result. These particles and rays are referred to collectively as "ionizing radiation" because their large energies allow them to eject electrons from atoms and molecules, thereby ionizing them.

If the particles or rays emitted during radioactive decay travel through living tissue, the molecules which make up that tissue are damaged. In the case of human beings, this damage can manifest itself, following latency periods, as an increased rate of mutations, cancer, or leukemia.

One source of exposure of people to the emissions of radioactive decay is the uranium which is mined to fuel nuclear reactors. Of interest here is the major constituent, the isotope uranium-238. This isotope decays by several steps to lead-206. The first several steps of this decay are: uranium-238, thorium-234, protactinium-234, uranium-234, thorium-230, radium-226, radon-222, polonium-218, lead-214 and so on. One of these decay products, radon-222, is a gas, and has a half-life of 3.8 days. If the radon is formed deep underground, the gas begins to migrate upward toward the surface. However, if the migration is slow, or the distance is large, much of the radon-222 will have decayed before it reaches the surface. In this case, the resulting polonium-218 is trapped near its point of formation. If the radon is formed near the surface and can escape into the air, it can decay there and the resulting polonium-218 or its decay products can be inhaled as particulates, or enter the food chain.

Uranium occurs primarily in veins of relatively low-grade ore in the western states of the United States. These occur mostly in deposits greater than one hundred feet below the surface.[1] After mining, the ore is taken to a mill where 90% to 96% of the uranium is extracted. What remains with the other components of the ore is 4% to 10% of the uranium and essentially all of the thorium-230, in what are called the "mill tailings." The ultimate decay of this thorium to radon-222 is governed by the 80,000-year half-life of thorium-230. The uranium-238 similarly follows its natural decay through radon-222 with a time scale determined by its 4.5 billion year half-life.

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[1] U.S. Senate, Committee on Energy and Natural Resources, Petroleum Industry Involvement in Alternative Sources of Energy, 197?, pp. 243, 246, 249.

Because the original ore deposits were far underground, very little, if any, of the resulting radon-222, or its decay products could ever reach the surface or the air, or the food chain. However, once the ore has been mined and processed, uranium mill tailings are normally placed in piles above the surface, from which significant quantities of radon-222 can diffuse into the air for a long time into the future.

The uranium extracted from the ore at the mill is further processed and then taken to an enrichment plant. Here the concentration of the minor isotope, uranium-235, is increased from the .7% found in nature to about 3% required for commercial reactor fuel. This increase is accomplished by a separation process, which results in a second output stream of less than .7% enrichment. The high enrichment output stream is processed into a suitable chemical form and fabricated into fuel for nuclear reactors.

The uranium-238 contained in this fuel will, by present policy, be buried deep underground with the high-level radioactive wastes from the operation of the reactor. This deep burial will prevent the release of the resulting radon-222 to the atmosphere.

The major portion of the uranium-238 is contained in the lower enrichment, or "depleted" (that is, depleted in uranium-235) stream from the enrichment plant. Since this is the major portion of the uranium-238 mined to operate a reactor, it represents the largest potential source for radon-222. At present this material is being stored in steel containers.

In the normal sequence of events, once fuel is placed into a reactor, it remains there until it is "burned out." During the operation of the reactor, the uranium-235 in the fuel undergoes fission, or splits to form fission products, and releases neutrons. Many of these fission products, such as strontium-90, iodine-131 and cesium-137, are radioactive and represent a severe health hazard. The formation of these large quantities of fission products is associated with the onset of the chain reaction when the reactor goes "critical." Prior to this event, the fuel could easily be removed from the reactor, being relatively harmless to handle, and used as fuel in another reactor. When a reactor goes critical, a buildup of radioactive fission products commences which makes the fuel lethal to handle without remote control equipment. This condition makes inspection or correction of any possible damage in the reactor internals or to the fuel very difficult.

The chain reaction in the reactor releases neutrons. Some of the neutrons released in the chain reaction are responsible for the continuing of the chain reaction; others, however, are absorbed by structural components, such as the reactor pressure vessel. This causes the formation of activation products such as radioactive cobalt-60, nickel-59, and niobium-94[2] throughout components of the

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[2] Half-lives are: cobalt-60, 5.25 years; nickel-59, 750,000 years, and niobium-94, 50,000 years.

reactor. The formation of these materials begins when the reactor goes critical. Before the reactor goes critical, the components are non-radioactive and can be salvaged as ordinary metal. After the reactor has gone critical and these activation products have formed, then these components are radioactive waste and are a health and safety hazard. The extent of the hazard depends on the specific quantities of radioactive materials present.

These quantities of radioactive materials increase in general with the power level of operation of the reactor and the length of time of operation at any given power level. Thus, the plant becomes increasingly radioactive the more it is used. This also applies initially to the fuel. Under normal practice, once criticality is achieved, the reactor is operated at a very low power level (or rate of fission) for some time while operating parameters are measured and checked. If the operation is according to design expectations, then the power level is increased, and operation is again checked. In this way, the power level is slowly increased to its maximum value. During this process there is no specific point at which the plant suddenly ceases being not hazardously radioactive and becomes clearly dangerous. Thus, the singular, clearly definable point of demarcation is that of the initial criticality. At that point the buildup of radioactivity begins, and will only be increased by subsequent operations.

Irreparable injury to a population results from increased exposures to ionizing radiation. Incremental exposures are attributable to routine emissions from an operating reactor. In addition, persons

residing in the vicinity of a reactor, or their descendants, will be subjected to any additional increases in radiation associated with decommissioning of a radioactive facility at the conclusion of its operational life.

Commitment of a particular reactor to operate means that members of the general population will be exposed to increased amounts of radon-222 and its daughter products, in the air and through the food chain, as a direct result of the operation of those facilities associated with the reactor's fuel cycle. Exposure may take place during the operational life of the reactor. But radon-222 will go on being emitted into the environment for billions of years into the future from the radioactive decay of thorium-230 and uranium-238 in mill tailings or from sources of depleted uranium. At the present time practices and regulations governing uranium mill tailings do not prevent these releases of radon-222 and its radioactive daughters. No permanent method of preventing them has yet been proposed.

These radiation exposures may be expressed in terms of incremental increase in the risk to an individual of contracting cancer or leukemia or of producing defective children. It should be emphasized that the operation of the reactor and its fuel cycle activities are the source of the carcinogenic and mutagenic agent -- ionizing radiation -- that will be responsible for these subsequent damages. These are irreparable injuries.

ATTACHMENT B

Selected Portions of the Transcript of
the Evidentiary Hearing for an Operating License
for Three Mile Island, Unit 2

MR. CHANDLER: Before making the witness available for cross, Mr. Chairman, I would ask, if I may, just a couple of questions on direct.

MR. LINENBERGER: Mr. Chandler, just a couple of clarifying questions here before we get underway.

Is it your intent that this corrected version be incorporated in today's transcript?

MR. CHANDLER: I believe that it would be beneficial if indeed we did incorporate this copy in the transcript. I understand and recognize that on May 21 Dr. Gotchy's testimony has previously been incorporated. It does not include the footnote, the second footnote, and the two changes that Dr. Gotchy just made will not appear in the transcript at that point.

I think for convenience, therefore, it would be beneficial to have it incorporated at this point in time. It will also be at the same place where the cross-examination is contained.

MR. LINENBERGER: Well, this is the Chairman's decision, on that point.

I had a second question. The title designates this as supplemental testimony. In what context is the word "supplemental" used?

MR. CHANDLER: There is some discussion, sir, of the coal and nuclear fuels alternatives contained in the final

Environmental Statement and supplement thereto for Three Mile Island. This testimony is supplemental to the discussion that is already contained in the Final Environmental Statement, and is prepared and sponsored at the direction of the Appeal Board in the Hartsville decision, ALAB-367.

MR. LINENBERGER: Is it the Staff's position, then, that the Three Mile Island FES is to be further modified by the incorporation of this testimony?

MR. CHANDLER: Yes, sir, it is.

MR. LINENBERGER: Thank you.

CHAIRMAN LUTON: Do you have some direct examination?

MR. CHANDLER: Yes, thank you.

BY MR. CHANDLER:

Q Dr. Gotchy, on page 2 of your testimony, the second full paragraph, second sentence, you've indicated that the premise of the estimated total body population dose is GESMO, particularly GESMO I document, utilizing the uranium only recycle option.

In view of the fact that the GESMO proceeding has been postponed indefinitely, and the Administration has announced its intention to defer its involvement in reprocessing for some period, is the premise of uranium recycle only still a valid assumption to use?

A It would appear not to be at this time. However,

assessment total body and lung.

MR. LINENBERGER: From all nuclides?

THE WITNESS: Yes, sir.

BY DR. KEPFORD:

Q Going back to the uranium mill tailings piles, radon-222, I understand, keeps coming out of these piles.

A Yes, sir.

Q Where does it come from?

A It comes from the decay of radium-226, which, in turn, comes from the decay of thorium-230.

Q Radon-222 has a fairly short half life, does it not?

A Yes, sir, it's about 3-1/2 days.

Q Radon-226 is considerably longer?

A Radium-226?

Q Radium-226.

A It's several thousand years. I don't know the exact half life.

Q It's sixteen hundred and twenty-some.

A That sounds right.

Q How about thorium-230?

A That's about an 80,000 year half life.

Q So then, functionally, as far as emissions go, the precursor of radon-222 would have essentially an 80,000 year half life?

A That's correct.

Q After the 40 year -- well, as I recall your earlier testimony when we were talking about this 50-year dose commitment model, that was a one-year exposure?

A We calculate it on a per-year basis, but then integrate it over the 26-year period.

Q Integrate it over the 26-year period?

A Yes.

Q Where in this table are the radon emissions considered beyond that period?

A They're not. They're not considered beyond the period representing 40 years -- it's an average -- beyond the 26-year period and the 40-year environmental dose commitment for each of those 26 years, and then calculated for 50 years beyond that.

It's a triple integration.

Q Okay. Whatever that represents, that will terminate at some given date in the future, that period of integration?

A Yes. The period, essentially, that we're considering, we're talking here about a 40-year environmental dose commitment.

Q Commencing when and ending when?

A Well, this is a 40-year environmental dose commitment per year, or per point in gigawatt years of

electricity production. It's broken down in that manner.

It represents an annual release, if you like, integrated forward in the environment for 40 years, and considering population dose during each of those 40 years, allowing for removal mechanisms in some cases, and radioactive decay in all cases.

Q What population did you assume? Did you assume the same uniform population density throughout that forward integration period, going back to the 7.5 persons per square mile in the west and 160 in the east?

A Did we assume the cost in population?

Q Yes.

A Yes. The population, I believe, that was used was the projected Bureau of Census estimate of the total population in the U. S. in the year 2000.

Let me explain something here that may help you.

The 7.5 persons per square mile really doesn't make much difference, because of the way the population density grows as you progress eastward from the areas where the uranium is mined and milled.

Most of the population dose, in fact, comes -- a good bit of it comes from the midwest due to deposition of the lead-210 and its daughters in cereals.

And in GESMO, recognizing that the central plains

states produce a large quantity -- a large amount of the total cereal production in the United States, and that this cereal, indeed, is not consumed within the population exposed, the Staff calculated the uptake in cereals, and then calculated the population dose resulting from export of that grain to the rest of the United States. And that's where the major dose contribution comes from, is from the food pathways, and largely through the cereal path from the midwest.

Q Okay. I'd like to go back now. The period under consideration in GESMO ends in the year 2000, is that right? Is that correct?

A As far as the growth scenario, yes. But remember, the environmental dose commitment goes 40 years beyond that.

Q You then integrate 40 years ahead?

A In essence, yes. The last year, the year 2000 releases are integrated 40 years into the future.

Q Okay.

A The environmental behavior.

Q Okay. Does the emission of radon-222 stop with the year 2000?

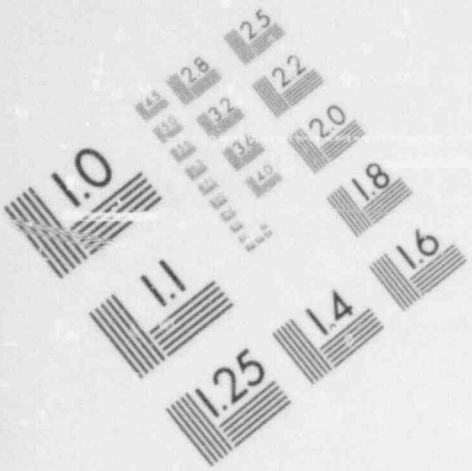
A No, it doesn't.

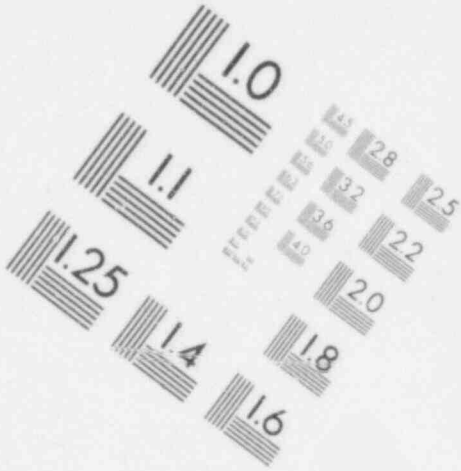
Q Does it stop in the year 2040?

A No, it does not.

Q How long does it go on?

A In the case of tailings piles -- now, in the case





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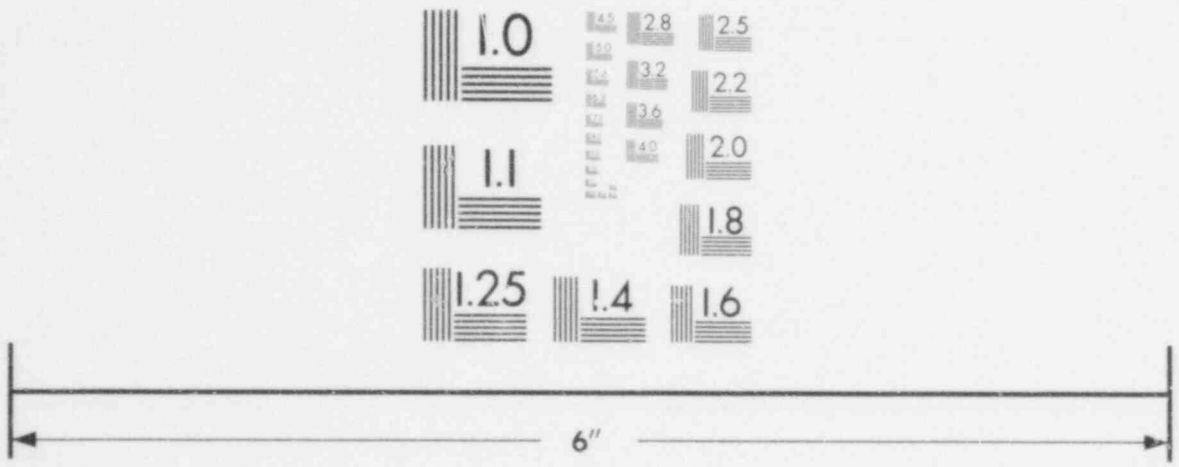

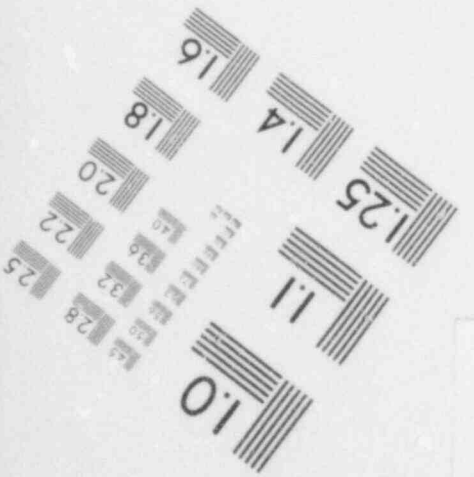

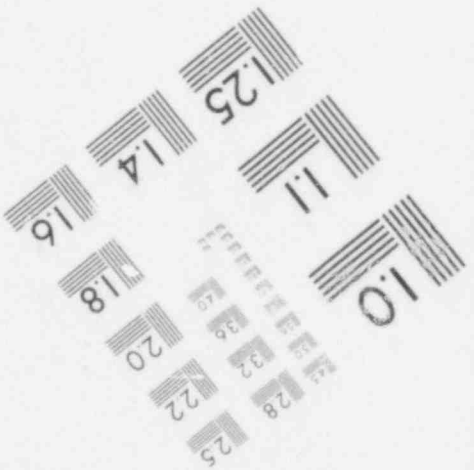

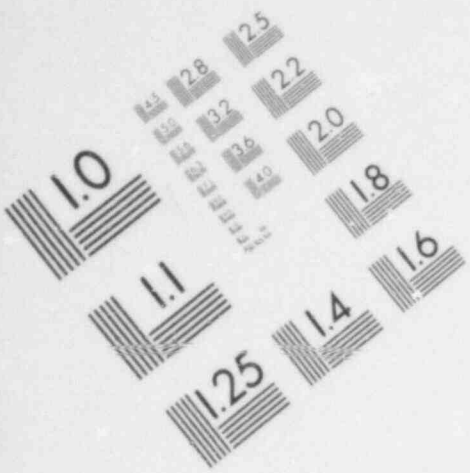

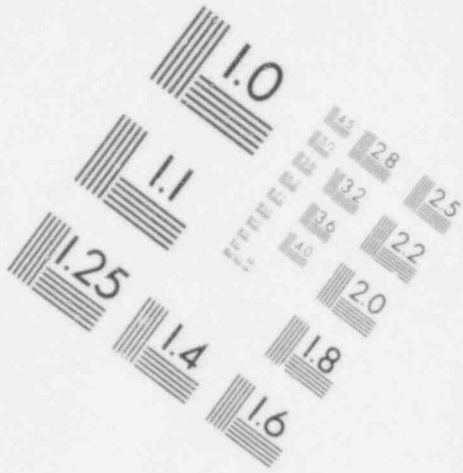

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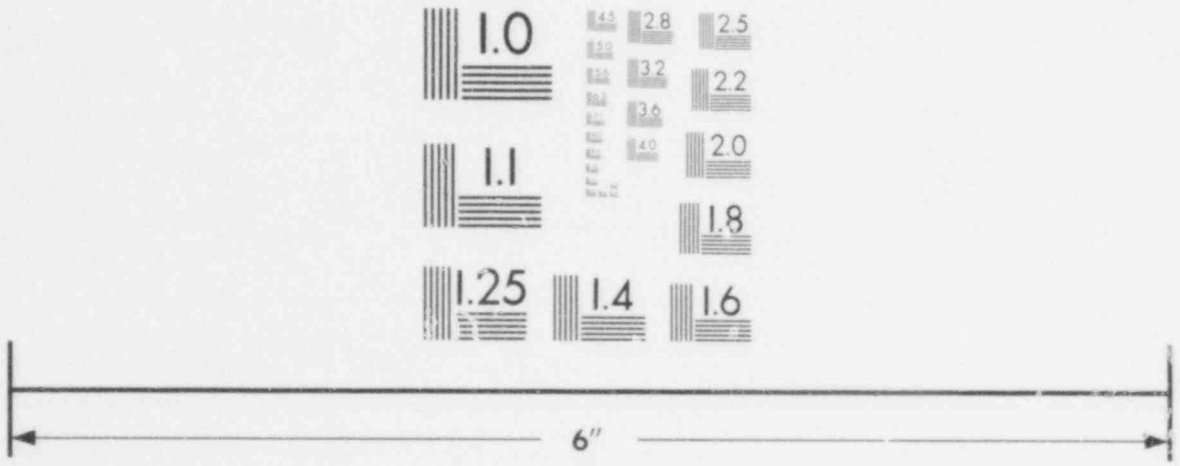

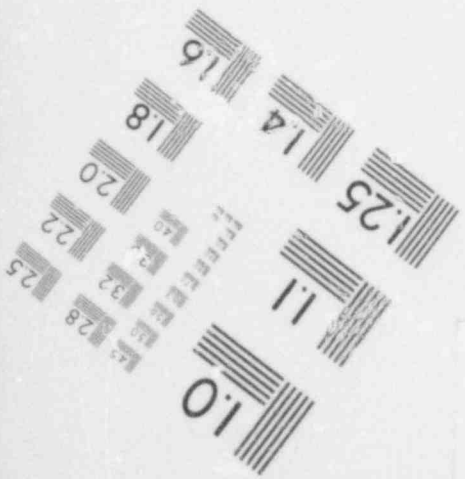

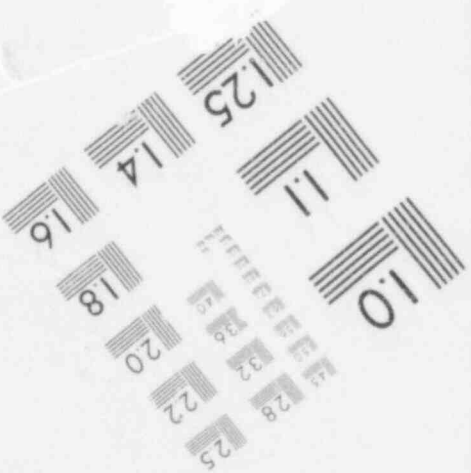

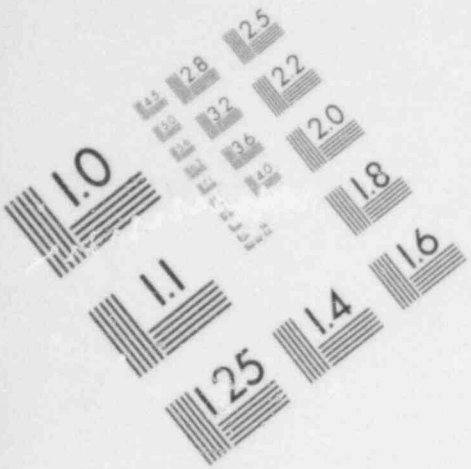

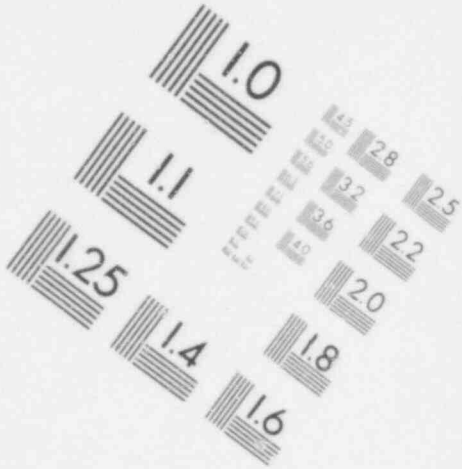

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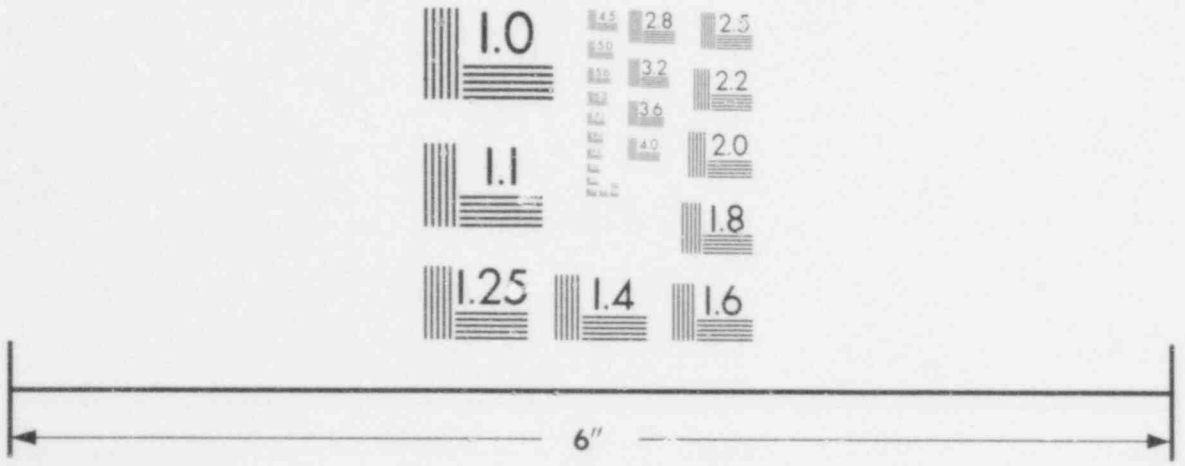

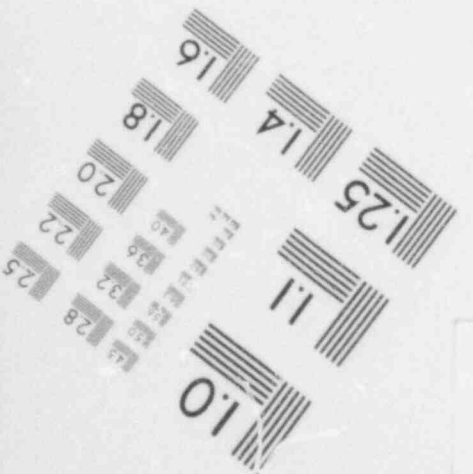

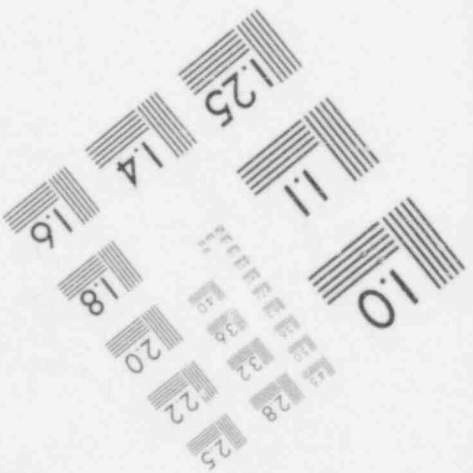

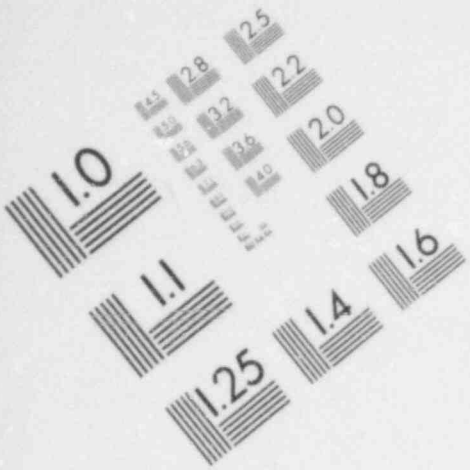

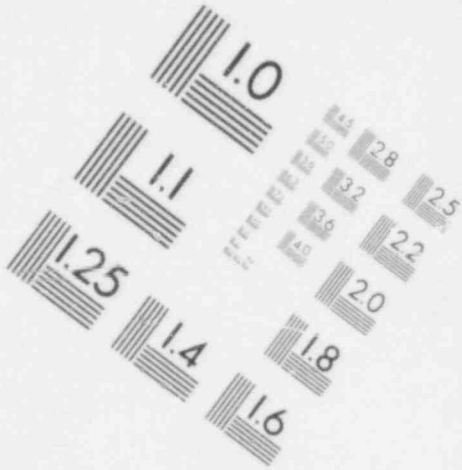

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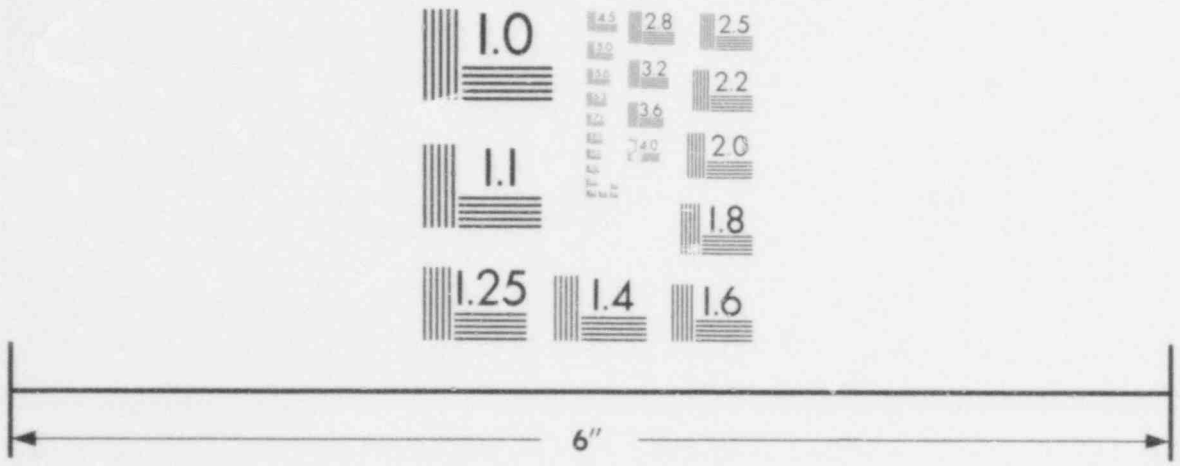
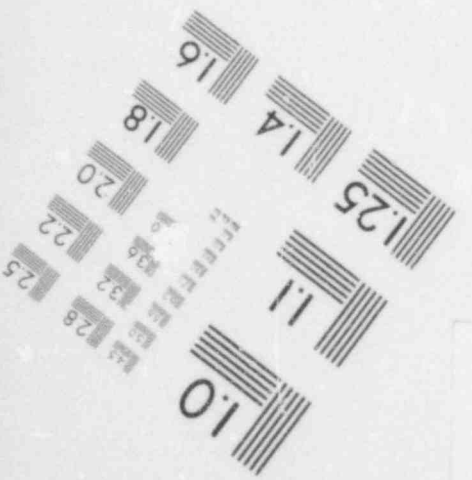
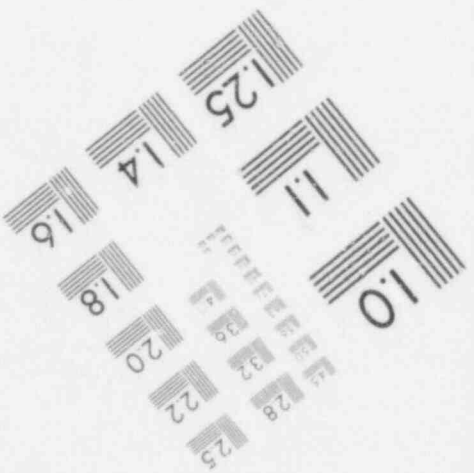
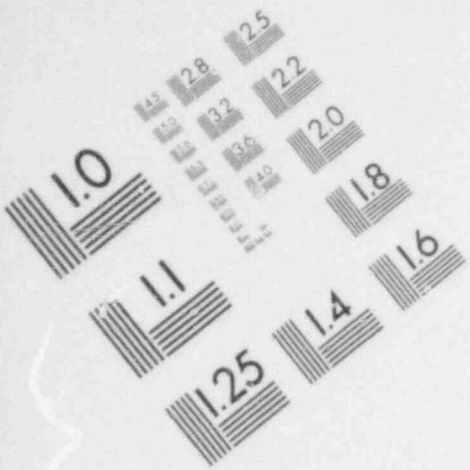








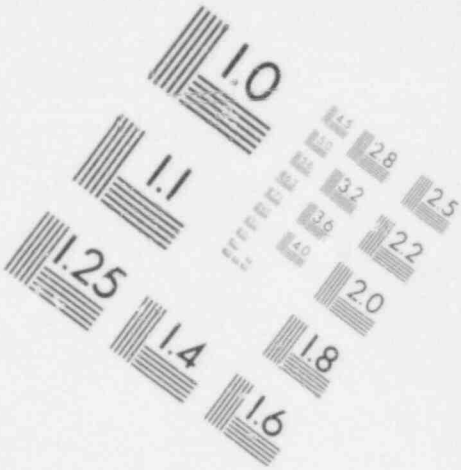
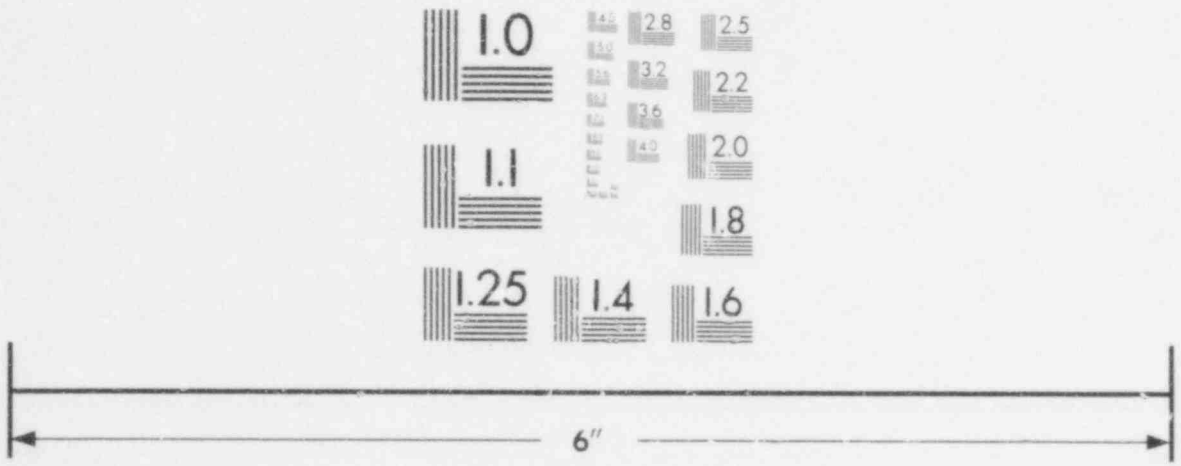
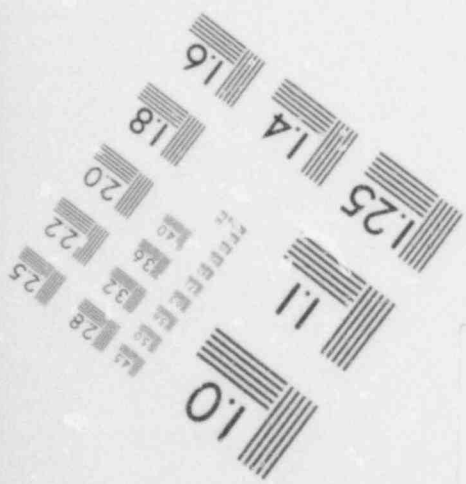
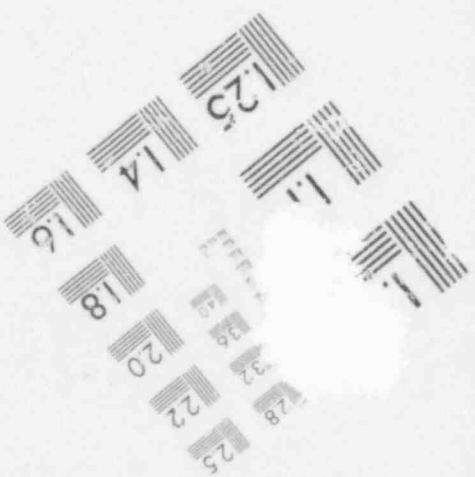


IMAGE EVALUATION TEST TARGET (MT-3)







vel 10

of mines the emanations cease when the mines cease operation. They close them up, because the mines are pumping radon from the interior of the mine, the idea being to reduce the concentrations to miners, to reduce their health hazard.

So in a sense we're pumping radon out of these mines to the atmosphere. So those, which account for, as we estimate, something on the order of 84 percent of the dose during this period, cease at the time the mines stop operating.

With regard to mill tailings, the thorium-230, which is unsupported by any additional uranium in the tailings pile, will decay out with an 80,000 year half life. So that it would take something on the order of a million years for the thorium-230 to essentially completely decay away.

Q Would it be correct to say, then, that the dose commitment calculated -- the dose calculated, or the health effects -- let's say the health effects calculated in Table 1a would represent a rather small portion of -- would represent an effect on a very small portion of the radon-222 committed as a result of the operation of this plant?

A If everything else stayed the same, namely that there were no changes in, for example, cure for cancer for the next million years, and that the population did in fact continue to grow -- or even stayed stable, but didn't decline -- that these assessments--and I'm sure you're probably aware

of Dr. Pohl's assessment, Dr. Pohl from Cornell University--would, integrating now, we're talking about in this case you assume a stable world population and integrated over 80,000 years, one half-life of thorium-230.

Now, this is integrating roughly over a trillion people. And as I recall, he calculated several thousand excess deaths associated with radon. If it's permitted to emanate from these tailings piles for that 80,000 year period, and if there is no cure for any cancer in that time, you can project several thousand excess deaths, which is considerably larger than we would project for the period that we're talking about here.

Q Dr. Gotchy, when you mentioned there were several thousand effects, was that effects total, or effects per year, if one carried out this essentially million-year operation?

A That was, as I recall, per . . . I don't recall, in terms of per annual fuel loading, or per reactor year. They're pretty close. I could check, if you like.

Q I would appreciate it.

(Pause.)

A I just recalled I don't have that with me. I had it yesterday, but I forgot to bring it. We're in the process of moving my office, and I'm having a hard time finding anything these days.

I'm sorry. I don't have it here with me.

3a eb1

Q Well, Dr. Gotchy, in part both Staff's and Applicants' objections to the admissibility of the Intervenors' prefiled testimony here seemed to relate -- perhaps I describe it incorrectly but it seemed to relate to values in that testimony and contained in Table 2 in which three different sources of radon-222 were listed and three different curie activities -- excuse me, curie productions are attributed to those three different sources.

Now are you in a position not to speculate or to guess but to technically determine and defend your answer with respect to the following:

Are those values in Table 2 more appropriately associated with the 75 curies appearing in the body of Table S-3 or more appropriately associated with the 4600 curies in Footnote 5 to Table S-3, none of the above, or is it immaterial?

I give you three options for answer there.

A I guess my first inclination would be to say it's immaterial. But I recognize if you take either 75 curies a year or 4600 curies a year and multiply it by something on the order of 10 to 100 billion years you're going to get a lot of curies.

And the question is-- And I think that these numbers would probably be correct, but this represents the decay of all the uranium-238. It would be accompanied, I

eb2

should say by the decay of all uranium-238 in the world which is-- We're talking about a period here that's an order of magnitude longer than the age of the universe, so I don't think it is really a meaningful number.

Q Okay.

But now I think you gave me two bases for saying that it's not meaningful. One was the time element. Okay, let's set aside the time element for the moment. That has its own special considerations.

But the other thing you said was that it's associated with the decay of all the uranium-238 in the world. Now if I read this testimony correctly -- and I will come back and question Dr. Kopford later on this. But if I read this testimony correctly it's not all in the world but only that associated with TMI-2.

A That's correct. I meant it would be-- At the same time this was occurring all the rest of the uranium in the world would be decayed, --

Q Oh, surely.

A -- because you're integrating over infinity.

Q Sure. Okay.

So your primary basis then for saying that the answer to my question was none of the above but immaterial relates explicitly to the length of time over which one integrates this rather than the starting value? Is that what

you're telling me?

A Yes. I think what he has got here-- I can't argue with these numbers. I can come up with approximately the same numbers. If I integrate over infinity these are the curies produced. The only question is what you do with that number.

Q Peace, peace. I was only inquiring whether or not you had a quarrel with these numbers, not what you do with them.

Okay.

MR. LINENBERGER: Mr. Chairman, I think that completes all the questions I have for Dr. Gotch . do have some for Dr. Kepford.

CHAIRMAN LUTON: All right.

It has been more than an hour and a half. We'd better recess for about 15 minutes, after which we'll return and ask a couple of questions of Dr. Kepford.

(Recess.)

CHAIRMAN LUTON: We'll continue now with some questions for Dr. Kepford.

BY MR. LINENBERGER:

Q Dr. Kepford, on page 1 of your testimony you make refarences to four time periods listed in Table 1, or at least I seem to interpret the comments on page 1 that way. I would like you to explain to me, please, sir, with reference

ATTACHMENT C

Health Effects Comparison for Coal and Nuclear Power: Three Mile Island, Unit 2, Testimony of Dr. Chauncey R. Kepford

Health Effects Comparison for Coal
and Nuclear Power
Three Mile Island Unit 2
Testimony of
Chauncey R. Kepford
July 5, 1977

The problem of attaching a certain level of health degradation to the population from electrical energy generation is a thorny one. Comments on such health effects have been made by various authors, (Refs. 1-4) among others. While there is a wide variation in the form and magnitude of the results, one common thread holds them together, and that is that they tend to concentrate on the health effects attributable to facility operations and tend to disregard health effects over the lifetime of very long-lived isotopes. Pohl[5] has offered some calculations with regard to radon-222 emissions from uranium mill tailings piles over extended periods. The purpose of this testimony is to compare some of the very long term health effects from Three Mile Island Unit 2 to a coal-fired unit of the same size. It will be suggested that the health effects estimations which have appeared in the literature, including those of Pohl, are orders of magnitude too low for both options.

Some idea of the magnitude of the radioactivity problem of the uranium mill tailings can be obtained from Table 1.[6] This table compares the cumulative total quantities of long-lived radioactive wastes to be produced by the anticipated nuclear industry in the 1975-2000 period.

The ore tailings, with a relatively small number of curies, require the second largest dilution volumes in three of the four time periods listed, and the largest in the fourth. The problem arises because of the long half-life of thorium-230, 80,000 years, and the 4.5 billion year half-life of uranium-238. The more biologically important isotope daughters of these two isotopes are radon-222 and its daughters, including lead-210 with a 21 year half-life. The problem exists because radon-222, being a gas, can diffuse and of the tailings piles in substantial quantities

before decaying. Radon-222 has three related sources in the uranium mill tailings. First, from thorium-230, in secular equilibrium with the uranium-238 in the ore. In the milling process, I assume 90% of the uranium-238 is removed from 0.1% U_3O_8 ore, and 100% of the thorium-230 remains in the ore tailings.

Table 1

Waste[1]	Radioactivity (MCi)		Volume needed for dilution[2] Air		Water	
Year after shutdown	100	1,000,000	100	1,000,000	100	1,000,000
Solidified high-level	2610	.9	6.1×10^{20}	3.0×10^{18}	1.5×10^{15}	3.1×10^{11}
Cladding	24	0.0	4.3×10^{18}	6.0×10^{15}	1.7×10^{12}	1.8×10^{9}
Iodine[3]	3994	3825	2.0×10^{14}	1.9×10^{14}	6.7×10^{10}	6.4×10^{10}
Low-level transuranics	6.3	0.0	4.7×10^{19}	4.8×10^{16}	1.3×10^{12}	6.4×10^{9}
Intermediate-level transuranics	.93	0.00	1.1×10^{18}	2.3×10^{15}	5.3×10^{11}	7.1×10^{8}
Nontransuranic	.13	0.00	6.5×10^{13}	1.6×10^{10}	4.4×10^{9}	1.3×10^{5}
Ore tailings	3.8	0.3	5.3×10^{18}	2.7×10^{17}	1.6×10^{13}	8.1×10^{11}

1. See paper for definitions of waste categories.[6]
2. Volume of air or water needed to dilute all radioactive components to levels specified in ERDA's Radiation Concentration Guides as maximum acceptable for unrestricted use.
3. Curies.

The second source is from the 10% of the uranium-238 remaining in th ore. And third, the depleted uranium-238 from the gaseous diffusion plants.

The quantities of radon-222 which will ultimately be produced by decay of these three sources from the ore mined for one year's operation of TMI-2 are listed below in Table 2. The source terms are from WASH-1248, Table S-1, corrected for the 880 MWe capacity of TMI-2 and its assumed lifetime capacity factor, 0.65.

Table 2

Source of Radon-222	Radon-222 produced, curies
Thorium-230	3.2×10^{8}
Uranium-238 (left in ore)	1.8×10^{12}
Uranium-238 (depleted)	1.3×10^{13}

With the depleted uranium-238, it is assumed that all is open to the environment, which is not now the case, as it is currently stored as UF_6 in steel cylinders. However, unless it is properly cared for, it will be released, since the integrity of the cylinders cannot be assured for the necessary time period. The numbers in Table 2, it must be emphasized, represent the numbers of curies of radon-222 produced by decay, and do not necessarily represent quantities released to the environment. Assuming one per cent of the radon-222 formed by decay is released to the environment, the quantities remain large. Yet the long-term health effects go largely ignored. None of the authors cited (Refs. 1-4) appear to have considered health effects from mill tailings. Pohl considered only the thorium-230 contribution to radon-222 generation, ignoring the remaining uranium-238.

The biggest problem with long-term health effects calculations is the sheer conjectural nature of future population numbers and distributions. The simplest solution is to project the present situation ahead to infinity (a prospect some find most depressing). Using this projection, one can then easily calculate the long-term health effects attributable to TMI-2. On this basis, using the death rate of Gotchy[8] of 0.023 deaths per year, and the release rate of GESMO[9] of 4800 curies of radon-222 per year, a death rate per curie can be obtained as deaths per curie per year. From this, and the numbers in Table 2, each reduced by 100, and each multiplied by the 30-year operational life of TMI-2, the deaths attributable to TMI-2 are obtained, and are listed in Table 3. Also listed in Table 3 are the deaths calculated using the total health effects for the 30-year operational life of the

mill from the EPA.[10]

Table 3

Source of Radon-222	Deaths, Gotchy	Deaths, EPA
Thorium-230	4.6×10^2	6.4×10^3
Uranium-238 (left in ore)	2.6×10^6	3.6×10^7
Uranium-238 (depleted)	1.9×10^7	2.6×10^8

Again, it must be emphasized that these numbers are based on a constant world population and population distribution. However inappropriate this assumption may seem to some, it serves as a starting place in the understanding of the long-term health effects of the uranium fuel cycle.

Although the model developed here is not a perfect predictive tool, it more closely approximates the full health impact than do the models, used in current regulatory practice, which assume no health effects after a certain arbitrary time.

Alternatives to permitting these health costs would be to either not mine the uranium in the first place, or to dispose of the tailings and depleted uranium-238 in such a way that they will be secure throughout the necessary geological time period.

An alternative method of looking at the hazard from the tailings is to assume, for computational purposes, that the radon-222 produced over long periods is, instead, produced annually in the quantities listed in Table 2 at the tailings piles. The effect would be to charge the present generation with the 10^{10} or more curies of radon-222 (again assuming 1% reaches the environment) that would be released for each year's operation of TMI-2 concurrently with its operation. The radon problem is much more apparent with this approach, since the quantities of radioactivity involved are about the same as an entire year's production of fission products. The total release

of a year's fission products to the environment would surely constitute a disaster of unprecedented proportion.

The combustion of coal which contains uranium can also present enormous health effects. For a coal-fired plant of 880 MWe generating capacity, about 1.6×10^6 tons of coal would be needed each year, assuming a 0.65 capacity factor. If the uranium concentration is 1 ppm, then about 2.1×10^{11} curies of radon-222 are committed to be released by the eventual decay of the uranium-238. If one assumes a uniform distribution of the uranium throughout the ash, slag, and very fine, respirable particles, at least 99%, maybe 99.5%, can be recovered at the plant. Also, since the ash constitutes a small fraction of the original bulk of coal, the obvious solution to the uranium in ash problem is to return it to the mine. This would reduce the released uranium, and hence, radon-222, to about 2.1×10^9 curies. However, the population density in the east is much higher than in the areas of present uranium mining. Assuming 3 million people to be within a 50 mile radius of the alternative coal-burning plant at TMI, an increase in population density of about 50 is calculated over that used by Gotchy (Ref. 7, Appendix A, 1.(a)). With this factor of 50 and a 99% removal of ash, the health effects become 1.5×10^7, using the death rate per curie of Gotchy, or 2.1×10^8 using the EPA rate.

In Table 4, the long-term health costs for the coal and nuclear generating options are listed for various plant parameters.

Table 4

Deaths

	TMI-2		TMI (coal)	
	Gotchy	EPA	Gotchy	EPA
Deaths per MWe (880)	3.0×10^3	4.1×10^4	1.7×10^4	2.4×10^5
Deaths per year (30)	8.7×10^4	1.2×10^6	5.0×10^5	7.0×10^6
Deaths per Kilowatt hour	1.7×10^{-5}	2.4×10^{-4}	1.0×10^{-4}	1.4×10^{-3}
Kilowatt hours per death	5.8×10^4	4200	104	7100

Table 4 deserves a few comments. First, one may suggest that other facilities in the uranium fuel cycle, such as conversion, enrichment, and fabrication,[11] also release significant quantities of uranium as particulates to the environment. Since most of these facilities are in the east, the considerations applied to the coal particulates released apply. Under the assumptions used here, the death rate of Gotchy would lead to the estimate of 3.2×10^6 deaths, while that of the EPA would be 4.5×10^7 deaths per year of operation.

It should also be noted that there are factors active in the east which may reduce the health effects from coal burning and releases from the conversion, enrichment, and fabrication steps, although not necessarily equally. Since the releases are in the form of very fine particulates, it may be expected that many will be blown out to sea instead of settling out on land. Furthermore, for what does settle out, in general, in an easterly direction from its point of release, most of the radon-222 produced by decay would also blow out to sea well before the first half-life of the radon would pass.

In addition, any uranium-238 deposited on the ground in the east would undoubtedly be buried by natural processes in the much more moist environment than would be the case for the tailings piles in the west. Such conditions should reduce the radon emissions in the east. It may be that all these factors may reduce health effects from the coal fuel cycle by factors of from 10 to even 1000. Such reductions might also be expected for the uranium fabrication, enrichment, and conversion facilities. However, these factors would not be expected to be operative in the west to more than a factor of two or so: the time required for emitted radon to drift much of the way across the country.

Our knowledge of physics tells us the radioactive materials discussed in this testimony will undergo decay. Furthermore, due to the intervention of man, they are placed where they have a greatly enhanced opportunity to cause health problems if people are around over very long periods of time. The inability of man at present to forecast what populations and population distributions will be present a thousand, million, or billion years from now should not lead us to ignore our contributions to the health impacts of the

far future. This testimony offers a very simplistic method of counting such effects. No comparison is made to any other death rate from any other cause, since the purpose of this statement is to count the long term health effects attributable to the operation of TMI-2, or a coal alternative. If we assume an arbitrary value for human life of one million dollars, the calculated deaths from the uranium-238 left in the ore dwarf all conceivable benefits from TMI-2. The same may possibly be said about coal.

However, both options under current and anticipated control technologies remove an unnecessarily large slice from the human race, given the assumptions used here. And none of these individuals can be expected to receive any benefit from the operation of TMI-2.

FOOTNOTES

1. Ernest J. Sternglass, "Environmental Radiation and Human Health". In: Proceedings of the Sixth Berkely Symposium on Mathematical Statistics and Probability. University of California Press, 1971.

2. John W. Gofman, Testimony submitted to the Environmental Protection Agency on Proposed "Part 190 -- Environmental Radiation Protection Standards for Nuclear Power Operations", April, 1976.

3. L.B. Lave and L.C. Freeburg, "Health Effects of Electricity Generation from Coal, Oil, and Nuclear Fuel", Nuclear Safety 14 1973, pp. 409-428.

4. L.D. Hamilton, "The Health and Environmental Effects of Electricity Generation--A Preliminary Report." Brookhaven National Laboratory, BNL 20582, July, 1974.

5. Robert O. Pohl, "Health Effects of Radon-222 from Uranium Mining." Search, 7 (1976), pp. 345-354.

6. Numbers taken from various tables from "Projections of Wastes to be Generated," International Symposium on the Management of Wastes from the LWR Fuel Cycle, July 11-16, 1976, Denver, Colorado.

7. Environmental Survey of the Uranium Fuel Cycle, WASH-1248, U.S. Atomic Energy Commission, April, 1974. Data derived from numbers in Table S-1, corrected for capacity factor and electrical output, and assuming no uranium or plutonium recycle, and secular equilibrium in the ore.

8. R.L. Gotchy, Testimony in these proceedings, entered May 21, 1977. Footnote, Table 1a.

9. Final Generic Environmental Statement on the Use of Recycle Plutonium in Mixed Oxide Fuel in Light Water Reactors, (GESMO, Final) NUREG-0002, U.S. Nuclear Regulatory Commission, August, 1976, Vol. 3, Chapter IV, Section J, Appendix B, p. III J(B)-3.

10. Estimate of the Cancer Risk Due to Nuclear-Electric Power Generation, U.S. Environmental Protection Agency, October, 1976, ORP/CSD-76-2, Table 1, p.7.

11. Environmental Analysis of the Uranium Fuel Cycle, Part I, Fuel Supply, U.S. Environmental Protection Agency, EPA-520/9-73-003-B, 1973, Tables 3.2, 4.2, and 5.3.

ATTACHMENT D

Memorandum of Dr. Walter Jordan

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 30, 1977

Edward Luton, Esq., Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Gustave A. Linenberger
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Ernest O. Salo
Professor, Fisheries Research
Institute, WH-10
College of Fisheries
University of Washington
Seattle, Washington 98195

In the Matter of Metropolitan Edison Company, et al.
(Three Mile Island Nuclear Station, Unit 2)
Docket No. 50-320

Gentlemen:

Attached for your information is a copy of a memorandum from Dr. Walter Jordan to James P. Yore, Chairman of the Atomic Safety and Licensing Board Panel, dated September 21, 1977, in which Dr. Jordan discusses Table S-3 of 10 CFR Part 51.

In the memorandum, Dr. Jordan describes certain aspects which he believes to be in error. Table S-3 is attached to the NRC Staff's "Assessment of the Impact of Revised Table S-3 values on the Three Mile Island, Unit 2 Cost-Benefit Balance" following transcript page 2620. Although Table S-3 is not related to any issue in controversy in this proceeding, Dr. Jordan's comments may also have a bearing on the testimony of Staff witness Dr. R. L. Gotchy entitled "Supplemental Testimony Regarding Health Effects Attributable to Coal and Nuclear Fuel Cycle Alternatives" following Tr.1883. Dr. Gotchy's testimony on health effects utilizes, as one of its bases for the uranium fuel cycle, the radiological source terms provided in Table S-3.

The enclosed memorandum is being provided to all licensing boards before which Table S-3 has been addressed for their information. The Staff has Dr. Jordan's comments under review and plans to submit its assessment of these matters when its review is completed.

Sincerely,

Gregory Fess

Gregory Fess
Counsel for NRC Staff

Enclosure:
Memo fm. Dr. W.Jordan to
J.P.Yore dtd 9/21/77

cc: See page 2

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cc w/enclosure:
Dr. Chauncey R. Kepford
Ms. Karin W. Carter
George F. Trowbridge, Esq.
Ms. Judith H. Johnsrud
Atomic Safety and Licensing
Panel
Atomic Safety and Licensing
Appeal Panel
Docketing and Service Section

NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD PANEL
WASHINGTON, D. C. 20555

September 21, 1977

MEMORANDUM FOR: James R. Yore, Chairman
Atomic Safety and Licensing Board Panel

FROM: Walter H. Jordan, ASLBP

SUBJECT: ERRORS IN 10 CFR §51.20, TABLE S-3

Licensing of a nuclear power plant includes a consideration of the environmental costs of building and operating the plant. This includes the environmental costs of the fuel cycle such as mining, milling, fabrication of fuel elements and waste disposal. These costs have been summarized in Table S-3 of 10 CFR §51.20(e), revised*.

One section of the table deals with radiological effluents. The quantity of radioactivity discharged is given in curies for each important nuclide and is stated as being the total amount emitted "per annual fuel requirement or reference reactor year." For example, the maximum quantity of Kr-85 that might be released to the atmosphere as a consequence of operating a reference reactor (1000 MWe, 80% capacity factor) for one year would be 400,000 curies and would be released from the plant that reprocesses

* 42 F.R. 13803, March 14, 1977

the fuel. The table includes 1.1×10^7 curies of high-level wastes (to be buried at a Federal Repository) that would be generated for each reference reactor year (RRY) of operation. With one exception the figures given do indeed conservatively state the total amount of radioactivity that would be released as gas, liquid, or solid as a consequence of operating a reference power plant for one year or alternatively as a consequence of mining and milling the quantity of uranium required to fuel such a plant for one year, the so called annual fuel requirement (AFR).

The one important exception has to do with the quantity of Rn-222 where the figure given is "74.5 curies. Principally from milling operations and excludes contribution from mining". This figure is in error. The correct value would be some 100,000 times greater! The technical basis for my conclusion will be discussed in a later section, but is based on the fact that a mill tailings pile continues to emit radon for thousands of years.

The curie quantity for Rn-222 appeared in the original S-3 Tables and remain unchanged in the March 10, 1977 revision of the Table. However, the footnote 5 of the revised table is new and also contains an important error. The penultimate sentence states (accurately I believe) that "... (NUREG-0002) indicates a maximum release of about

4800 Ci of Rn-222 when contributions from mining are included." This is indeed the total from the mining of one "annual fuel requirement" that is emitted during the approximately 25-year life of the mine. At the end of the life of the mine it will be sealed and no further radon emitted.

The final sentence of footnote 5 is incorrect. It reads as follows: "NUREG-0002 also indicates that mining contributes about 500 person-rem (total body) and that milling contributes about 100 person-rem (total body) of a total of about 610 person-rem (total body) to offsite U. S. population per annual fuel requirement." I have no quarrel with the dose from mining. But there is no justification for limiting the dose from tailings piles to that from radon emitted during the period of 1975 to 2000. The dose figure integrated appropriately into the future would be more nearly 10 million person-rem taking into account the long half-life of the parent nuclide of radon, as will be shown later.

The source of the error for the quantity of radon emitted per AFR is apparent. It was copied from Table S-3 of WASH-1248 (reprinted as the last two pages of NUREG-0116, supplement to WASH-1248). WASH-1248 was the AEC Staff

testimony in the rulemaking hearing RM-3 and somehow the error was not caught at that time.

The error in footnote 5 is surely due to misapplication of the data in Table VIII (A)-6 from GESMO, also reprinted in NUREG-0116 and corrected in NUREG-0216.

TECHNICAL CONSIDERATIONS

NUREG-0002 is concerned with the environmental consequence of the operations of light water reactors for electric power production during the period from 1975 to year 2000. The authors assume that the installed nuclear capacity will grow from 45 GWe in 1975 to about 500 GWe in the year 2000. They assume that the reactors will operate at 80% capacity and will produce a total of some 4700 GWe-year of electric energy during the 26-year period. This will require the mining of 1.60×10^9 MT of ore which can be converted into about 1.50×10^6 MT of U_3O_8; the ore mined is assumed to have a uranium concentration of 0.1%. The production of 4700 GWe-year of electricity will require 5875 reference reactor years of operation, since the reference reactor operates at 80% capacity.

Table VIII (A)-6 from NUREG-0002 (reproduced in NUREG-0116) gives the total amount of Rn-222 emitted during the 26-year period as a consequence of the mining and milling

of 1.6×10^9 MT ore. The quantity of Rn-222 from mining is 2.4×10^7 Ci; from milling is 4.1×10^6 Ci for a total of 2.84×10^7 Ci. If this quantity is apportioned equally to each of the 5875 annual fuel requirements (AFR) the result is

4085 Ci per AFR from mining
750 Ci per AFR from milling
4835 Ci per AFR total

Presumably this is how the figure of 4800 Ci was arrived at in footnote 5 to Table S-3.

I would suggest that footnote 5 be changed to show only the 4085 Ci from mining. Since the mines are closed and radon emission stopped it is logical to apportion the total emitted during the life of the mine among the number of AFRs mined. The correct procedure for apportioning the radon from milling is different as will be seen shortly.

The last sentence of footnote 5 to Table S-3 deals with the offsite doses due to radon. Again, the origin of the numbers shown is apparent but the logic is faulty. Table VIII (A) 6 shows the following dose commitments to offsite U. S. population

Total body dose - mining -- 3.0×10^6 person-rem
Total body dose - milling -- 5.8×10^5 person-rem

If these numbers are divided by the 5875 AFRs mined during the 26 years one obtains 510 person-rem from mining and 100 person-rem from milling as stated in the footnote.

Again, I suggest that only the dose from mining be retained in the footnote inasmuch as the 100 person-rem from milling is grossly in error.

Let us now consider how to treat properly the radon from the tailings piles associated with the uranium mills. Although the mill recovers most of the very long lived uranium from the ore, the Th-230 which was in radioactive equilibrium with the uranium is returned to the tailings piles. Consequently the Rn-222, a daughter of Th-230 is continually generated in the tailings pile and will diffuse to the surface of the pile and escape into the atmosphere. Since Th-230 has a half-life of about 80,000 years the tailings pile becomes a long lived source of radon. Therefore the total amount of Rn-222 that is emitted by 2.7 x 10^5 MT of tailings (approximately that associated with 1 AFR) becomes a very large number when integrated over the radioactive life of Th-230. NUREG-0002 does not include that number, however, it does estimate that the amount of Rn-222 that would be emitted <u>each year</u> from the 1.6 x 10^9 MT of tailings in piles at the end of this century would be about 420,000 Ci, assuming a 2-foot thick earth cover over the piles. If this number is divided by the 5875 AFRs which produced the piles, one arrives at a figure of 71 Ci/yr. This is numerically near the 74.5 Ci figure of Table S-3 --

hence changing that table from "Ci per AFR" to "Ci per AFR" might be the easiest way out. The total amount of per AfR over all future years would be 71 x 1.44 x 80,000 ≅ 8,000,000 Ci, and is the proper figure to show in Table S-3 if the units are not changed.

Since the radon continues to seep from the tailings pile for a very long time, the total dose to people over all future generations could become very large. Deaths in future generations due to cancer and genetic effects resulting from the radon from the uranium required to fuel a single reactor for one year can run into the hundreds. (See Pohl, Search, Vol. 7 No. 8, Aug. 1976). It is very difficult to argue that deaths to future generations are unimportant. But it can be shown that the number is insignificant compared to those due to the radon contribution in natural background.*

In summary the values given in Table S-3 for the amount of Rn-222 emitted per annual fuel requirement is grossly in error. So also is the dose to offsite population from milling due to one annual fuel requirement -- the correct number is more nearly 10 million person-rem rather than 100 person-rem.

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* NUREG-0002 (Vol. 1. p-30) points out that by the year 2000, the radon release rate from tailings piles would be less than 0.2% of the radon released annually from the soil of the United States.

I would suggest that emission be given in curies per year per ADR; that doses be expressed in person-rem per generation per annual fuel requirement.

W H Jordan

Walter H. Jordan, Member
Atomic Safety and Licensing
Board Panel

ATTACHMENT E

ALAB-456

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Jerome E. Sharfman

In the Matter of	)	
METROPOLITAN EDISON COMPANY, et al.	)	Docket No. 50-320
(Three Mile Island Nuclear Station, Unit No. 2)	)	SERVED JAN 30 1978

Mr. Chauncey R. Kepford, State College, Pennsylvania, for the intervenors, Citizens for a Safe Environment and York Committee for a Safe Environment.

Mr. Ernest L. Blake, Jr., Washington, D.C. for the applicants, Metropolitan Edison Company, et al.

Mr. Henry J. McGurren for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

January 27, 1978

(ALAB - 456)

Before this Board is the appeal of intervenors, Citizens for a Safe Environment and York Committee for a Safe Environment, from the December 19, 1977 initial decision of the Licensing Board in this operating license/ environmental review proceeding involving Unit No. 2 of

the Three Mile Island Nuclear Station. LBP-77-70, 6 NRC ___. In conjunction with their exceptions to that decision, the intervenors moved for a stay of its effectiveness. The motion was said to be based upon the content of the exceptions.

By unpublished order of January 3, 1978, we called attention to the fact that the motion was deficient in that it failed to address adequately the four well-settled criteria governing the grant or denial of stay relief which are now embodied in 10 CFR 2.788(e), 42 Fed. Reg. 22128, 22130. See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), CLI-77-27, 6 NRC ___, ___ (November 4, 1977); Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-437, 6 NRC ___, ___ (October 14, 1977).[1/] Because, however, the intervenors are represented by a lay person, we decided to provide them with an opportunity to cure the deficiency in a supplemental memorandum.

The intervenors have availed themselves of that opportunity. It is manifest to us, however, that the showing

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1/ As stated in Section 2.788(e), those criteria are: (1) whether the moving party has made a strong showing that it is likely to prevail on the merits; (2) whether the party will be irreparably injured unless a stay is granted; (3) whether the granting of a stay would harm other parties; and (4) where the public interest lies.

contained in their supplemental filing falls far short of what would be required to warrant our foreclosing reactor operation pending the outcome of the appeal.

The intervenors do not contend, let alone attempt to establish, that the operation of Unit 2 during the pendency of the appeal would pose an immediate and direct threat to the health and safety of their members. Rather, their request for stay relief turns out to relate exclusively to one aspect of the consideration of the environmental effects associated with the uranium fuel cycle -- the amount of radon (Rn-222) that is generated by the uranium mill tailings produced in the course of the mining and milling process. The claim is that that amount is far greater than was assumed for the purposes of the environmental review of this facility.

Were we to reach the merits of that claim and to find it to be substantial, there would remain the question whether the error was of such potential magnitude as might possibly require the denial of an operating license to this now completed reactor. It is clear, however, that we need not reach that question. This is because assertion of the claim in this proceeding is barred as a matter of law for the reason that it constitutes an impermissible attack upon a generic regulation of the Commission.

1. Some years ago, the then Atomic Energy Commission embarked upon a rulemaking proceeding addressed to the manner in which the environmental effects associated with the uranium fuel cycle were to be considered in the individual NEPA cost-benefit analyses for light water reactors. The result was the adoption in April 1974 of a regulation which was codified in 10 CFR 51.20(e). As summarized by us in Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-349, 4 NRC 235, 238-39 (1976), vacated on other grounds, CLI-76-17, 4 NRC 451 (1976):

> Reflecting the Commission's conclusion that the environmental effects of the fuel cycle, including reprocessing of spent fuel and waste disposal, were "relatively insignificant" but nonetheless should be taken into account, the regulation in substance required the introduction of quantified environmental effects of the uranium fuel cycle into the cost/benefit analysis for each individual reactor -- and went on to stipulate that "[n]o further discussion of such environmental effects shall be required." The particular numerical values to be factored into the analysis for various stages of the fuel cycle (including reprocessing of spent fuel and waste disposal) were set forth in an accompanying Table, identified as S-3. These values were derived from the "Environmental Survey of the Nuclear Fuel Cycle" issued by the Commission's staff in November 1972, as subsequently revised in a staff document entitled "Environmental Survey of the Uranium Fuel Cycle" (WASH-1248, April 1974) which incorporated comments and recommendations offered during the course of the rule-making proceeding.

[Footnote omitted.]

In 1976, the Court of Appeals for the District of Columbia Circuit held invalid so much of the regulation as was concerned with the spent fuel reprocessing and waste disposal phases of the fuel cycle. Natural Resources Defense Council v. NRC, 547 F.2d 633, certiorari granted sub nom. Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, 429 U.S. 1090 (1977). In the wake of this decision, the Commission promulgated in March 1977 a new interim rule designed essentially to replace those portions of the existing rule which had been struck down by the court. 42 Fed. Reg. 13803 (March 14, 1977). In taking this action, the Commission expressly directed that "any operating license, construction permit, or limited work authorization (LWA) that may hereafter be issued must take into account the revised values contained in this rule." Id. at 13806 (emphasis supplied).[2/]

2. As originally promulgated, Table S-3 assigned a numerical value to, inter alia, the Rn-222 which would be

2/ The Commission indicated that the interim revised rule was to remain in effect for "the limited period of eighteen months", expressing confidence that final rulemaking proceedings can be completed within this period". 42 Fed. Reg. 13803, 13806. At this writing, those proceedings are in progress. They are confined to the reprocessing and waste disposal phases of the uranium fuel cycle (i.e., the portions of the original rule which were judicially invalidated - See fn. 5, infra.

released in the form of gaseous effluents from the uranium mill tailings. That value was 75 curies per annual fuel requirement of a model 1000 MWe light water reactor. Because the decision of the District of Columbia Circuit in Natural Resources Defense Council, supra, did not invalidate the portions of the table which pertained to the mining and milling phases of the fuel cycle, there was no necessity to focus on those phases in the consideration of an appropriate replacement interim rule. And, as it turned out, little change was made in the Rn-222 value. The value assigned in the interim rule is 74.5 curies, with the notation that it is derived "[p]rincipally from milling operations and excludes contributions from mining." 42 Fed. Reg. 13803, 13807.

It is this value which the intervenors assert is far wide of the mark. They rely not only on the testimony of their own witness below but also on the "corroboration" of that testimony to be found in a September 21, 1977 memorandum from Dr. Walter H. Jordan, a technical member of the Licensing Board Panel, to the Chairman of that Panel. Dr. Jordan expressed the view therein that the 74.5 curie value was in error and that the "correct value would be some 100,000 times greater". He went on to set forth the analysis which led him to this conclusion -- adding, however, that the numerical result which he reached "is insignificant

compared * * * to the radon contribution in natural background."

The Jordan memorandum was immediately transmitted by the Chairman of the Licensing Board Panel to the Chairman of the Commission. On October 5, 1977, the latter acknowledged receipt of the memorandum. Noting that it involved "a generic matter", the Chairman of the Commission indicated that the memorandum was being made publicly available and that copies were being specifically furnished to the NRC staff and to counsel for an organization which had filed a petition for rulemaking on a related matter.

3. In the totality of these circumstances, we think it clear that, in the absence of contrary instructions from the Commission, the Licensing Board was obliged to give effect to the values in the revised Table S-3 in this proceeding. This conclusion follows not only from what we said several years ago in rejecting a similar attack upon the original Table S-3[3/] but, as well, from the Commission's express direction last April that "any

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3/ Specifically:

> [T]he environmental values assigned in Table S-3, * * * reflect the Commission's considered evaluation and quantification of the adverse environmental effects of the uranium fuel cycle attributable to individual reactors. The figures were developed in public rulemaking proceedings convened by the Commission specifically to consider such matters. 37 F.R. 24191 (1972). They form an integral part

(FOOTNOTE CONTINUED ON NEXT PAGE)

operating license * * * that may hereafter be issued must take into account the revised values contained in [the interim] rule." See p. 5 , supra. Still further, now as before, 10 CFR 51.20(e) mandates that, in the applicant's environmental report, "the contribution of the environmental effects of uranium mining and milling * * * be as set forth in Table S-3" and goes on to state unequivocally that "[n]o further discussion of such environmental effects shall be required."[4/]

3/ (FOOTNOTE CONTINUED FROM PREVIOUS PAGE)

of the new regulation. To go behind them and challenge the basis on which they rest is in effect a challenge to the regulation itself. It may well be that these values rest on unfirm footing. The Licensing Board, however, is not the proper forum for consideration of such matters. The Commission's regulations provide that "any rule or regulation of the Commission, or any provision thereof, ... shall not be subject to attack ... in any adjudicatory proceeding involving initial licensing ..." 10 C.F.R. §2.758 (1974 rev.).

Potomac Electric Power Co. (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-218, 8 AEC 79, 89 (1974) (footnote omitted); accord, Philadelphia Electric Co. (Limerick Generating Station, Units 1 and 2), ALAB-262, 1 NRC 163, 204 (1975); see Union Electric Co. (Callaway Plant, Units 1 and 2), ALAB-347, 4 NRC 216, 217-219 (1976). See also Public Service Electric & Gas Co. (Salem Nuclear Generating Station, Units 1 and 2), ALAB-426, 6 NRC 206, 210-11 (1977).

4/ Section 51.20 governs environmental reports at the construction permit stage. No different rule obtains respecting the environmental reports at the operating license stage. See 10 CFR 51.21.

It is difficult to perceive how the Commission could have spoken in plainer terms. Nor is there any reason to doubt that, had the Commission believed that the Jordan memorandum necessitated some other course, it would have so notified the adjudicatory boards. In this regard, there was not the slightest hint in the acknowledgment by the Chairman of the Commission of the receipt of the memorandum that either he or the other members of the Commission thought that the then -- and still -- outstanding instruction should be modified to any extent.[5/]

5/ In issuing its notice of reopened hearing on the interim fuel cycle rule last May, the Commission announced that "[t]he subject of the hearing will be confined to the environmental effects of spent fuel reprocessing and radioactive waste management in the light water power reactor uranium fuel cycle, and to the question whether the outcome of the interim rulemaking should be made permanent for future use, or if it should be altered, in what respects". The notice went on to state that the NRC staff "has initiated a study designed to examine information that has developed since promulgation of the fuel cycle rule for the purpose of generally updating the rule in other subject areas" and that "[t]his updating will be the subject of a separate rulemaking proceeding." 42 Fed. Reg. 26987, 26989 (May 26, 1977) (emphasis supplied). In its comments on the scope of the reopened hearing, the NRC staff brought these statements to the attention of the Hearing Board and asserted that one example of material which is appropriate for consideration in the future rulemaking proceeding is "the document submitted to the Commission by Dr. Walter H. Jordan * * * in which

(FOOTNOTE CONTINUED ON NEXT PAGE)

4. In light of the remoteness of the possibility that the intervenors will ultimately prevail on the single issue pressed upon us in their supplemental memorandum, stay relief would be appropriate only upon the most compelling demonstration that the other factors to be considered (see fn. 1, supra) weigh very heavily in their favor. That demonstration has not been made.

For present purposes, we need not go beyond the especially important irreparable injury factor.[6/] As already noted, the intervenors do not even endeavor to

5/ (FOOTNOTE CONTINUED FROM PREVIOUS PAGE)

he suggests the need for changes to the front end portions of the rule due to radon emissions from mill tailings". See First Round of Suggested Staff Questions and Comments on Scope of Proceeding, filed on October 31, 1977 in Uranium Fuel Cycle Impacts From Spent Fuel Reprocessing and Radioactive Waste, Docket No. RM-50-3, at p. 3, fn. 2.

Although we agree with that position, it does not follow that, pending the outcome of the future rulemaking proceeding, the value assigned in Table S-3 to radon releases is subject to reexamination in individual licensing proceedings. The short of the matter is that there is no room for such reexamination given the Commission's unmistakable command (see text above) that the now assigned S-3 values be taken as establishing, inter alia, "the contribution of the environmental effects of uranium mining and milling." To repeat, we are obliged to give total respect to that command so long as the Commission chooses to leave it in effect.

6/ We might note parenthetically, however, that the intervenors' showing on the remaining two factors is extremely weak.

show that plant operation during the pendency of the appeal will pose a direct threat to the health and safety of their members, who reside in the general vicinity of the facility site. And their motion papers do not suggest that any -- let alone irreparable -- injury would be sustained during the period in question by reason of the mining and milling of additional uranium. The intervenors do make vague references to the "radioactive contamination" of the reactor and the creation of radioactive waste as a source of injury; here too, however, we are left entirely in the dark regarding what the nature and extent of that injury might be. And intervenors did not complain about these consequences in the proceedings below.

Motion for a stay denied.

It is so ORDERED.

FOR THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

Margaret E. Du Flo
Secretary to the
Appeal Board

ATTACHMENT F

Intervenors' brief in Support of Exceptions
to the Initial Decision, Dated December 19, 1978

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

In the Matter of	)	
METROPOLITAN EDISON CO.,	)	
et al.	)	Docket No. 50-320
(Three Mile Island Nuclear Generating Station, Unit 2)	)	

INTERVENORS' BRIEF IN SUPPORT OF EXCEPTIONS TO THE INITIAL DECISION DATED DECEMBER 19, 1977

January 30, 1978

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Aircraft

Contention 5 of the Intervenors' Petition alleged that the safety-related structures of TMI-2 are of insufficient strength to withstand the impact of aircraft above 200,000 lbs. All parties conceded that this statement was a statement of fact (I.D., para. 40). Further, none of the parties refuted the concern of the Intervenors that such an impact might lead to radiological consequences greater than the admittedly unacceptable levels of 10 CFR Part 100. The rest of the contention, as interpreted by the Board, pertained to whether or not the number of flights of large aircraft (meaning greater mass than 200,000 lbs. or the design basis aircraft), constituted a threat to the health and safety of the public.

Both the Applicant and the Staff took the approach that the problem could be solved by the use of predictive models, without an articulated discussion of the consequences of an accident with larger than design basis aircraft (tr. 521, 709).

Under cross-examination, both Staff Witness Read and Applicant Witness Vallance admitted that their respective predictive models were subject to an unknown level of uncertainty in the model itself (tr. 562, 653-4). In addition, both Witnesses admitted that it was not even important or worthwhile to assess the confidence limits in part of (tr. 653) or all of their input data (tr. 562, 607). This approach to the use of a predictive model has the advantage that the results are essentially unassailable. If one is interested primarily in insuring that the administrative decision to license the plant will be affirmative, the approach is perfect.

The public bears the burden of administrative errors, however, and in this proceeding, a number of factors contribute to cast very serious doubt on the rosy aura of security in the use of unquestionable numbers based on unverifiable predictive models with input data of unknown confidence.

The data used for the input into the model of Witness Vallance contained an admitted bias (tr. 658), and did not contain data pertinent to

the Pennsylvania growth rates of air traffic (tr. 530). It also was revealed that all of the flights of large aircraft (greater than 200,000 lbs.) in or out of Harrisburg International Airport were unscheduled aircraft (tr. 555-6). Yet the crash data used by Applicant Witness Vallance included crashes of scheduled aircraft, indeed the data were composed primarily of scheduled aircraft crash data (tr. 557), with a "relative small amount of unscheduled cargo traffic incorporated in those data also." The record does not demonstrate the applicability of scheduled aircraft crash data to unscheduled aircraft landings and takeoffs (tr. 557). A request to the Applicant for crash data on military aircraft was made (tr. 560), and the data were promised (tr. 585) but never delivered. Military crash data were of relevance since some of the large aircraft were military aircraft (tr. 586). Staff Witness Read acknowledged "At the present there is no agreed upon way of designing a rigid structure, steel reinforced structure, against aircraft impact." (tr. 624). And Witness Read further stated, when asked if there was any guarantee that TMI-2 could withstand the impact of a 200,000 lb. aircraft (again, the design basis aircraft), "to the best of my knowledge and belief, no test of a large aircraft against a rigid structure" had been performed since immediately following World War II (ending, August, 1945)(tr. 631).

In addition, the subject of consequences to the public of an accident with larger than design basis aircraft was discussed to a limited amount on the record, with less than confidence-inspiring results. Applicant Witness Vallance acknowledged that he had not considered the consequences of an accident to the public in his analysis (tr. 521). Staff Witness Read stated that accident consequences were not completely ignored in his analysis (tr. 709), and conceded that he couldn't describe in any meaningful way what the consequences would be if a large aircraft crashed into a nuclear power plant (tr. 663). Witness Read admitted that the crash could produce consequences no worse than the worst postulated in the Reactor Safety Study (tr. 696). Read subsequently stated that he thought the existing criticisms of the Reactor Safety Study (WASH-1400) were about as valid as the Study itself (tr. 696). He similarly agreed that, combining the estimated magnitudes of the

underestimation of health consequences and probabilities, one could come up with much, much higher levels of risk than were estimated in the Study (tr. 698-9).

When the foregoing is all put together, it becomes clear that there is very little that is known to be factual with regard to the subject at hand, namely, the probability of and consequences of a large aircraft crashing into TMI-2. The quality and applicability of the input data are not known. The model used by the Applicant is a home-made one, and has never been subjected to peer review and criticism (tr. 563, 565). The NRC model does not require thorough analysis or knowledge; the "analysis is just a filling out of the little formula . . ." (tr. 652). And the record shows clearly that there has been no clear understanding or consideration of the consequences to the public of an aircraft impact into TMI-2. It is not known whether or not the safety related structures can even withstand the crash of a design-basis aircraft. Under these circumstances, the conclusions of the I.D. are premature (para. 50). Indeed, the claim of conservatism in para. 49 of the I.D. is based on exceedingly tenuous evidence. When asked about his "conservative analysis," Staff Witness Read stated that he used values that were realities or that were "substantially conservative compared to things that have happened in the past." (tr. 620). Subsequently, Read stated that the conservatisms "might in the future be quantifiable." (tr. 1305). This is much less than a definitive description of what is to be expected from the Staff in performing a "conservative analysis" designed to protect the health and safety of the public.

The Intervenors attempted to break through this morass of equivocation by means of a motion of April 15, 1977, filed under extreme hardship and inconvenience imposed by the Board. The Intervenors made an oral motion to compel the Applicant to produce a witness to describe the consequences of a large aircraft crashing into TMI-2 (tr. 590-3), and the Board deferred ruling on the motion (tr. 600). Subsequently, the Staff offered to produce a witness to describe the structural ability of TMI-2 to withstand design-basis aircraft crashes, at the suggestion of the Board (tr. 637-8). On the basis that such a witness would be produced by the Staff, the Intervenors deferred cross-examination on the question of the structural integrity of TMI-2 (tr. 638).

The Board ultimately requested the Intervenors file a motion to require production of the witness. The Board set an arbitrarily short and exceedingly burdensome time limit (10 days, even though the Board was told that Intervenors were to travel to New Mexico during this time) on the Intervenors in which to produce this motion, denying Intervenors' plea for an extra two weeks to formulate the motion. Thus the Board deprived the Intervenors of any opportunity for research or benefit of legal advice or even a typewriter (see tr. 727-47 for a fuller discussion of this issue). The motion was submitted, in timely fashion, handwritten. Having saddled the Intervenors with an arbitrary and unreasonable time limit, the Board then dismissed the request that the Staff produce a witness to discuss the structural make-up of TMI-2 (tr. 748). After having denied the Intervenors' request for enough time to put careful thought into the motion (tr. 737), the Board waited until May 18, 1977, to deny the motion and procrastinated until August 8, long after the record had been closed, to supply the required justification for the denial. Thus the Board denied the Intervenors the opportunity to pose legitimate questions regarding an important aspect of accident analysis and the consequences of possible Class 9 accidents from aircraft impacts, for which no known preventive engineered safety features exist. The Board, by its own acts, effectively put a lid on the subject. Similarly, the Board refused the offer of the Staff to discuss whether or not TMI-2 could even withstand a design basis aircraft crash (tr. 748).

In its denial of the Intervenors' motion to produce a witness, the Board attempted illegally to place the burden of proof on the Intervenors by suggesting that the Intervenors' motion was rejected because it did not show that the large aircraft impact "should have been considered a design basis event" (emphasis in the original document). Such a position is inconsistent with the Commission's rule, 10 CFR 2.732. Compare York Committee for a Safe Environment, et al., v. USNRC, 527 F. 2nd 812, 815-816, at n. 12 and n. 13 (D.C. Cir. 1975). This spurious argument by the Board came after the Intervenors had been denied the opportunity to establish a possible relationship between a Class 9 accident and a large aircraft impact, since the Board arbitrarily and capriciously had denied the Intervenors the right to cross-examine the Staff witness with regard to aircraft impact consequences because of the pending motion

and "until we rule in your favor on that motion. . ." (tr. 1309).

The Board's denial of the motion, and the I.D. (para. 45), are illegal because they rely on an arbitrary chosen impact probability rate. The decisions to deny the motion and issue the I.D. were based upon assumptions, shown under cross-examination to be highly dubious, as explained above, that the probability of a large aircraft impacting into TMI-2 was (slightly) less than 10^{-7} per year. This use of an aircraft impact probability of 10^{-7} per year is without any reliable or probative basis in the record of either a knowledge of the risk to the public of exposure to large quantities of radiation or a knowledge of the radiological consequences to the public of such an accident. The Board, in effect, ignored or considered negligible the radiological consequences in excess of the exposure guidelines of 10 CFR 100 which could result from the crashing of a large aircraft into TMI-2 (I.D. para. 46). By ignoring the radiological risks and consequences to the public, the Board failed to protect the health and safety of the public, as required under AEA, NEPA, and ERA.

In short, the <u>only</u> solid information the Board had upon which to reach its conclusion (I.D. para 50) consisted of the professional judgments of the two witnesses (tr. 610, 674) and their estimates of the large aircraft volumes necessary to constitute a threat to TMI-2. But even in this latter regard, there was no agreement. Witness Vallance indicated that "several orders of magnitude" in increases of large aircraft movements would be required before the guideline level was reached (tr. 553). Witness Read initially implied a factor of 4 increase in traffic would reach the guideline level (tr. 618). Witness Read later, in his supplemental testimony (after tr. 1297) stated that aircraft movements greater than a factor of 10 larger than current levels would exceed guideline levels, though he retained his value of 2400 flights as the guideline level.

In a decision dated August 24, 1977, the Atomic Safety and Licensing Board issued ALAB-429. In that case, the Appeal Board remanded to the Licensing Board certain aspects of the proceeding. The issue involved concerned the potential threat of LNG (Liquified Natural Gas) tankers, crashes, and ignition of any released gases to the Hope

Creek Generating Station, Units 1 and 2. The Appeal Board cited a number of deficiencies in the evidentiary record, including conflicting evidence, confusion in the assumptions made in the choice of data, and failure to consult other potentially relevant sources of information (ALAB-429, pages 10, 11). An entirely analogous situation exists in the present proceeding. The Intervenors sought by means of a motion dated August 27, 1977, to have the reasoning of the Appeal Board in ALAB-429 applied to this proceeding with regard to an external hazard to TMI-2, large aircraft crashes. This motion was summarily dismissed with no articulated reason by an order dated September 19, 1977.

For example, as mentioned earlier, the crash data used by Applicant Witness Vallance applies to all commercial air traffic, scheduled and unscheduled, with the majority of the data being due to scheduled aircraft (tr. 557). Yet Witness Vallance stated that the large aircraft using Harrisburg International Airport were entirely unscheduled and military (tr. 557, see also Read testimony, page 1) aircraft. The applicability of this data has not been established. The refusal of the Applicant to supply the military aircraft crash data also has not contributed to sound and reasoned decisionmaking in this proceeding.

The aircraft crash into a nuclear power plant, as TMI-2, creates a spectre unlike any other externally propagated hazard at nuclear power plants, with the possible exception of earthquakes. The problem here rests solely with the ability, or inability, of the safety-related structures to withstand aircraft crashes. If these structures fail, then the last line of defense for normal accidents becomes the first safeguard to fail. However, such a single failure does not necessarily lead to holocaust. The record remains totally void of any information on the nature or degree of any subsequent failures of the plant safety boundaries and the consequences of such failures--consequences to the plant, if any, and consequences to the public, if any. Thus, the point made by Staff Witness Read, "You never accept the probability if the consequences are too high." (tr. 709-10) fell on deaf ears. In reality, the crash probabilities assumptions were given complete acceptance by

the Board, with only the most vague of references to consequences, even though the Board explicitly had expressed concern over whether or not a large aircraft could initiate a Class 9 accident (tr. 727-8). Again, the Board relied on judgments obtained from inserting numbers of unquestionable and unknown accuracy and applicability into unverifiable models.

This reasoning by the Board does not even satisfy 10 CFR 2.760(c), let alone the dictates of the APA, 5 USC 706, or the requirement of the AEA, NEPA and ERA to protect the health and safety of the public. The Board obviously prefers to play bookie when other peoples' lives are at stake. The Board has no such authority.

Evacuation Plans and Emergency Response Capability

Intervenors contended that the emergency response and evacuation plans of the responsible governmental agencies and the Applicant were inadequate and unworkable.

The plans were based upon the unproven and questionable assumptions that all necessary officials will be available at all times, will known how to respond and will react promptly, and that members of the public will respond to a radiological emergency and allow themselves to be evacuated, despite prior assurances that accidents severe enough to warrant evacuation are "highly unlikely."

The Initial Decision (I.D. page 33) misquotes the final sentence of the Intervenors' Contention 8 as follows: "No operating and evacuation plans are shown to be workable through live tests." The Final sentence of Contention 8 actually reads as follows:

> No operating license should be granted for Unit 2 until emergency and evacuation plans are shown to be workable through live tests.

In other words, Intervenors submit that a license to operate TMI-2 should not issue before the emergency response and evacuation plans have been shown to be workable through live tests and drills of those who would be evacuated.

The confidence expressed by Applicant and Commonwealth witnesses that evacuation could be accomplished in a timely manner was based entirely upon studies of and experiences with non-radiological emergencies (tr. 805-6, 829-32, 2431-44, 2528) and upon previously announced drills involving only official personnel (tr. 786-7, 793). These reliances are unfounded because they are based on past events and untested paper plans which have little bearing on the ability to accomplish evacuation during a real radiation disaster.[1] Their assurances that evacuation would be accomplished in a radiation emergency were not based on personal knowledge

[1] It is relevant to note here that, following the Millstone reactor accident in Connecticut in December, 1977, New York state placed civil defense emergency personnel on Long Island on alert, but did not notify the public of the potential need to evacuate. Further, in January, 1978, U.S. officials failed to notify the Canadian government of the impending reentry of the damaged Russian nuclear-powered satellite in order to "head off a re-creation of Mercury Theater," a reference to the 1938 radio broadcast of "War of the Worlds," which had created some public panic. (New York Times, January 25, 1978, page 1).

Commonwealth witnesses admitted their ignorance of radiation and radiation-induced injury or other radiation-induced health effects (tr. 1355-56, 813-14, 837, 1567). Hence there is substantial doubt that the judgment of those responsible for public health and safety protection would not be defective in the aftermath of a radiological accident at TMI-2 which required evacuation of the surrounding area. The Board acted with caprice and arbitrariness, and violated its own rules of practice, in accepting these unfounded assurances by the Commonwealth witnesses of their ability to effect the safe evacuation of all affected persons. After admissions with regard to the absence of even a rudimentary understanding of radiation or of what constitutes a radiation injury (tr. 1355-1356, 813-14), or of the maximum permissible dose to which volunteer evacuation personnel are permitted to be exposed (tr. 1448), one must inquire, as the Board did not, whether Dauphin County Civil Defense Director Molloy, would fail to take appropriate action to protect his volunteers, e.g., whether he would have any way of knowing when to withdraw them from evacuation efforts to protect them from exposure greater than the maximum permissible doses. The Board's conclusion (I.D. para. 65) that State and local officials "will not be hampered" in the discharge of their responsibilities to protect the health and safety of the public" is arbitrary, capricious, evasive, and irrelevant. The record demonstrates, however, that these officials have no understanding whatsoever of the magnitude and nature of possible radiological accidents or theirconsequences, of the public's lack of demonstrated ability to respond to radiological accidents swiftly and effectively, or of the kinds of difficulties that may develop in the process of evacuation following a radiological accident at TMI-2. The Board's reliance (I.D. para. 65) on the confidence expressed by the Commonwealth witnesses, who admitted to being unschooled and unknowledgeable in radiological matters, that their ignorance would not compromise their own effectiveness of response and is therefore in violation of the Commission's rules.

The assurances by the Commonwealth's Witness Molloy, who is the primary person responsible for implementing evacuation following a radiological accident at TMI-2, with regard to the ability of the County Civil Defense organization to cope adequately with the management of

public vehicular traffic following such an accident is contradicted by Molloy's admission that he knows of no studies of traffic flow in the Harrisburg metropolitan area (tr. 1434). No showing was made in the record that evacuation of large numbers of people from the environs of the plant could be expected to proceed with sufficient speed and effectiveness to protect adequately or credibly the health and safety of the public.

Further assurances of the Commonwealth's witnesses, whose authority with regard to the proper techniques for response to an accident at TMI-2 is doubtful, as shown above, that public drills are not needed to ensure that the public will respond quickly and effectively to emergency evacuation instructions (I.D. para. 65) do not constitute reliable, probative, and substantial evidence that such is in fact the case in radiological emergencies. The Board's conclusion (I.D. para. 66) that a "diversity of non-radiological events" referenced provide sufficient basis for disregarding the need for live tests to demonstrate the workability of evacuation plans in the event of a radiological emergency is not based upon evidence in the record and is arbitrary, capricious, and illegal. In addition, the Board's finding (I.D. para. 63) that a "randomly required initiation of the appropriate emergency response plans will not fail due to any inability to contact state and local officials" is also arbitrary and capricious, and is not based upon evidence in the record of actual experience by state or local officials or the Applicant with random drill.

In this same vein , Commonwealth's Director of Radiological Health, Thomas Gerusky, who was present during cross-examination of Commonwealth witnesses on the emergency preparedness issue, but who did not himself testify, has declared unambiguously in the record of the Draft of the EPA Workshop Proceeding on the October, 1976, Chinese Fallout Incident that the Chinese Fallout experience showed that the Commonwealth's ability to assess doses quickly and effectively probably would not have been adequate had the incident resulted from a nuclear reactor accident. (Draft Proceedings of a Workshop on the October, 1976 Chinese Fallout Incident, pp. 23-24). Gerusky is the primary person responsible for determination of the need to evacuate in response to an accident at TMI-2.

This recently released documentation corroborated the record's demonstration of the inadequacy of the Commonwealth's radiological accident response capability.

Specifically, the Commonwealth's Director of Radiological Health Thomas Gerusky stated, at page 24 of the EPA Draft Proceedings document, that, with respect to response to the fallout from the Chinese nuclear test:

> We had acceptable programs for this particular case. I doubt that they would be acceptable in the case of a reactor accident.

The Commonwealth concealed this crucial insight into its inability to respond effectively to a radiological accident at TMI-2. The Commonwealth did not enter into the TMI-2 record this or any other adverse assessment of its ability to calculate doses accurately and in time to enable a determination of the necessary evacuation requirements, even though the Commonwealth was a full party during the subsequent TMI-2 Operating License Hearings.

The inability of the Commonwealth to maintain its existing monitoring capabilities was raised in the TMI-2 proceedings, but made no visible impression on the Board or Staff. The Board (I.D. para. 64) ignored the health and safety of the public and therefore acted contrary to AEA, NEPA, and ERA, because it ignored the extensive and undisputed testimony in the record that the Commission has no procedures for assuring the existence of a continuing capability to respond to a radiological emergency. For example, the Board violated the APA, AEA, NEPA, and ERA in accepting the Staff's determination that the Applicant would fill the void in the event that the Commonwealth's Bureau of Radiological Health Suffered a reduced emergency response capability (I.D. para. 64). There had been no showing in the record that the Applicant is willing or able to assume the Commonwealth's role under these circumstances. There had been no showing in the record that the Commission has or will develop procedures for assuring the continuing existence of an emergency response capability by the Commonwealth, the Applicant, or any other entity, with regard to the possibility of an accident at TMI-2. Evidence that a reduction in the Commonwealth's response capability was a very real possibility was entered into the record by the Intervenors (tr. 1109), but was conveniently deemphasized by the Board (I.D. para. 64).

By restricting Intervenors' cross-examination of the Commonwealth witness from Dauphin County Civil Defense to discussion of an area beyond the boundary but in the immediate environs of the Applicant's designated evacuation zone, the Board also acted arbitrarily and capriciously, preventing full exploration of the ability of the County Civil Defense agency to protect all potentially affected persons residing within its jurisdiction, irrespective of any limitations based upon the alleged improbability of the Class 9 accident. Civil defense and disaster preparedness officials must take disasters as they come without regard to whether or not they exceed some arbitrary level of probability, risk, or consequence. The Board and Commission cannot turn their backs on the responsibility for licensing under 10 CFR 50.57 (a)(3)(i) and (a)(b) and their fundamental responsibilities under AEA, NEPA, and ERA.

The failure of the Staff and Board to look beyond the confines of the evacuation zone defined by the Applicant constitutes a failure to conform with the mandate of the Atomic Energy Act, particularly in view of NEPA and the Energy Reorganization Act of 1974, to protect the health and safety of the public. The prejudice to the public interest by this restriction of inquiry to evacuation of the areas in the immediate vicinity of TMI-2 is compounded because the record had already shown that a Class 9 accident at TMI-2 could occur by the crashing of a large aircraft into the TMI-2 plant.

It should also be noted that the recent findings of an <u>increased</u> relationship between low doses of radiation and serious health effects have implications for the evacuation of members of the public who reside close to, though not in the immediate environs of, TMI-2. The prepared testimony of Applicant Witness Herbein, et al. (after tr. 757) specifically mentions public exposure levels considered to be the levels which must not be exceeded (Testimony, page 9). One of these levels that Herbein notes may not be exceeded, the whole body dose of 5 rem, falls in the range of doses found to <u>double</u> the incidence (compared to that which would be expected without the dose) of certain forms of cancer, according to the first broad-based epidemiological study of low dose exposure to humans ever undertaken, the Mancuso Report (tr. 2331-2338). This implies that the public is being subjected to extraordinary risk prior to the call for evacuation.

The question of who looks after the health and safety of the public during and after a reactor accident received a considerable amount of attention in this proceeding. Staff Witness Brittz stated that it was not NRC policy to measure radiation doses to people, but that the Applicant was required to do so through calculations (tr. 1065). Under accident conditions, the responsibility for monitoring exposure levels to members of the public andlooking after the protection of the public would fall upon the State, according to Staff Witness Van Niel (tr. 1075).

Witness Van Niel later reaffirmed that doses received by members of the public during accident conditions would be assessed by the Applicant (tr. 1743). Staff Witness Stohr admitted that the responsibility of the Applicant toward any monitoring of radiation doses extended only out to the edge of the Low Population Zone (tr. 1770). Witness Stohr was unable to identify any agency at all which had radiation dose monitoring responsibility beyond the Low Population Zone (tr. 1770), and stated that he was unaware of any regaulations delineating such responsibility (tr. 1771).

The testimony of Applicant Witness Herbein identifies the thyroid as the critical organ during an accident (after tr. 757; testimony, page 9). Staff Witness Stohr stated that the amount of radioactivity in the thyroid could be measured through the use of properly calibrated whole body counters (tr. 1787). Witness Stohr further stated that he had received assurances that the State would use whole body counters in its dose assessments for members of the public, depending on the circumstances, though he acknowledged that the State had no such counters (tr. 1788). However, the record does not show that the Applicant or Staff have considered how many people may need to have their thyroid doses measured as a result of an accident at TMI-2, the location and availability of the counting equipment, or the means of transporting those people affected to the counters. Thus, here again, the Staff and the NRC, in their eagerness to license another plant, have recklessly ignored the non-delegatable duty of the Commission to protect the health and safety of the public.

Furthermore, the Applicant is required by the rules of the Commission to furnish the information concerning an accident to the Commission (after tr. 757). On page one of its prepared testimony on Intervenors' contention 3, the Applicant states:

> In the highly unlikely event of an accident, . .Metropolitan Edison Company (Met Ed) as operator of TMI-2 has the responsibility to detect the event, . . . initially assess and thereafter constantly reevaluate its potential effect on on-site and off-site personnel, and provide . . . information of off-site consequences to local, state, and federal authorities (emphasis added).

This information which the Applicant is required to provide the Commission to comply with the Commission's rules consists of, among other things, the essential information needed by a member of the public to establish his level of radiation exposure, regardless of whether or not the person is evacuated. However, Sec. 190 of the AEA specifically states that any information required to be provided under the Commission's rules cannot be used as evidence against the Applicant in Court. These rules of the Commission, which require that the Applicant be the sole source of information on exposure levels to the public, and information regarding any potential corrective action, conflict with the interest of Congress in the Price-Anderson Act and the AEA, and with the letter and intent of the ERA. TMI-2 cannot be licensed because the granting of a generating license would thwart the intent of Congress expressed in the Price Anderson Act, as explained below.

The Price-Anderson Act is composed primarily of Sec. 170 of the AEA. This Act was added to the AEA in 1957 to fulfill two basic needs:

> First, to protect the public by assurring the availability of funds for the payment of claims arising from a catastrophic nuclear incident;
> Second, to remove a deterent to private industrial participation in the atomic energy program posed by the threat of tremendous liability claims.
> (Report of the Joint Committee on Atomic Energy, of August 26, 1965, to accompany S.2043, which later became P.L. 89-210, approved September 29, 1965) (from Selected Materials on Atomic Energy Indemnity and Insurance Legislation, Joint Committee Print, March 1974, at 284).

While the latter of these two purposes has clearly succeeded, the success of the former need has yet to be established. The Joint Committee

on Atomic Energy was aware that the laudable goal of protecting the public by providing money to satisfy certain claims in the event of a nuclear catastrophe had not been fully realized, and in a 1965 Report on renewing the Price-Anderson Act, the Committee stated:

> It is the clear intent of this legislation that if a member of the public is ever injured by a nuclear incident, he will not be subjected to a series of substantive and procedural hurdles which would prevent the speedy satisfaction of a legitimate claim. (Selected Materials on Atomic Energy Indemnity and Insurance Legislation, at 293).

Thus, the legislative history of the Price-Anderson Act shows an expressed Congressional desire to ensure that the public would be promptly compensated if an injury results from the use or misuse of the peaceful atom. Congress also established, by renewing the Price-Anderson Act, that an important part of the protection of the public health and safety mandated by the AEA involved the availability of funds to compensate victims of a nuclear incident.

Subsection (o)(3) of the Price-Anderson Act therefore specifically states that in the event of a nuclear incident, some portion of the available funds for compensation will be set aside for "possible latent injury which may not be discovered until a later time . . .." (AEA, Sec. 170(o)(3)). This phrase was included in amendments to the AEA in 1966 (P.L. 89-645) in recognition of the known relationship between ionizing radiation and the subsequent incidence of cancer, which could first appear five, ten, twenty or more years afterwards.

In the Joint Committee report on S-3830, which later became P.L. 89-645, approved October 13, 1966, the Committee had addressed the problems of proof a claimant might fare in establishing a causal link between his alleged personal injury and a subsequent health effect (Joint Committee on Atomic Energy Report of September 16, 1966, on S. 3830). The Committee report acknowledged that the establishment of a link between radiation exposure and subsequent injury might prove very difficult, and concluded that the AEC should undertake a major research effort "to provide the basic scientific information needed to assist in establishing the validity of claims based upon alleged radiation injury" (Selected Materials on Atomic Energy Indemnity and Insurance Legislation, at 320).

Thus, the Price-Anderson Act was intended to require that the Commission improve the prospects that a claimant might be able to establish the causal connection between radiation exposure and subsequent injuries. As described above and as shown in the TMI-2 proceeding, the Commission now requires the Applicant to be the initial, primary, and essentially sole source of radiological information in the event of a radiological accident (I.D. para. 53). But Section 190 of the AEA prohibits victims of a nuclear accident from using data reported by the Applicant in a suit for damages. By relying exclusively upon the Applicant to monitor during a radiological accident, the Commission, in view of Section 190, in effect denies the right to compensation which the Commission itself is required to protect and advance under the Price-Anderson Act. Commission reliance upon the Applicant for information thus denies victims of a nuclear accident the opportunity to introduce in court the only evidence likely to establish a claim under the Price-Anderson Act. This Commission policy is illegal because the Commission derives its authority from the AEA, which includes the Price-Anderson Act. By, in effect, authorizing this potential monopoly of radiological accident information which cannot be used against the Applicant, the Commission violates the AEA, NEPA, and ERA, and illegally denies victims of a nuclear accident their constitutional rights of due process and equal protection.

In addition, Section 3(d) of the AEA sets forth the basic purposes of the statute and vest in the Commission the responsibility for protecting the health and safety of the public. This responsibility is deemed to be of such importance that only under certain limited and specified conditions may some of this authority be delegated to others. One instance where the Commission may delegate responsibilities is when it makes a finding that a state has the capability to adequately protect the health and safety of the public. The Commission is not, however, authorized to turn over responsibility for performing the crucial assessment of the severity of a reactor accident entirely to a self-interested party, the Applicant, as has been done in the TMI-2 proceeding. Upon this crucial assessment depend the decision(s) to evacuate the

public residing beyond the exclusion zone boundary. This crucial assessment is of major import to protection of "the health and safety of the public," and cannot be delegated by the Commission, the Staff, or the Board. The Board is not concerned that the Applicant excercises complete control over the information used to make the initial decisions which trigger the beginning of this crucial assessment (I.D. para. 53), and has therefore exceeded its statutory responsibilities.

In view of the numerous inadequacies enumerated above, the Board's conclusion that the emergency and evacuation plans related to potential reactor accidents at TMI-2, and the Board's rejection of Intervenors' Contention 8, was without merit, and was arbitrary, capricious and illegal under the APA and the Commission's own rules of practice, which require that the I.D. be based upon reliable, probative, and substantial evidence (10 CFR 2.760). The Board's decision must be reversed for these reasons, and because with regard to Contention 8 the I.D. also violates the AEA, NEPA, and ERA.

Financing

The practice of the Commission of denying financed assistance to Intervenors creates hardships, burdens, and other complications which are borne by no other party to the proceeding. No other party has to pay all its expenses out of its own pocket, with no reimbursement. No other party, in consequence of poverty, is denied expert legal representation or is denied the opportunity to present witnesses. No other party bears the full, uncompensated burden of typing, reproducing, and mailing. The Intervenors in this proceeding have borne all these burdens. In addition, Intervenors as ratepayers of the Applicant are subsidizing the Applicant's costs in this proceeding and as taxpayers are contributing a portion of NRC and Commonwealth costs.

The Commission's rules guarantee, at least in principle, that

> Every party to a proceeding shall have the right to present such oral or documentary evidence and rebuttal evidence and conduct such cross-examination as may be required for full and true disclosure of the facts. (10 CFR 2.743(a)) (emphasis added).

With one exception of the unrecompensed testimony on health effects of the nuclear fuel cycle, the Intervenors were in effect denied, by order of the Board denying financial assistance, their right to present oral testimony and rebuttal evidence in support of their contentions. The sole exception was the testimony of the Intervenors' only witness, who was also the authorized representative of the Intervenors. It should also be noted that the Intervenors' efforts to introduce documentary evidence into the record was denied by the Board. (See tr. 2300-31, for a fuller discussion of the attempt by the Intervenors, their financial situation, and the Board's denial). The Intervenors, due to their participation in previous hearings before the Commission (Three Mile Island Unit 1 and Peach Bottom Units 2 and 3, both operating license proceedings) found themselves deeply in dept to their respective attorneys.[2] As a result, when the opportunity arose to enter the TMI-2 operating license

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[2] It should be noted here that in the Commission's Statement "Financial Assistance to Participants in Commission Proceedings," (Fed. Reg. 41, p. 50829-38), the second footnote refers to these cases. What the Commission Federal Register Statement ignored was the comment of the Court in York Committee for a Safe Environment v. USNRC (D.C. Cir. 1975, n. 13) that ". . . it would be unrealistic to expect public interest litigants to underwrite the expense of mounting the kind of preparation and presentation of evidence that is ordinarily required in this type of case."

proceeding, the Intervenors did so, knowing that they could not afford expert legal advice or a complete set of expert witnesses, yet believing that their abbreviated set of contentions raised issues of grave significance to the safety and health of the public.

In its Statement "Financial Assistance to Participants in Commission Proceedings," (Fed. Reg. 41, p. 50829-38), the Commission gave itself seemingly unstinting praise for the ability of the Staff to handle safety and environmental matters. If all safety problems of nuclear reactors had been understood and had been solved at the time of the Statement, Nov. 1976, such a statement might be believable. If all of the environmental impacts of the nuclear fuel cycle had even been acknowledged and evaluated by the Staff (fully 8 years after the passage of NEPA), such a soothing statement might be appropriate. However, this proceeding illustrates that at least with regard to environmental matters, the Staff has hardly progressed much since Calvert Cliffs. The use of a clearly defective value in Table S-3 (74.5 curies for radon-222) and the 50-year dose commitment model (or, more properly, a million year dose concealment model) constitute blatant and illegal attempts by the Staff and Commission to ignore the AEA and ERA, and to evade the mandate of NEPA and the subsequent and related court decisions, and to deceive the public.

The need for expert legal advice in this kind of proceeding is obvious. The Applicant has its own legal staff. Yet to handle its affairs in this proceeding, the Applicant obtained the services of outside experts in the field. This decision of the Applicant was obviously made to protect its own interests.

None of the other parties have suffered in this proceeding for a lack of expert witnesses or expert legal advice, except the Intervenors. The Intervenors cannot even pay for non-expert legal advice. The Intervenors were not able to hire a single expert witness. The rights of the Intervenors under Commission rule 10 CFR 2.743(a) and under the constitutional guarantees of due process and equal protection received no protection from the Commission whatsoever. If it was Commission policy to insure that any intervenors were meant to be bled of their meager

resources and exhausted of their energies, that nuclear power plants were always to be licensed no matter what the intervenors put forth as evidence, no changes from the present system could be readily observed.[3]

In this proceeding, there can be little doubt that the Intervenors have committed various exotic procedural miscalculations and errors. To what extent such errors due to ignorance occurred, the Intervenors will probably never know. But that is not important. The real point is that the Intervenors were effectively denied the opportunity for expert legal and expert technical advice by the Commission's policy of de facto denial of due process and equal protection, and by the Commission policy of insuring that its hearings are thoroughly stacked against the Intervenors, and supportive of the Applicant. The promotional aspects of the old Atomic Energy Commission were removed from the NRC by Congress under the ERA, a change that the Commission seems to be unaware of. This problem is well illustrated by the procedural antics of the Board concerning the Intervenors' motion to require the Applicant to present witnesses to discuss the structural ability of TMI-2 to withstand aircraft impacts. The Board imposed an arbitrary and wholly unreasonable time constraint upon the Intervenors in this instance, knowing full well that the Intervenors' representative would be away from resource materials and even the possibility of informed legal advice during that short time. The Board seized upon the Intervenors' inability to be expert in everything, denied the motion which the Board itself had requested, and then procrastinated months before offering reasons for its denial. The issue was closed, and the Board saved itself from a nasty confrontation with the Applicant. (The Applicant had stated rather than undertake an engineering study to determine the ability of TMI-2 to withstand a large aircraft crash, the Applicant would refuse to obey the Board's request or directive, tr. 640-2). The Board, on Friday, June 10, 1977, promised

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[3] The letter of June 27, 1977, to the Chairman of the NRC, by Mr. Harold Green, very accurately sums the situation, as far as it goes. Drawing on the entire experience of the Intervenors in this proceeding, it becomes obvious that the sole purpose of this hearing was to create a record for the purpose of granting a license to the Applicant. The Board, Staff, and Applicant shared a common goal. Furthermore, there would be no information the Intervenors could supply which would alter this predetermined conclusion.

for the proceeding between Applicant and Intervenors. The Commission's Federal Register Statement estimates that a full-scale intervention might cost $100,000. The Commission is strangely silent on the subject of how much an applicant spends to advance its case.

It should also be pointed out, that each step in this proceeding brought an experience, process, or procedure which was totally unfamiliar to the persons authorized to represent Intervenors in this case. Thus, this proceeding involved the first cross-examination, first sworn testimony by Dr. Kepford and the first preparation of finding of fact and conclusions of law, exceptions to an Initial Decision, Supplemental Memorandum in Support of a Motion for Stay, ever performed or prepared by the Intervenors' representative, and all in the complete absence of legal training. No other party had this burden. The Intervenors could not hire expert legal or expert technical advice for any part or preparation of this proceeding, except for whatever expertise the record shows that the Intervenors themselves provided. This imbalance was not based on a voluntary decision by the Intervenors to conduct their case in this inadequate manner; their decision was dictated entirely by the fact that there was no money to hire outside consultants, legal or technical.

In this case, the Intervenors had less than $500 with which to present its case, do all the necessary research and paper work, travel, eat, sleep, and so on. Intervenors' authorized representative undertook the case pro bono publico, with no expectations of reimbursement, much less salary. No money was available for witnesses. The case of the Intervenors has been clearly prejudiced by this handicap. Would any applicant enter an ASLB proceding with such paltry funds? Would any applicant allow itself to be confined to spending no more than $500 for an entire hearing? The obvious answer to both questions is of course not. The Commission practice is to reserve that "treat" just for Intervenors.

There is an additional troubling dimension of both a rather more philosophical nature and crippling reality that deserves consideration here. As the at best meager resources of intervenors are exhausted by their participation in the successive proceedings that comprise the

administrative procedures, intervenor after intervenor, in case after case, is forced into the position of mounting an inadequate, incomplete case and eventually, bled to death financially, forced to drop out altogether. In this manner, case law by default and faulty and illegal and fraudulent precedents are allowed to stand by the attrition of one side in these unequal and unjust adversarial proceedings. This body of biased case law is then used by the agency to bludgeon subsequent challenges by other underfinanced intervenors. Neither justice nor the public interest is served.

The Commission policy of denying funds to intervenors is unconstitutional since this policy, and the Commission policy of advocacy of the applicant, serve to deprive the intervenors of due process of law and equal protection under the law. The Commission, the Staff, and the Board have advanced no reason whatsoever why those who oppose having nuclear power plants imposed upon them for the private gain of an applicant should not have resources <u>equivalent</u> to those of the applicant for the protection of intervenors' rights.

Comparative Health Effects of the Nuclear Fuel Cycle

Paragraph nos. 7, 23, 24, 29, 30, 32, 33, 34, 35, 37, and 39 of the Intervenors' Exceptions to the Initial Decision of Dec. 19, 1977, refer to aspects of the long-term health effects of the uranium fuel cycle. These paragraphs will be discussed together in the ensuing discussion which will focus primarily on the long-term health effects of the radioactivity produced by the mining of the quantity of natural uranium-238 needed to support operation of Three Mile Island Unit 2 (TMI-2) for one year. In particular, the primary subjects for consideration are radon-222 and its daughter products, the period of time involved in the release of these decay products, and their as yet unaccounted for health effects. The following discussions of the quantity of radon-222 produced and the time periods involved, it should be emphasized, will pertain to that quantity associated solely with the mill tailings left after the removal of the uranium necessary to fuel TMI-2 for one year.

The evidentiary record in this proceeding shows a remarkable level of agreement between Staff Witness, Dr. Reginald Gotchy, and the Intervenors' sole witness, Dr. Chauncey Kepford, on numerous aspects of the radon-222 problem. Kepford's testimony revealed that from the mill tailings piles about 320 million curies of radon-222 would be produced by the thorium-230 initially present in the tailings pile. A larger source of curies would be the small amount of uranium-238 not recovered in the milling process, producing ultimately about 2 trillion curies of radon-222 (both numbers, Kepford testimony, Table 2). Gotchy agreed that enormous quantities of radon-222 would be produced (tr. 2888) and acknowledged, on rebuttal, the validity of Kepford's estimate of the quantities of radon-222 produced (tr. 2890). On this subject, there is no controversy. The fact that hundreds of millions to trillions of curies of radon-222 will be produced by decay of thorium-230 and uranium-238, respectively, in the mill tailings piles produced from milling uranium for one year's supply of fuel for TMI-2 is undisputed on the record in this proceeding.

The memorandum of Dr. Walter Jordan of the Atomic Safety and Licensing Board Panel, dated Sept. 21, 1977, (but not made available to the Intervenors by the Staff until Nov. 30, 1977) addresses radon-222 emissions

only from the thorium-230 initially present in the mill tailings piles. His calculations add further support to the record and Dr. Kepford's testimony on the subject of radon-222 emissions.

In marked contrast to the harmony described above is the Commission policy of recognizing only 74.5 curies due to the radon-222 produced as a result of the mill tailings piles needed to produce fuel for one year of reactor activity. The emissions which continue for a million years (tr. 2228-9) and billions of years (tr. 2888-90), apparently have not been recognized or evaluated as contributing to adverse health effects, even though such recognition and evaluation is required by the National Environmental Policy Act of 1969, as amended ("NEPA"), the Atomic Energy Act of 1954, as amended ("AEA"), the Energy Reorganization Act of 1974 ("ERA"), and the Administrative Procedure Act of 1946, as amended ("APA"). The magnitude of this omission was alluded to by Dr. Jordan (Jordan memorandum, page 3), and was the subject of Kepford's testimony.

The prepared testimony of Staff Witness Gotchy conforms to this apparent Commission policy by not considering the actual duration of radon-222 emissions. In this prepared testimony, Gotchy concluded that a total of 0.48 persons would die from causes associated with each year of operation of a 1000 MW(e) reactor (Gotchy testimony, Table 1a). As a footnote to Table 1a of his testimony, he noted that an additional 0.023 deaths per year of operation would be caused by the mining and milling portions of the uranium fuel cycle. These figures prepared by Gotchy were deficient largely because they were derived by assuming that the mill tailings would produce radon for only one year per year of plant operation. As explained below, Gotchy neglected to consider the mill tailings releases for the duration that radon-222 emissions are produced from the mill tailings piles.

In reaching its conclusions on the comparative "health effects" of the coal and uranium fuel cycles, the Board apparently accepted the (at times identical, word for word) arguments of the Staff and Applicant. The term "health effects," as used by the Board, is a euphemism for avoidable premature deaths from leukemia, cancer, and other disease produced by ionizing radiation, including genetic defects. In short, the Staff arguments which the Board relied upon are as follows:

(a) Kepford did not use the same 50-year dose commitment model as the Staff, (Staff's Proposed Findings of Fact and Conclusions of Law, August 19, 1977 ("Staff F.O.F."), para. 65) Kepford's population model is unacceptable; his conclusions remote and speculative (Staff F.O.F. para. 69).

(b) Radon-222 releases from any fuel cycle are small compared to natural background releases (Staff F.O.F., para. 66). Radon-222 deaths from TMI-2 are insignificant compared to all other deaths during the same interval (Staff F.O.F., para. 69).

(c) The nuclear fuel cycle is less harmful than the coal fuel cycle, and is economically preferable to coal (Staff F.O.F., para. 70).

All of these arguments by the Staff and Board are without merit.

The first argument propounded by the Staff (Point (a), above) is trite in the extreme. The Staff has not established that its 50 year dose commitment model is the correct model to be used. The NRC has no rules, regulations, or even guidlines on the subject of predictive models. Nor has the Staff established that the 50 year dose commitment model is even remotely an appropriate model.

To begin with, the Staff has failed to take into account the long-term nature of the problem of long-lived radioisotopes. Since many radioisotopes released to the environment due to the nuclear fuel cycle have much longer half-lives than 50 years, and many others produce decay products which persist beyond the Staff's arbitrary 50 year limit, the Staff's short 50 year period of consideration obviously and grossly underestimates the environmental impacts of the nuclear fuel cycle, in defiance of the letter and spirit of NEPA. In Calvert Cliffs Coordinating Committee v. USAEC, 449 F. 2nd 1109 (D.C. Cir., 1971) ("Calvert Cliffs"), the Court stated:

> We conclude, then, that Section 102 of NEPA mandates a particular sort of careful and informed decision-making process and creates judicially enforcable duties . . .. But if the decision was reached procedurally without individualized consideration and balancing of environmental factors--conducted fully and in good faith--it is the responsibility of the courts to reverse. (emphasis added).

Regarding emissions from the mill tailings piles, the 50-year dose commitment model in connection with the 74.5 curies used by the Staff actually corresponds to a several billion year dose concealment model. (See Staff Witness Gotchy's remarks, tr. 2888.) Concealment here means the intentional omission of the overwhelming majority of health effects caused by the nuclear fuel cycle. The Staff dose commitment model therefore does not qualify as "careful and informed decisionmaking" or a balancing of environmental matters "conducted fully and in good faith." (Calvert Cliffs, above). (emphasis added).

The use of the 50-year dose commitment model must also be viewed in the light of footnote 12 of NRDC v. USNRC, 547 F. 2nd 633 (D.C. Cir. 1976), which states, in part,

> We note at the outset that this standard is misleading because the toxic life of the wastes under discussion far exceeds the life of the plant being licensed. The environmental effects to be considered are those flowing from reprocessing and passive storage for the full detoxification period. (emphasis added).

Here the Court plainly articulates the principle rule for consideration of long-lived radioactive pollutants: the environmental effects of long-lived radioisotopes are to be considered "for the full detoxification period." The detoxification period is a property of the particular isotope, and may not be limited by an arbitrary and capricious (however convenient) administrative decision to ignore the laws of physics. The uncontroverted Table 1 of the Kepford testimony (page 2) and the accompanying discussion in the record identify the mill tailings as being toxic for periods comparable to the spent fuel wastes. The 50-year dose commitment model, therefore, is legally and scientifically unacceptable and wholly inappropriate. It should also be noted that the Commission has yet to apply NEPA's "full disclosure" principle to any of the long-lived radioactive products of the nuclear fuel cycle. The mill tailings problem is just one aspect of this larger unaddressed problem of the millenia.

With respect to mill tailings piles and radon-222, the primary defect of the Staff's 50-year dose commitment model is the underlying assumption that the mill tailings are producing radon-222 for only one year. The record shows unequivocally that the radon-222 emissions continue for more than one year. The physical laws that govern radioactive

decay determine that emission of radon-222 from the tailings piles continues for millions and billions of years. (See page 1 and Table 1 of Kepford testimony.) Only when the duration of the mill tailings problem has been fully factored into the calculations can the magnitude of the real health effects of the mill tailings problem be appreciated and considered. And in order to estimate such health effects, a model describing future populations and population distributions must be used (point (b), above).

Clearly, there is no model available which could be expected to even reasonably accurately predict numbers of human beings and their distribution patterns a thousand, ten thousand or a million or a billion years into the future. The lack of a model capable of calculating these numbers with precision does not, however, mean that the health effects attributable to emissions can be simply disregarded or ignored.

Models for estimating health effects far into the future can be verified only by actually counting the numbers of human beings--or, as it were, performing the experiment. To determine accurately the future health effects, the experiment would entail establishing with certainty the population numbers and distributions throughout the next twenty billion years or so by observation and recording of the necessary information. The impossibility clearly arises in doing so and in transmitting such information back for decision-making now. To transmit this information back to current decisionmakers would entail restoring at least some part of the universe of the far future (the end of the experiment) to the conditions of today, obviously a hopeless violation of the Second Law of Thermodynamics. There are many more fruitful endeavors than challenging the Second Law. Of relevance here is the practice of choosing models to forecast future events within the limitations imposed by the Second Law.

In the Three Mile Island 2 proceeding, several predictive models were used. One such vehicle for prediction was used by the Board to decide that the consequences to the public of a very large aircraft impacting into TMI-2 need not be considered seriously (I.D. para. 50). Another was a short-range predictive model used by the Applicant to estimate the quantity of electricity it expects to sell in the next five or so years (see Final Supplement to Final Environmental Statement (FSFES).

Sec. 8I. This model was relied upon by the Board in the I.D. (para. 121). The fact that this Applicant model is defective and inaccurate (compare Table 8.3, FSFES with Table 21, FSFES, page B-65) apparently did not trouble the Board.

Yet another predictive model relied upon by the Staff addresses the matter of future population. Recently the NRC published a report entitled Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle , NUREG-0116, Oct., 1976 (tr. 2400-1). Of pertinence here is a section of this report which discusses the consequences of a failure at a high-level radioactive waste repository. The report states

> Assessment of long-term consequences should consider future human habits and demography. Since there is no means of accurately determining distant future societal habits and demographic data, one approach is to assume that societal habits and population distribution will not change much from those of today. Alternatively, concentrations of waste materials in the lithosphere, hydrosphere, and atmosphere can be projected for some future time, and arbitrary future societal scenarios can then be superimposed on these distributions. As a reference case, and for perspective, the present society, with its habits and population distributions, can and has been used. (NUREG-0116, page 4-88, and tr. 2398-2401) (emphasis added).

This Staff report then goes on to calculate the doses to the maximally exposed individual at periods of 100, 10,000, 100,000, and 1,000,000 years after the repository is sealed (Tables 4.19-22). Thus the Commission itself has used a futuristic model involving the projection of the population and population distribution of today far off into the future. Kepford has merely conformed to the Commission's own approach to population projection.

The foregoing discussion on predictive models used in this proceeding was for illustrative and illuminative purposes. It shows that, by their very nature, long-term models are unverifiable, and therefore are to some extent speculative. To what extent they are speculative may be unknown and unknowable. At any rate, the position of the Staff (accepted by the Board) with regard to the predictive population model used by the Intervenors' Witness Kepford is absurdly contradictory.

The Staff position is totally untenable. It accuses Kepford of using "a vast array of assumptions" (Staff F.O.F., para. 69) and states incorrectly that his conclusions are "remote and speculative" (Staff's F.O.F., para. 69). No elaboration or reference to the record is made for support of these charges, nor is any articulation offered. But the most shocking aspect of the Staff's position is the Staff's hypocrisy, since the Commission itself has used exactly the same model as Kepford, as discussed above. The population assumptions contained in Kepford's model are not a Kepford concoction; Staff usage of these same assumptions predates Kepford's use of them. The attitude of the Staff here is like the petulent child taking his ball and going home when things don't go his way. Since Kepford's results do not support the Staff position, the Staff doesn't want Kepford to use the same model that the Staff had used. The Staff, however, has no monopoly on predictive models. A model good enough for Staff usage must also be good enough for use by Intervenors.

The Board (I.D. para. 125) and the Staff (point (b), above) also argue that the releases of radon-222 attributable to the operation of TMI-2 are small compared with naturally occuring releases of radon-222 (Staff's F.O.F., para. 66). The context of this entire discussion of the comparative effects of the coal and uranium fuel cycles must be recalled: it came about as a result of deficiencies of the FES prepared by the Staff in the Hartsville case. The Appeal Board, in ALAB-367, found that the Staff did not present sufficient information, with regard to environmental effects of the coal and nuclear fuel cycles, in its discussion of "alternatives to the proposed action." (5 NRC 92 (1977), 103).

In the context of a discussion of alternative energy sources, such as coal, nuclear, hydroelectric, solar, conservation, or any other generating scheme, the inclusion of the quantity of naturally occuring releases of radon-222 is wholly inappropriate, and is nothing short of ridiculous. These natural releases of radon-222 would occur entirely independently of any of the means of generating electricity and in an equivalent manner for each and every alternative. For the nuclear alternative, such natural releases would be augmented by additional

amounts of radon-222 released from uranium mill tailings piles.[7] It is these added releases of radon-222 from the mill tailings over time, above and beyond naturally occurring amounts of radon-222, that make the difference between the uranium fuel cycle and any other fuel cycle. The naturally occuring emissions of radon-222 have, therefore, no place in the comparative analysis of the uranium and other fuel cycles. As the Appeal Board stated in ALAB-367, ". . .it is the ultimate consequences to human-health of the two types of plants that have to be compared. . . .", (ALAB-367, note 52)(emphasis added), not natural releases of radon-222, not the effect of cosmic rays, nor the total amount of sunlight incident upon the U.S. in one year, the total number of deaths in the U.S. in one year,or the price of tea in China.

The Applicant sought to create the impression that Kepford testified under cross-examination that the number of deaths caused by the operation of TMI-2 for one year would add only one additional death per billion deaths from other causes over the time span considered (I.D., para. 125, tr. 2867-75). As the record clearly shows, Kepford pointed out that these mathematical manipulations insisted upon by the Applicant were totally irrelevant comparisons (tr. 2863, 2864-5, 2869, 2875). The reasoning here by the Applicant and the Board was fully as faulty as that of the Staff in its attempts to attach importance to the natural releases of radon-222. Here, under the assumption of a constant world population, the number of people dying naturally over the next 27 billion years from all other causes applies equally to TMI-2 and any other generating option. The important parameters, again, in any comparative study are the factors that differ among the options, not those which are the same. The only relevant parameters in a comparative study of the health effects of the coal and nuclear fuel cycles are the differences in magnitude between the health effects attributable solely to the coal fuel cycle and those attributable solely to the uranium fuel cycle. Thus the arguments of the Staff, Applicant, and Board for giving no weight to the Kepford testimony on the basis of comparison to any naturally occurring background effect which effects both coal and nuclear fuel cycles equally (but separate from their own contributions) are completely irrelevant in a discussion of the comparative health effects of the coal and nuclear fuel cycles.

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[7] Cosmic rays would also act equally on each energy option, and therefore are not included in the analysis of alternatives, since the differential effects are nonexistent.

Furthermore, the relevance of these arguments by the Board, Applicant, and Staff to the cost-benefit analysis or to the consideration of alternatives of TMI-2 has not been established. The evidentiary record does not show that the Board, Applicant or Staff has articulated in a reasoned manner that naturally released radon-222 is in any way related to the operation of this plant nor does the record show that the Board, Applicant, or Staff have discussed how that quantity of radon-222 is to be factored into the cost-benefit analysis of TMI-2, or the relevance of such if it even can be factored into the analysis. Nor have the Board, Applicant, or Staff shown how the natural releases of radon-222 pertain to the evaluation of alternatives to TMI-2. These omissions of the Board and Staff constitute procedural violations of APA and NEPA.

Thus, in order to justify the granting of an operating license for TMI-2, the Board (a) disregarded the uncontroverted evidentiary record with regard to the duration of radon-222 releases, and thereby disregarded the physical laws governing radioactive decay, and, (b) ruled that predictive models are admissible only where they provide conslusions favorable to the Staff's and Applicant's positions. Under the APA, AEA, NEPA, and ERA, the Board has no such authority.

One of the more glaring omissions of the prepared testimony of the Staff Witness Gotchy was the fact that the testimony ignores important new findings in the area of the effects of low-levels of ionizing radiation on humans. As Gotchy correctly stated, the present radiation standards are based on studies of high doses and high dose rates (tr. 2402). However, very recent findings (tr. 2331-6) have indicated that low doses, such as those to which workers are routinely exposed, cause a much higher incidence of cancer than would have been expected from the high-dose studies. One such study has recently been published (the Mancuso Report, tr. 2331), with prior peer review, in the Journal Health Physics (November, 1977, pages 369-385). Here the authors found that allowable routine occupational doses of workers in governmental nuclear facilities were sufficient to double the incidence of some forms of cancer among workers. This would correspond to an increase of at least a factor of 100 over the risk estimator upon which Gotchy relied. Witness Gotchy testified that he was acquainted with the Mancuso study. Reliance upon the Gotchy

estimates of health effects, therefore, does not conform to the principles of "informed decisionmaking" or "full disclosure".

In his opening statement, Dr. Kepford observed that members of the Armed Services were exposed to ionizing radiation during nuclear weapons tests in Nevada during the 1950's (tr. 257-259). Subsequent to that prophetic statement, a series of articles appeared in various newspapers (attached) concerning the plight of these irradiated servicemen. While a study of their health problems as a result of their exposures is only beginning, the data so far corroborate the findings of Mancuso, Stewart, and Kneale that low doses of ionizing radiation are 10 to 50 times more damaging than the upper bound of the BEIR Committee's findings (tr. 2331-2338). It should also be noted that Gotchy based his estimates on the lower bound of the BEIR Committee cancer risk estimates (tr. 2171-2).

The Commission also acted illegally by issuing the I.D. prior to the completion of review of the testimony of Dr. Gotchy. This testimony was entered into the proceeding as a supplement to the FSFES (tr. 2096-7). The testimony was submitted to other Federal Agencies on September 29, 1977, for comment, and the final version, containing reasoned responses to agency and public criticism has not yet, as of January 30, 1978, been issued. As a result, the Board's I.D., issued December 19, 1977, was legally premature, since it anticipated no significant changes in the health effects assessment. NEPA requires that the agency's decision-making be informed by a complete and adequate evaluation of environmental impacts and alternatives. Calvert Cliff's Coordinating Committee v. AEC, 449 F. 2nd 1109 (D.C. Cir. 1971), emphasizes that strict compliance with NEPA is required in spite of any alleged delay, cost, or administrative burden. By failing to wait to consider the completed final impact statement, produced as a result of the agency's review of public and agency comments on Dr. Gotchy's circulated testimony, the Board violated its obligations under NEPA.

The question of whether or not the testimony of Intervenors' Witness Kepford challenged Table S-3 or the Commission's rules was skirted by the Board (I.D. paras. 124, 125). Intervenors submit that

only after it has been determined how the 74.5 curie number in Table S-3 can be reconciled with the more complete information presented to the Board during the evidentiary TMI-2 proceeding can an operating license for TMI-2 possibly be granted.

In NRDC v. USNRC, 547 F. 2nd 633 (D.C. Cir. 1976), the Court found that

> Regarding most phases of the fuel cycle, these promises were fulfilled and the Environmental Survey did an adequate, even admirable job of describing the processes involved. It assembles data on the consumption of resources, and discusses the risks of accidents and other hazards in detail, supporting the staff's conclusions with numerous references to the scholarly literature and to technical reports on file with the Commission.

The Commission has used this portion of the decision to justify those portions of Table S-3 not remanded by the Court, as stated, for example, in the Forward to NUREG-0116, Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle, October, 1976. However, the very next sentence of that decision points out that the only two portions of the fuel cycle under review were the reprocessing and waste management portions:

> However, with regard to the two phases of the fuel cycle which are the focal points for this appeal, reprocessing and waste disposal, that kind of detailed explanation and support for the staff's conclusions was noticeably absent from the Environmental Survey as originally published (emphasis added).

Apparently, the other deficiencies in the Commission's rulemaking proceeding were not brought to the Court's attention.

The Court went on to say

> We therefore hold that, absent effective generic proceedings to consider these issues they must be dealt with in individual licensing proceedings (emphasis added).

One must seriously question the effectiveness of a generic proceeding which has permitted the underestimation of a particular number by a factor of at least 100,000 (Jordan Memorandum, page 2). There is also reason to be concerned if decisions involving "major Federal actions" (NEPA, Sec. 102(2)(c)) are made based on a number so patently, so obviously false.

It also seems pertinent to inquire for how long have the Staff and Commission known about the fraudulant nature of this 74.5 curies number.

Furthermore, the Kepford analysis has received corroboration from the memorandum of Dr. Walter Jordan of the Atomic Safety and Licensing Board (Memorandum of Dr. Walter Jordan, September 21, 1977. See Staff letter, November 30, 1977, in this proceeding). Dr. Jordan not only confirmed the quantities of radon-222 released by decay from the thorium-230 initially present in the mill tailings piles; he also suggested that the population exposure would not be 100 person-rem as assumed by the Staff, but, more properly, 10,000,000 person-rem. Following the established Commission procedure of multiplying this 10 million person-rem figure by the Commission's $1000 person person-rem value placed on human life (10 CFR 50, Appendix I), one calculates a $10,000,000,000 (ten billion dollars) environmental health cost attributable to just one year's operation of TMI-2. This value is to be compared with the value of the benefit of electricity generated by TMI-2. Assuming a value of $0.05 per kilowatt hour, (kwh), 900 MW(e) capacity, and a 0.65 capacity factor, a value of the benefit for one year's operation of TMI-2 of about $250 million is obtained. In order to match the health cost suggested by Dr. Jordan, the "benefit" of TMI-2 (electricity) would have to be priced at about $2.00 per kwh. It is questionable if any state public utility commission or other regulatory agency would conclude that electricity priced at $2.00 per kwh provides a benefit to society; it might indeed be judged an intolerable burden. Thus it has not been clearly established that the electricity generated is, in itself, an adequate benefit to justify operation of TMI-2 under AEA, NEPA, and ERA. And, therefore, on a cost-benefit basis, it has <u>not</u> been shown that TMI-2 is of any benefit. (Compare I.D. para. 128).

It is thus clear that the long term health cost of <u>just</u> damage attributable to the radon-222 emissions from the thorium-230 initially present in the mill tailings created to fuel a nuclear reactor for one year overwhelmingly dwargs the benefit derived from the same nuclear reactor. Had the radon-222 from the decay of the small amount of uranium-238 been included in this calculation, the resulting health costs would be about 5000 times larger! These costs the Staff entirely ignores, and the Board states without justification that its decision

need "not require a resolution of these matters" (I.D. para. 125).

The Staff letter of November 30, 1977, promises a future Staff evaluation of the Jordan Memorandum (but not of the Kepford testimony). The Staff never explained why it believed that Kepford's testimony was any less deserving of Staff evaluation than the Jordan Memorandum. This promise is repeated in the Staff letter of December 20, 1977. However, the serious questions raised by Kepford's testimony and Jordan's memorandum were totally ignored by the Staff when the Staff failed to propose any exception to the Board's Initial Decision, dated December 19, 1977.

On January 28, 1978, (only two days before the deadline for filing this brief) the Intervenors received a Staff assessment entitled merely "Appendix." This otherwise unidentified document, consisting of four affadavits and discussions by members of the NRC Staff, goes a long way toward aiding the withdrawal of the Staff's head from the ground on the subject of health effects attributable to radon-222. The document wholly confirms the Intervenors' contention that the 74.5 curie number used in Table S-3 bears no relationship whatsoever to the actual releases of radon-222 from the mill tailings piles, that the 74.5 curie number is a totally inaccurate and fictitious reflection of the radon-222 problem, and, that its past, present, and future continued use is therefore fraudulent in the full sense of the word.

While the Appendix represents a giant step forward toward a truthful assessment by the Staff of the full mill tailings piles problem, it still falls far short of a full and accurate evaluation of the health effects due to the creation of mill tailings piles to support one year's reference reactor operation. Among the shortcomings noted in the short time available to review this Appendix are the following:

(1) The treatment assumes stabilization of the mill tailings, which does not reflect current practice (tr. 2198).

(2) The assessment of health effects is projected only out to 1,000 years, which constitutes only one-eightieth of the first half life of the thorium-230 in mill tailings, ignores completely the contribution of uranium-238 remaining in the mill tailings, and thus is still far short of "full disclosure."

(3) The assessment of health effects still relies on the completely irrelevant argument that releases of radon-222 from the mill tailings are small compared to natural background releases (page 12 of "Appendix, and Table 8). For reasons discussed earlier in this brief, this comparison is invalid. Furthermore, the Staff has not applied this argument on the benefit side of the ledger, where the result of the analysis would cast doubt on any perceived need for TMI-2. The Staff has not yet compared the annual output of the assumed "benefit" of TMI-2 (electrical energy), to the natural solar energy incident upon the U.S. each year[5] (See Final Supplement to the Final Environmental Statement, para. 10.2).

(4) The health effects assessment points out the philosophical nature (p. 7) of calculating future health effects and suggests such estimations are meaningless (p. 13). If correct, this reasoning should then be applied to all predictive models uniformly, not just models where such reasoning is useful to support or to discredit a particular model. For instance, the years required to validate all of the accident probability assessments in the Reactor Safety Study and the time required to verify the aircraft crash models in this proceeding (tr. 654) should also be regarded in the same light. Furthermore, if glaciation is expected to recur (p. 13), the Staff should examine its concept of mothballing nuclear facilities, since they cannot be expected to withstand a glacier.

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[5] According to "Nuclear Power: Issues and Choices," Ballinger Press, 1977, about 44,000 Quads of energy (one Quad = 10^{15} Btu) fall on the U.S. each year (p. 130), or 4.4×10^{19} Btu. By contrast, TMI-2 (assuming 900 MW(e), 0.65 capacity factor) would produce only about 1.8×10^{15} Btu. The output of TMI-2 would then be 4×10^{-5} per cent of the sun's input, and this output would be indistinguishable from the "background" solar energy.

(5) The Staff has revealed that its intentions with regard to a permanent solution to the radon-222 emission problem amount to nothing more than a short-term expedient "solution" (Data in "Appendix" from R.M. Wilde, pages 8 and 9). The proposed covering is expected to last "at least several hundred years" (page 9). This "pussycat method" of disposing of very long-lived toxic substances by merely scratching a little dirt over the pile and walking away is hopelessly inadequate and is illegal (See NRDC v. USNRC, D.C. Cir 1976, at n. 12 discussed earlier), whether the covering proposed is twenty inches or twenty feet. The full cost of the full solution to the problem should be borne directly by whatever population directly receives the postulated benefit of the reactor. Otherwise, the cost-benefit analysis would be incomplete, in violation of the AEA, NEPA, ERA, and the Commission's own rules.

It should also be noted that if the environmental dose commitments (man-per curies per reference reactor year) from Table 2 of the Staff's Appendix are multiplied by the number of curies to be released to the environment by the eventual decay of only the thorium-230 present in one reactor year's mill tailings piles, 300 million curies (Kepford testimony, Table 2 and page 3), and are then multiplied by the cancer risk estimates of page 7 (Appendix), one obtains an estimate of numbers of deaths on the order of thousands to tens of thousands per reference reactor year. These numbers fully support the Kepford assessment of health effects from thorium-230, and the full thrust of the Jordan memorandum. However, the Staff's assessment in the "Appendix" is only for a thousand years, which will not suffice. The Staff has again failed, as explained above, to consider the toxic nature of the radon-222 for the full duration of the period during which the toxic radon continues to be released. The Staff claim that such calculations are speculative or remote and are therefore "meaningless" is no justification for the continued concealment of the vast majority of estimated health effects which will occur after 1,000 years and which have yet to be acknowledged by the Staff.

The Staff is to be commended for its progress in the direction of full and true assessment, as shown in this new "Appendix." However, this "Appendix" cannot be considered the final word on mill tailings piles emissions and their consequences, in view of the still short period of mill tailings health effects included in this new Staff assessment, compared with the full long duration of the problem. In short, the Staff "Appendix" of January 20, 1978, falls far short of the full disclosure and the full discussion and consideration "to the fullest extent possible" which is required by NEPA. The Staff Appendix also reveals that the Staff feels future generations will have to fend for themselves when the thin layer of dirt (still only proposed by the Staff) washes away ("Appendix," Gotchy affadavit, pages 12-13). This is a clear violation of the NEPA principle requiring this generation to be caretakers of the environment for future generations.

During the TMI-2 evidentiary proceeding, the Staff relied wholly on the discredited Table S-3 of 10 CFR 51.20 and 10 CFR 50, Appendix D, to exclude from consideration environmental effects which would call into question either the adequacy of the Staff's environmental analysis or the validity of the Staff's or Board's pre-conceived conclusions.

Throughout the TMI-2 proceeding, the Staff and Board have simply arbitrarily and capriciously refused to consider in any meaningful way any arguments which might cast doubt or suspicion on the cost-benefit analysis or discussion of alternatives for TMI-2. This position of advocacy is beyond the statutory authority of the Staff and Board under AEA, NEPA, and ERA, and is also beyond the statutory responsibility of the Board under the APA. The Staff and Board have, in particular, also ignored the mandate of the Court in Calvert Cliffs' Coordinating Committee v. AEC, 449 F. 2nd 1109 (D.C. Cir. 1971), a decision with which the Commission apparently has barely begun to comply. The Staff and Board actions during the TMI-2 proceeding have also sneered at the "full disclosure" requirements of NEPA which are described by the Court in Environmental Defense Fund v. Corps of Engineers, 325 F. Supp. 728, 759 (E.D. Ark. 1971):

> ...At the very least, NEPA is an environmental full disclosure law. . . The "detailed statement" required by Sec. 102(2)(c) should, at a minimum, contain such information as will alert the President, the Council on Environmental Quality, the public, and, indeed, the Congress, to all known possible environmental consequences of proposed agency action (emphasis supplied by the Arkansas District Court).

The above mentioned actions by the Staff and Board do not conform to reasoned decisionmaking, exploration of all environmental effects to the fullest extent possible, or protection of the health and safety of the public. In defiance of the letter and intent of ERA, they fail to recognize the removal of the promotional aspects of nuclear power from the legal authority of the Commission. These violations of APA, NEPA, AEA, and ERA, and the related judicial decisions constitute sufficient basis to reverse the I.D. in this proceeding. The end result has been that the Staff and the Board relied upon an inadequate survey of the health effects of the uranium fuel cycle, a seriously defective cost-benefit analysis for TMI-2, and an equally defective analysis of alternatives to the operation of TMI-2. These actions by the Staff and the Board are not supported in the evidentiary record by reasoned judgments, full disclosure of environmental damage, or evaluations and full consideration of environmental damage "to the fullest extent possible," in violation of the APA, AEA, and NEPA.

But this reliance by the Staff, the Board (and Commission) has even deeper and more sinister implications. By defining 74.5 curies as the total amount of radon-222 to be attributable for all time from any source generated to fuel a nuclear reactor for one year, the Commission denies the existence of the physical processes governing radioactive decay of the parent elements of radon-222 after one year. It is difficult to imagine a more arbitrary, capricious, unreasoned, unarticulated, arrogant or deceptive act. It defies reason. The deception of this action by an agency required by law to protect the health and safety of the public cannot be overstated.

Thus, it would stretch the imagination to consider that the 74.5 curies number, which, by admission of the Jordan estimate, is at least in error by a factor of 100,000, represents an adequate evaluation of

the radon-222 emissions problem. Table S-3 has survived an uncanny number of revisions considering its inadequacies. See the Jordan memorandum for a fuller description of the errors, old and new, incorporated into Table S-3. The conclusion seems unavoidable that the incorporation into the Commission's rules of a provision to repeal the laws of physics describing radioactive decay was an intentional act to create an artifice in order to avoid compliance with NEPA. This conclusion, with all its implications, ramifications, and consequences, seems inescapable. The Intervenors, therefore, submit that the value of 74.5 curies is defective, dishonest, and the continued use of this number by Atomic Safety and Licensing Boards and the Commission can only be termed fraudulent.

For the Board or the Commission to use Table S-3 as a vehicle to conceal and withhold from consideration important information concerning enormous environmental costs, makes a mockery of justice, of all of the environmental protection intentions and requirements of NEPA, the public health and safety requirements of the AEA and ERA, the arbitrary and capricious and reasoned decisionmaking standards of the APA, and the removal of the promotional duties of the Commission under the ERA. The Board's reliance on a fictitious number is an extraordinary abuse of discretion, an abuse of unprecedented magnitude. Therefore the I.D. must be reversed.

Further Discussion of the Board's Statutory Violations

The primary basis of the Intervenors' argument is that the Staff and Board have committed numerous procedural and substantive violations of the Administrative Procedure ProcedureAct of 1946, as amended ("APA"), the Atomic Energy Act of 1954, as amended ("AEA"), the National Environmental Policy Act of 1969, as amended ("NEPA"), and the Energy Reorganization of 1974 ("ERA"). Among these errors committed by the Staff and Board are numerous errors which require that the I.D. be reversed. The effect of these errors of omission and commission has been to place the Staff and Board in a position of total opposition to any position taken by the Intervenors. While such a position may not in itself be reason for reversal, in this particular proceeding such a position necessitates that the Staff and Board turn their backs on the laws of both physics and man, as shown above. The Staff position has also required that the Staff turn its back on the statements of the Staff's own witness, Gotchy,who wholly and completely corroborated the basic thrust of the crucial and uncontroverted testimony of Intervenors' Witness Kepford. It is arbitrary, capricious, ludicrous, and without support in the record for the Board to have ignored the fact that Staff Witness Gotchy's testimony in the record and the Jordan memorandum of September 21, 1977 substantiate, and do not in any way detract from, the information which the Board considers that Kepford merely "alleges" with regard to radon-222 releases from the mill tailings piles (I.D. para. 125).

The end result has been that the Staff and Board relied on an inadequate survey of the health effects of the uranium fuel cycle, a seriously defective cost-benefit analysis for TMI-2, and an equally defective analysis of alternatives to the operation of TMI-2. These actions by the Staff and Board, which have been described more fully above, do not conform to reasoned decisionmaking, exploration of all environmental damage which would result from the proposed operation of TMI-2, or protection of the health and safety of the public.

The I.D. was rendered either in defiance of through a serious misconception of the Board's statutory obligations. Even if the Commission

had officially recognized and was investigating and considering the radon-222 emission problem to the fullest extent possible, NEPA requires that a detailed analysis and consideration of the problem, its probable and possible implications, and alternatives be available to agency and outside decisionmakers before the Board can approve the proposed licensing action. This NEPA requirement is necessary to ensure that major federal agency actions will only be taken after the agency has reached an informed, coherent, and accountable decision.

The AEA and ERA authorize the Board to grant licenses for nuclear facilities only to the extent that such action is "consistent with the health and safety of the public." (NRDC v. USNRC, 547 F. 2nd 633, 640 at n. 15, D.C. Cir. 1976). Therefore, and in view of the enormous magnitude of the errors in Table S-3 and Dr. Gotchy's prepared testimony, which the record, Dr. Jordan's memo and the Staff "Appendix" of Jan. 20, 1978 vividly demonstrate, any further commitment to Gotchy's prepared testimony or Table S-3 and its built-in defects would be arbitrary, capricious, an abuse of discretion, and otherwise illegal, and would also violate the due process and equal protection guarantees of the U.S. constitution. (The affadavit of Jack Rothfleisch in the Staff Appendix of January 20, 1978 states that the 74.5 curies of radon-222 listed in Table S-3 comes from the tailings pond of the mill during the operation of the mill (page 3). This means, then, that Table S-3 contains no reference whatsoever to any emissions of radon-222 from the abandoned mill tailings piles, stabilized or unstabilized). Along similar lines, Judge Tamm was moved to comment in the final closing paragraph of his concurring opinion in NRDC v. USNRC (emphasis added):

> The Commission should be able to supply the court with a statement of the methods by which its staff arrived at the figures embodied in Table S-3 and by which Dr. Pittman concluded that the waste storage problem is already technologically and economically soluble. If it cannot, then we will have no choice but to invalidate the Commission's rule under the "arbitrary, capricious" standard; if it can, we should defer to the administrative weighing of risks and benefits of additional reactors.

The I.D. is in violation of NEPA because it in effect relegates important portions of the full and good faith environmental considerations required under NEPA to other proceedings, which, even if they are to be

conducted at some future date, would be conducted after the "major federal action" proposed by the I.D. has been taken. Footnote 17 of the NRDC v. USNRC decision indicates that the possibility that a particular issue may eventually become the subject of an effective rulemaking proceeding does not entitle the Board to refuse to consider that issue in individual licensing actions. Thus in the absence of effective and completed generic hearings concerning radon-222 emissions, individual facility hearings, such as TMI-2, are the appropriate and necessary forum for ventilation of this and other basic and as yet unresolved issues in the proposed licensing action.

The Commission is required to protect the health and safety of the public under Sections 2(d), 2(e), and 3(d) of the AEA, particularly in view of the purpose and language of the ERA, which was enacted to separate the regulatory functions of the former Atomic Energy Commission from the developmental and promotional disposition of that agency. NEPA, in addition to requiring that agencies discuss and consider environmental impacts and alternatives to ensure more informed and environmentally benign decisionmaking, expands long-standing agency missions by requiring the establishment of a broader view of the public interest. Section 102(1) of NEPA requires that all federal policies, regulations, and laws must be "interpreted and administered" to the fullest extent possible with NEPA's policies of environmental protection. Thus the Commission's obligation to protect the public health and safety under the AEA and ERA must be administered in conjunction with NEPA's emphasis on health, safety, and the importance of serving as a caretaker to preserve the environment for future generations. Section 101(b)(3) of NEPA requires that all federal agencies "use all practicable means . . . [to] attain the widest range of beneficial uses of the environment <u>without</u> degradation, <u>risk to health or safety</u>, or other <u>undesirable</u> and <u>unintended</u> consequences" (emphasis added). It cannot be disputed that this policy of preventing unnecessary risks to the public health or safety must also be construed from the perspective of the Commission's responsibilities as trustee of the environment for future generations. Section 102(2)(c)(iv) specifically requires the agency to analyze and consider the relationships between short-term uses and the long-term productivity of the environment. Section 101 (a) of NEPA establishes a complementary requirement to use "all practicable means and measures . . . to

create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations . . .". Section 101(b)(1) repeats this emphasis by restricting federal action to a manner which is consistent with the needs of future generations, by obligating all federal agencies to strive to "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations."

To paraphrase the court in NRDC v. USNRC, 547 F. 2nd 633, at 640 (D.C. Cir. 1976), if TMI-2 is granted an operating license then "more and more" mill tailings piles and radon-222 emissions "are brought into being, irretrievable commitments are being made and options precluded, and the agency must predict the environmental consequences of its decisions as it makes them.[5] Radioactive decay-producing radon-222 and its daughter products is most definitely an inevitable consequence of the operation of TMI-2. The continuing concealment of the radon-222 consequences of the proposed licensing action and the continuing refusal to evaluate and respond adequately to these adverse environmental consequences cannot be justified under NEPA or any other legal authority. An objective effort which amounts to a full and good faith consideration of environmental impacts and alternatives is required under NEPA. Calvert Cliffs' Coordinating Committee v. USAEC, 449 F. 2nd 1109, 1112-13, and at n. 5 (D.C. Cir. 1971).

The Board and Staff have violated NEPA's full disclosure and substantive requirements because they have failed to be responsive to the radon-222 problem once it had been brought to their attention. Compare York Committee for a Safe Environment, et al., v. USNRC, 527 F. 2nd 812, 815-816, at n. 12 and n. 13 (D.C. Cir. 1975). Apparently the agency did not make a reasoned choice based upon a full, good faith, explicit, and objective consideration of the alternatives to granting an operating license to TMI-2. It is important to reiterate that the mill tailings

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[5] This quote from the Vermont Yankee court and the other references to judicial decisions in this brief are meant only to be representative and suggestive of the larger number of judicial decisions which support the view of NEPA which Intervenors rely upon in this brief.

emission problem results invariable and exclusively from the current techniques for production of fuel for nuclear facilities. One obvious solution to the mill tailings problem related to the proposed operation of TMI-2 is to withhold the TMI-2 operating license until such time that a technologically reliable and long-term solution to this problem, including believable guarantees that such a long-term solution will be implemented, is available.

Prior to fuel loading of TMI-2, uranium ore will have to be mined and milled, with the separation of U_3O_8 "yellowcake" from ore. In this process, mill tailings are created. The creation of mill tailings marks the beginning of a many-billion year public health problem, discussed above, still awaiting even acknowledgement by the Staff. As such, the creation of these mill tailings to support TMI-2, absent the availability of technologically reliable, long-term solutions (together with coherent and dependable Commission policy and regulations on the disposal of these tailings) to prevent altogether these future health effects, constitutes an irreparable injury.

The Intervenors also submit that fuel loading with subsequent radioactive contamination of TMI-2, including any fission reactions at all, will turn TMI-2 irrevocable and irreversibly into radioactive waste. Decommissioning of nuclear reactors is one of the many unresolved problems of the fuel cycle and has received only the most superficial and wholly insufficient evaluation by the Staff, and, in this proceeding, by the Board, under its supposed "full NEPA review". E.g. tr. 263-264, and 2395-2397. Compare York Committee for a Safe Environment, et al., v. USNRC, 527 F. 2nd 812, 815-816, at n. 12 and n. 13 (D.C. Cir. 1975). The Intervenors submit that the act of achieving the first fission reaction, with subsequent radioactive contamination of TMI-2 also constitutes irreparable injury to the Intervenors and to the public generally and constitutes an irreversible action.

Any pre-operational fuel loading or testing of TMI-2 involving radioactive fuel will require the production of mill tailings and the related long-term radon-222 emission problem. Once these mill tailings piles have been produced, irreversible damage has been done to the public health and safety and to the environment. Although some mill

tailings piles may have already been produced in order to provide the Applicant with fuel for TMI-2, in anticipation that the Applicant would obtain an operating license for TMI-2, the total radon-222 related damage may be mitigated by using such fuel for a nuclear facility which has already been granted an operating license, and by withholding an operating license from TMI-2 as described above. Therefore, and in order to prevent TMI-2 from being turned irretrievably into radioactive waste as described in the previous paragraph, the I.D. may not allow loading of the fuel until the Intervenors have exhausted their appeals before the Commission. This effective stay of the I.D. pending the outcome of final review of the I.D. by the Commission is required and essential because of the severity and irreversibility of the consequences of an erroneous decision to authorize the loading of fuel in this proceeding.

The Intervenors believe that no party to this proceeding will be harmed by the stay of this decision pending the exhaustion of all reviews provided for in the Commission's rules. The Applicant has, for its own reasons, delayed the completion date of TMI-2 for about 4 years (see, for instance, Construction Status Report, July, 1977, NUREG-0030-77/7). This four year delay does not include the time involved in the planning and construction of TMI-2 but involves primarily preventable delays brought by the Applicant's voluntary decisions. The Applicant has no vested right to demand an operating license prior to a final finding by the Commission that the plant can be lawfully licensed. Until such time as the full Commission review has been completed, the Applicant has no legal justification for making, or causing to be made, TMI-2 irreversibly radioactive. It is also important to note that the Commission's fundamental responsibility is to protect the health and safety of the public and to obey NEPA. These statutory obligations cannot be ignored simply because the Applicant is able to conjure up the possibility that delay will be more costly than prompt but illegal action, particularly where that illegal action will cause irreparable injury to Intervenors or the general public.

The Intervenors believe that the public interest is best served when all parties, including the Commission, fully obey the letter and

intent of the applicable laws and related judicial decisions. The public interest would be served by the preventing of irreparable damage to the Intervenors who represent members of the public and the public interest at large. The public has a right to have agencies of government follow the dictates of the law. The I.D. must be stayed and reversed in order to restore public confidence and trust in the Commission and its attitudes toward its statutory obligations.

Thus, to the extent that the I.D., para. 132(d), attempts to allow the loading of fuel or any pre-operational testing involving radioactive fuel (a) before all appeals before the Commission in the TMI-2 proceeding have been waived by all parties to this proceeding; or (b) before the Commission has resolve all appeals of the I.D., which have been properly filed with the Appeal Board or with the Commission, and issues an order which is final and appealable before the federal courts under 28 USC Sec. 2342(4) and 42 USC Sec. 2239(b), the I.D. causes irreparable and irrevocable harm, and must therefore be reversed because it was issued in violation of the AEA, NEPA, and ERA, and the due process and equal protection clauses of the U.S. Constitution.

As indicated above, Table S-3 addresses only an infinitesimally small fraction of the radon-222 emissions attributable to the proposed operation of TMI-2. Both the Intervenors' cross-examination of chy and Kepford's testimony initially relied upon the emission rate of radon-222 in Table S-3 (e.g., tr. 2899-2903), and used the S-3 calculations as a springboard for an analysis of the true dimensions of the mill tailings problem. Commission rule 10 CFR 2.758(b) was not applicable to this investigation of the implications of Dr. Gotchy's prepared testimony because the mill tailings emission problem which that investigation uncovered is not in any special or unique way related to operation of TMI-2, since the problem is a product of the mining and milling of uranium ore generally.

The discussion of the true nature of the mill tailings problem in the TMI-2 licensing proceeding may actually be consistent with the Commission's regulations. Regulations 10 CFR 51.20(e) and 10 CFR 50, Appendix D (point 15 of part A) state that no further discussion of the environmental effects of the uranium fuel cycle, apart from the discussion

which has been included in Table S-3, "shall be required." Perhaps this language, as written, does not preclude further consideration by the Commission of information submitted by the Staff, the Applicant, or the Intervenors on the effects of the uranium fuel cycle. In other words, the Board would be required to assess the full impacts of the fuel cycle only when provided with information suggesting that such an investigation was in harmony with its overall statutory responsibilities, as in the TMI-2 proceeding. The numbers contained in Table S-3 would then represent minimum numbers of curies rather than the maximum numbers that the Board is required to consider, once information concerning the effects of the fuel cycle has been provided to the Board by any of the parties to a licensing proceeding. Thus this "shall be required" language would not authorize the Board to refuse fully and in good faith to consider the total environmental effects of the uranium fuel cycle, including those effects not already incorporated into Table S-3. Intervenors suggest that any other interpretation of these regulations would be contrary to and a violation of the AEA, NEPA, and ERA. It is also important to note footnote 57 of NRDC v. USNRC, 547 F. 2nd 633, at 653 (D.C. Cir. 1976), which indicates that S-3 is not to be applied mechanically in the Commission's licensing proceedings.

The Applicant has previously described the Intervenors' emphasis on the radon-222 emission problem as being illegal on the theory that this emphasis, albeit consistent with AEA, NEPA, and ERA, represents a "challenge" to Table S-3, which is included in a Commission regulation. As noted above, Intervenors suggest that the Applicant may have misunderstood the meaning of the "shall be required" clause, and the Intervenors therefore are not challenging the Commission regulation which includes Table S-3.

Even if the Intervenors are viewed by the Appeal Board as in effect contesting the S-3 regulation, then, with all due respect to the Appeal Board, the Intervenors submit that the rules, regulations, policies, procedures and practices of the Commission are entitled to great deference, but not to the point where (as here) the record demonstrates that they would be arbitrary, capricious, unreasonable, an abuse of discretion, or

otherwise illegal or unconstitutional.[6] This statement is particularly pertinent where (as in this particular proceeding) the record indicates that the existing Commission rules, regulations, policies, practices, or procedures do not adequately or credibly protect the health and safety of the public, as the Commission is required to do under Sections 2(d), 2(e), and 3(d) of the AEA, and under ERA and NEPA; or where the record demonstrates (as in this particular proceeding) that the existing Commission rules, regulations, policies, practices, or procedures are being applied to prevent the full disclosure and full consideration of environmental impacts and alternatives to a proposed licensing action that is required under NEPA.

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[6] E.g., to the extent that existing policies, procedures, practices or regulations of the Nuclear Regulatory Commission may be interpreted so as to prohibit or restrict the Intervenors from challenging the Commission's practices, procedures, policies, rules, or regulations with regard to

(a) the probability of aircraft impact contained in Standard Review Plan 3.5.1.6, NUREG-75/087;

(b) evacuation and radiation monitoring responsibilities and preparedness beyond the low population zone;

(c) Table S-3 of 10 CFR 51.20 and Appendix D of 10 CFR 50 and the assumptions that no adverse health effects are to be considered to occur after a certain arbitrarily short time;

(d) the supplement to the Final Supplement to the Final Environmental Statement prepared by the Staff (testimony of Dr. R.L. Gotchy);

(e) the policy of denying financial assistance to Intervenors;

(f) 10 CFR 2.758

any such restrictive application of these existing Commission policies, procedures, practices, rules and regulations in this manner is illegal, discriminatory, arbitrary, capricious, unreasonable, and an abuse of discretion, beyond the statutory authority of the Commission, and would constitute a denial of due process and equal protection as they are guaranteed by the United States Consitution.

The undisputed information described in the record and above prevents the granting of an operating license for TMI-2. The Board and Commission cannot choose to ignore the laws of radioactive decay and the intolerable inadequacy in the Applicant, Staff, and Board assessments of the TMI-2 operating license proposal. The granting of an operating license is arbitrary and irresponsible if, as in this proceeding, it ignores the laws of nature. The granting of an operating license is also arbitrary and irresponsible if, as in this proceeding, it ignores the Nation's governing legal framework, which forbids arbitrary governmental incursions which violate the letter, spirit, and intent of federal law and the Constitution of the United States.

A separate proceeding to consider the generic validity of Commission regulations, which the Applicant has protested that the Intervenors in effect are "challenging" is unnecessary and unwarranted. A separate proceeding of this kind is not appropriate because uncontroverted information brought to the attention of the Board has already unmistakably demonstrated that any Commission regulations which the Applicant suggests be made the subject of such a separate proceeding (e.g., S-3, the consequences of an aircraft impact, or emergency preparedness beyond the low population zone) are, as applied to the question of granting TMI-2 authority to operate, arbitrary, capricious, illegal, unconstitutional, and otherwise beyond the authority of the Board and Commission. The decision to evaluate and consider fully all of the information presented to the Board can and must be made within the scope of the TMI-2 procedure, without the need for any separate generic proceeding. In addition to the fact that such a separate proceeding may not be used to justify granting TMI-2 an operating license, Intervenors lack funds to pursue any such separate proceeding for purposes of generally challenging Commission regulations, e.g., tr. 247-249, and request by Intervenors of June 18, 1974.

NEPA requires a full and open discussion of environmental impacts and alternatives for purposes of informing the Commission, but NEPA's full disclosure policy is also needed to inform decisionmakers outside the agency process. Calvert Cliffs' Coordinating Committee v. USAEC, 449 F. 2nd 1109, at 1114 states:

> Moreover, by compelling a forward "detailed statement" and a description of alternatives, NEPA provides evidence that the mandated decision making process has in fact taken place and, most importantly, allow those removed from the initial process to evaluate and balance the factors on their own. (emphasis added).

To the extent that the Commission regulations or policies operate to truncate this required NEPA assessment and consideration of issues relevant to the proposed licensing action, it is also important to note that Section 102(1) of NEPA states:

> The Congress authorizes and directs that, to the fullest extent possible . . . the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this Act. (emphasis added).

Preventing a full ventilation of environmental impacts and alternatives to operation of TMI-2 is also contrary to Appendix D of 10 CFR 50, which counsel for the Staff stated governs the TMI-2 proceeding and requires a full review under NEPA (tr. 2128). A full NEPA review, as required under the statute and under Appendix D, cannot be conducted where the Board and Staff ignore adverse information presented and prevent serious questions from being raised, as was done repeatedly by the Board and Staff in this proceeding. For the above reasons, Intervenors conclude that the Board and Staff have failed, utterly and completely, in performing their full NEPA review function. The Applicant has likewise neglected its responsibilities under 10 CFR 51.20(d) because the Applicant has disregarded data adverse to its proposal in its filings before the Board and Commission. E.g., the record shows no evidence of any full and objective review by the Applicant, Staff, Board, or Commission of the following issues:

(a) how and when TMI-2 might be decommissioned, and the resulting economic and environmental costs. The record shows no evidence of a knowledge of the quantities of residual radioactivity remaining in the plant after removal of used fuel or the radiation levels to which workers will be exposed;

(b) the long-term radiological health and environmental effects of the uranium fuel cycle, as related to the operation of TMI-2 as required for cost-benefit analysis;

(c) the epidemiological relationship between radiation doses to workers in the nuclear industry and subsequent adverse health effects;

(d) the effect on the stated or perceived need for power of a change, from a rate structure which offers users or classes of users reduced rates for increased electrical consumption, to a flat-rate structure, or an increasing-rate structure;

(e) the financial capability of the Applicant to fulfill its obligations to the public in the event the Price Anderson Act is declared unconstitutional in all jurisdictions, as in Carolina Environmental Study Group, et al. v. U.S. Atomic Energy Commission, U.S. District Court, Western District of North Caroline, March 31, 1977;

(f) the effect of a serious program of energy conservation, such as, for example, the one proposed by the President of the United States, on the stated need for power;

(g) the institutional mechanisms by which a continued reliance on large, central-station generated electricity precludes serious efforts at energy conservation, home insulation, and the wide-scale use of the various forms of solar energy;

(h) health benefits of conservation of energy as an alternative to operation of the plant;

(i) data by sources independent of the nuclear industry showing that coal combustion is a more economical method of generating electricity than nuclear;

(j) reports which suggest that nuclear reactor accidents are much more probably and have much more severe consequences than stated in the Reactor Safety Study, WASH-1400;

(k) the social, political, technical, and environmental problems associatedwith all forms of radioactive waste disposal, including mill tailings piles;

(l) consideration of all the long-term radiological and environmental effects of all aspects of the uranium fuel cycle as related to the operation of TMI-2.

These twelve issues must also be addressed and fully considered before an operating license can be granted under AEA, NEPA, and ERA. To the extent that these issues have been mentioned in the record, they are mentioned in conclusory and perfunctory form or were raised by the Intervenors but excluded by the Board. Compare York Committee for a Safe Environment, et al., v. USNRC, 527 F. 2nd 812, 815-816, at n. 12 and n. 13 (D.C. Cir. 1975). The Board and Staff have violated both the

letter and spirit of AEA, NEPA, and ERA by their refusal to consider the long-term health effects of the entire nuclear fuel cycle, including but not limited to the radon-222 emissions problem. Thus the complete cost-benefit analysis supposedly carried out by the Board (I.D. pars. 129(k)) is inadequate, since it consistently, substantially, and materially overestimates the benefits and underestimates the costs of granting an operating license forTMI-2, as shown above.

NEPA places the burden of consideration of environmental impacts and alternatives on the federal agency involved, and does not require interested citizens to stir these agencies towards environmentally benign decisionmaking. The Intervenors have requested funding from the Commission in order to assure that the important environmental impacts of and alternatives to the granting of an operating license for TMI-2 be presented before the Board, since the Applicant and Staff are unwilling or unable to aid the Board in fulfilling its NEPA and other statutory responsibilities. All such requests by the Intervenors were categorically denied by the Board, e.g., Request by Intervenors of June 18, 1974; and tr. 246-249. The Intervenors were left amidst the Board's maze of procedural niceties and indifference to the public health and safety, which only a barrage of expert technical and expert legal resources could be expected to penetrate completely.

In such a setting, the TMI-2 formal proceeding became, in large part, a subterfuge to enable the Board to evade its statutory obligations. As described above, neither the Board, nor the Staff conducted a full NEPA review. The Staff's Final Environmental Statement, in many important places, merely and uncritically parrots various unsupported information filings submitted by the Applicant, e.g., FSFES discussion on "System Peak Loads and Energy Requirements," Sec. 8.3.1; on "Impact of Energy Conservation on Applicant's System Energy Requirements and Peak Load Demand," Sec. 8.3.2.; and on "Operating Costs," Sec. 8.3.3. Calvert Cliff's Coordinating Committee v. USAEC, 449 F. 2nd 1109 (D.C. Cir. 1971) established that automatic deference to the determinations of another agency of government conflicts with the duty under NEPA to consider fully and independently all environmental consequences of the proposed licensing action. Automatic or practically automatic deference

to unsupported assertions by the Applicant, whose immediate economic needs reflect values and priorities inconsistent with the public need for preservation and enhancement of the environment and for promotion of the public health and safety, likewise constitutes a violation of NEPA. Compare Greene County Planning Board v. Federal Power Commission, 455 F. 2nd 412 (2nd Cir. 1972). Thus NEPA places the burden of conducting a detailed, full, and good faith consideration of the environmental impacts of and alternatives to the operation of TMI-2 on the Commission, rather than on the Intervenors. By requiring the Commission to assume responsibility for identifying, discussing, and fully considering the environmental consequences of its actions, NEPA initiates the Congressionally mandated shift in agency values toward more environmentally responsive objectives.

As discussed above, the I.D. is defective because of NEPA violations and because it failed to protect the health and safety of the public as required under the AEA and ERA. These violations also involve a violation of the APA, 5 USC 706, because the Board acted arbitrarily and capriciously and exceeded its statutory obligations. These excesses cannot in good faith be rationalized as attributable to the discretion which the AEA, NEPA, ERA and APA grant to the Board and Commission because these violations involved an extreme abuse of discretion by the Board. With regard to radon-222, aircraft impact, evacuation preparedness, financing, and all other issues addressed in this brief, the I.D. is arbitrary, capricious, unreasonable, an abuse of discretion, beyond the statutory authority of the Board or Commission, and otherwise illegal. The I.D. must therefore be reversed.

Under 10 CFR 50, Appendix D, Parts D92) and D(3), the Board is not authorized to grant an operating license beyond 20 percent (20%) of full power. The I.D. violated this Commission regulation by authorizing the issuance of a full operating license (I.D. para. 133). Appendix D, Parts D(2) and D(3), are applicable to the TMI-2 proceeding under the provisions of Appendix D, Part C(3)(a).

Intervenors note that a review of the I.D. shows only two references by the Board to the Intervenors' proposed Findings of Fact and Conclusions

of Law of August 15, 1977 (I.D. para. 15 and 45). Intervenors had submitted 109 separate proposed findings for consideration by the Board. The Board did not even have the decency to address each of these proposed findings, separately or otherwise. The Board did not address the overwhelming majority of these 109 proposed findings at all. The Board noted merely that it had read these findings (I.D. para. 4). This evasive action by the Board constitutes a clear violation of APA, 5 USC 557 (c), which states, in part, that

> . . . The record shall show the ruling on each finding, conclusion, or exception filed by any party to the agency proceeding. . All decisions, including initial, recommended, and tentative decisions, are a part of the record and shall include a statement of:
>
> (A) findings and conclusions, and the reasons or basis therefore, on all the material issues of fact, law, or discretion presented on the record . . . (emphasis added)

Section 557(c) of the APA entitles Intervenors to know why the Board ignored, without exception, every one of their 109 proposed findings. These findings discussed the issues presented in this brief above. Section 557(c) requires that the Board specify its reasoning in order not to leave the Intervenors guessing, and to prevent decisionmaking behind closed doors. Intervenors were also prejudiced in the writing of this brief by not knowing the reasons, if any, which led the Board to ignore the important questions which these basic issue raise.

The APA also requires articulated and soundly reasoned agency decisions. Under the APA, the Board must inform the affected parties of its decision through specific and detailed responses to the issues that were presented before the Board. Disclosure of the underlying rationale of agency action, as required generally under APA, operates to deter and prevent agencies of government from exceeding their authority, because the parties will be apprised of the reasons or lack of adequate reasons which provided the official basis for the decision. This requirement of reasoned decisionmaking is also inherent in NEPA, and was violated in the extreme by the Board.

In addition to violating Section 557(c) of the APA and the spirit of reasoned decisionmaking which permeates the APA generally, paragraph four of the I.D. epitomizes the genteel contempt with which the Board, the Staff, and, understandably, the Applicant, responded to the Intervenors at every critical stage of the TMI-2 proceeding.

The Intervenors submit that their rights to due process and equal protection, guaranteed by the U.S. Constitution, were abridged by the TMI-2 proceeding. These rights were abridged because the Board's denial of financing, as explained above, prevented a balanced presentation of issues. These constitutional rights to a fair hearing were also violated because of the prejudicial and predetermined nature of the entire proceeding. The I.D. does not reflect an evenhanded response to the record. A re-established outcome, the production of another operating l[illegible], could not be swayed by the many significant and still unaddressed issues raised by the Intervenors and summarized in this brief above because the Board applied completely different standards to the evidence elicited by the Intervenors than it did to the information supplied by the Applicant. Such conduct is appropriate to advocacy, not to objective decisionmaking. Such conduct violates the basic principles of justice that are fundamental to due process and equal protection under the law.

For the reasons described above, the I.D. must be reversed. An operating license cannot, consistent with the Commission's legal obligations, be granted to TMI-2.

Wichita Eagle, April 14 1977

1957 A-Bomb Test May Be Cancer Link

ATLANTA (UPI) — Two Army veterans who were exposed to an atomic bomb test on the Nevada desert 20 years ago may help a medical detective discover whether there is a link between exposure to low radiation levels and cancer.

The men, Paul Cooper, 43, of Salt Lake City, and Donald Coe, 44, of Tompkinsville, Ky., were on duty at Yucca Flats, Nev., on Aug. 31, 1957, when the Army detonated a 44 kiloton atomic bomb. They were among 1,100 men stationed less than two miles from the test site.

Meanwhile, the Nuclear Regulatory Commission was urged Monday in Washington to strengthen its surveillance of atomic power plants by beefing up its inspection force to put one inspector at every site.

WITH A CURRENT force of 867 persons the NRC inspection office concentrates on a review of atomic power plant operating records to watch for possible safety violations. An inspector can be expected to visit one of the 58 licensed nuclear power plants once every two weeks.

Dr. Glyn Caldwell, chief deputy at the national Center for Disease Control's cancer branch, said Monday his attention was drawn to Cooper's condition granulocitic leukemia, by Veterans Administration doctors who knew of the CDC's interest.

"The scientific question is: Are these cases of leukemia delayed responses to low level radiation?" Caldwell said.

"When we have two out of 1,100 persons developing leukemia there's a possibilty that they went through a common experience," he said. The chances of coming down with leukemia are about 10 per 100,000 persons on a purely random basis, he said.

COOPER'S ARMY doctors said he could die at any time. Coe has "hairy cell" leukemia, a different but still fatal type, according to CDC cancer specialists.

"We need to find all the men who were exposed to the radiation and then we might be able to identify the low level of radiation as a cause of malignancies," said Caldwell.

Finding all the men won't be easy, Caldwell said.

Louisville, Ky.

Men exposed to '57 nuclear test

Army unit could be key to major leukemia study

Associated Press

ATLANTA — The lost roster of an airborne unit that was exposed to an atomic bomb test in Nevada in 1957 could be the key to an important study of leukemia, the national Center for Disease Control said yesterday.

Two former members of the 504th Airborne Infantry Regiment of the 82nd Airborne Division, Ft. Bragg, N.C., are known to have acute leukemia, a cancer that attacks the white blood cells, the disease center said.

There could be others, some of whom may already be dead, a spokesman sa

Dr. Glyn G. Caldwell, deputy co... of the disease center's cancer branch, wants to locate the other members of the unit — about 250 men.

Others were exposed to radiation during atomic tests at Yucca Flats. But Caldwell said the 504th would give scientists a specific group with which to work.

"What I am trying to do is to zero in on the 1957 test," Caldwell said. "I hope to find out if this group had an increased risk of leukemia, or cancer in general, compared with the national average."

The Army's official roster of the 504th apparently was lost in a fire at the St. Louis records center in 1973.

The two former members of the unit known to have leukemia were identified as Donald Coe, 44, of Tompkinsville, Ky., and Paul R. Cooper, 43, who is in a Veterans Administration hospital in Salt Lake City.

Cooper has filed a claim for service-connected assistance, claiming his unit was deliberately exposed to radiation.

Caldwell said his attention was called to the matter by the disease center's Epidemic Intelligence Service, which investigates epidemics.

Caldwell said he has received numerous calls from other people who were at tests as far back as 1945. He said Cooper claims as many as 1,100 people were in the immediate area at the time of the 1957 test.

"We know that people exposed to radiation at Hiroshima and Nagasaki had an increase in leukemia among survivors," he said. "The difference is that they were subject to tremendous doses. The average safe dose for radiation in this country is recognized as five rads, while the Japanese got greater than 100 rads per dose."

He said the soldiers in the 504th received about one and one-quarter rads per dose.

A rad is a unit of measurement of an absorbed dose of radiation.

Caldwell said studies showed the rate of leukemia in Japan before the atom bomb explosions was about what it is in this country — about 10 cases per 100,000. But it increased tremendously for about seven years after the war, and then dropped to the previous level, he said.

U.S. Hunts G.I.'s at '57 Atomic Test To Check Radiation-Leukemia Link

By MALCOLM W. BROWNE

The disability claim of a former soldier who charges that he contracted leukemia because of a 1957 atomic bomb test has prompted a nationwide search for other veterans present at the test.

The National Center for Disease Control in Atlanta, which initiated the investigation, is treating the case as an epidemiological study, trying to find a possible link between the test and leukemia.

Should a relationship be found, officials say, scientists would have to reappraise the safety standards applying to radiation exposure, and this could have profound effects on the future of nuclear technology, possibly involving the redesign of nuclear reactors.

At a meeting of Dec. 1, the Department of Defense, the Veterans Administration, the Department of Energy, the Public Health Service and the National Research Council decided to help with the study.

The Army veterans whose case prompted the study is Paul R. Cooper, 43, of Emmett, Idaho. Mr. Cooper was serving in a provisional unit of the 82d Airborne Division when the division participated in an atomic bomb test codenamed "Smokey" on Aug. 31, 1957, at Yucca Flats, Nev.

Claim Was Denied

In a compensation claim submitted to the Veterans Administration, Mr. Cooper contended that his leukemia was a result of his presence at the test. His claim was denied, as was his subsequent appeal.

But the National Center for Disease Control, in response to an inquiry from the Veterans Administration, took an interest in the case last August.

"It's partly a matter of science and partly of humanitarianism," Dr. Glyn G. Caldwell, deputy chief of the center's cancer branch, said in an interview.

Because of the attention Mr. Cooper's case generated in the press, another leukemia victim who was at the "Smokey" test, Donald Coe of Tompkinsville, Ky., came to light, and four other possible leukemia victims have been identified.

"The Pentagon has told us that about 3,153 people, give or take a few, were present at the Smokey test," Dr. Caldwell said. "We know that the average age of the 82d Airborne people was 22, and we have statistics on the number of leukemia cases one could expect in an unexposed population of 3,153 people."

1.9 Cases Predictable

"The predictable number for people at the age those soldiers would be now would be about 1.9 leukemia cases," he said. "That is, any number of cases from zero to six would not be significant in showing a relationship between the test and leukemia.

"But even six cases might be significant if we knew how many of those people present at the test have died since then."

The Defense Department has said that although some of those present were within two and a half miles of the 44-kiloton explosion, radiation doses were well below the accepted limit of safety, which is five rads a year. Everyone at an atomic bomb test is required to wear a film badge that registers radiation accumulated by the wearer.

But some scientists are concerned that even low doses may cause ill effects after a long period.

Leukemia is common, after a period of years, among victims of massive radiation doses, such as survivors of the Hiroshima and Nagasaki explosions.

If doses now considered safe were found to have effects such as leukemia over a longer term, the redesign of nuclear power reactors might prove necessary.

Medical Records Sought

The first step in the investigation will be to locate the men who participated in the test and to obtain medical records and death certificates. The interagency committee set up to conduct the study estimates that the task of checking available records will be completed in six months at a cost of about $100,000, a Defense Department spokesman said.

Meanwhile, however, Dr. Caldwell and his small staff at the Disease Control Center have succeeded on their own in locating 432 of the people they are seeking.

Because of press accounts of the investigation, Dr. Caldwell said, his office has received thousands of letters from former servicemen and others who were at bomb tests.

From the first atomic bomb test in July 1945 until June 30, 1976, there were 528 American atomic bomb explosions, including the two that ended World War II, Dr. Caldwell said. In 1957 alone there were 25 American tests. Dr. Caldwell estimates that up to two million Americans were present at tests potentially exposing them to some degree of low-level radiation.

Many of the letters he has received, Dr. Caldwell said, were from people who were at tests other than Smokey and who therefore cannot be included in the present study, because of the widely varying conditions of other tests.

He said tracking down records within the military and other organizations has proved extremely difficult, partly because of the Federal Privacy Act.

"Military record-keeping was not nearly as good in 1957 as it is today, thanks to computers," he said, "and incomplete records are another problem. Further problems will arise when we look for military personnel records because of the 1973 fire at the St. Louis military records center, which destroyed many of them. Even linking names with serial numbers turns out to be a major problem."

But Dr. Caldwell believes that the records generated "when money changes hands," insurance files, retirement payrolls, disability claims and so forth, may furnish clues, if and when they become available.

"We need to talk to doctors whose patients may be the men we're interested in. We need to interview the men themselves, at a certain point. We need to know causes of death on death certificates."

THE WASHINGTON POST Friday, Jan. 6, 1978

Dispute Arises on Who Will Run U.S. Study of '57 A-Test Effect

By Walter Pincus
Washington Post Staff Writer

Controversy has developed over who should run a government study of whether a 1957 nuclear weapons test caused a significant number of leukemia cases among 3,100 soldiers and civilian participants.

Two key members of Congress, Rep. Paul Rogers (D-Fla.) and Rep. Tim Lee Carter (R-Ky.), chairman and ranking GOP member respectively of the House Health and Environment Subcommittee, have written President Carter that they are "deeply concerned" that the planned inquiry "may be transferred from the Center for Disease Control."

At a Dec. 1 Pentagon meeting, it was decided that the National Research Council, an arm of the National Academy of Sciences, would undertake the study directed and funded by the Departments of Defense and Energy.

The purpose of the study was to resolve whether "the incidence of disease, particularly leukemia or cancer, increased among men exposed to atomic nuclear radiation," according to Dr. William H. Foege, assistant surgeon general and director of the CDC.

The Dec. 1 group also decided that along with the 1957 test, code-named Smokey, the study should include a survey of effects from other tests.

The Atlanta-based CDC's Dr. Glyn G. Caldwell, deputy chief of the cancer branch, has spearheaded the inquiry up to now.

He confirmed through investigation the first two leukemia cases and aided the discovery of four more among Smokey participants.

According to Caldwell, the finding of six leukemia cases among the 3,100 Smokey participants was "on the borderline" of proving a significant relationship between radiation received at the test and the illness.

Only 500 individual Smokey participants have been thoroughly examined.

Leukemia, a cancer of the blood that has been closely related to radiation exposure, generally occurs in about one of 1,000 persons.

The two congressmen pointed out in their letter that the CDC has no "vested interest in the outcome of the study" while the Pentagon, Energy Department and Veterans Administration are involved "in continuing litigation arising from atomic tests."

The three agencies, Rogers and Carter went on have "potential financial liability and obvious policy interests" in the outcome of the study.

The views of the two legislators will carry additional weight within the administration since they are planning to hold public hearings on Smokey before their subcommittee within the next few weeks.

The Smokey test took place near dawn on Aug. 31, 1957, at Yucca Flat in the Nevada nuclear test site. A 44-kiloton device was detonated on a 700-foot tower. Within three hours after the explosion, some 1,000 GIs maneuvered in the vicinity of ground zero.

One purpose of having troops exercise after the detonation, according to Army press releases at the time, was to publicize the role of the foot soldier in the age of atomic warfare.

Battle on Radiation Standards, Ever Bitter, Is Now Expanding

By Walter Pincus
Washington Post Staff Writer

In the summer of 1974, Dr. Samuel Milham of the Washington State Public Health Service completed a study of all deaths in the state and determined that there were excessive cancer fatalities among the workers exposed to low-level radiation at the U.S. government's nuclear facilities at Hanford, Wash.

The Milham study ran counter to the established government position that present federal exposure standards for low-level radiation are safe—a position that recently has come under increasing attack as additional studies surface.

Upon learning of Milham's conclusions, officials at the Energy Research and Development Administration, which supervised Hanford, became concerned about the public impact of the study.

They first tried to convince Milham that he should not publish the results of his study. When he did, in an obscure journal, ERDA officials tried to get Dr. Thomas Mancuso of the University of Pittsburgh, their contract researcher on the Hanford workers' health, to sign a news release saying his 10-year study had turned up no excess of cancer cases. Mancuso refused.

ERDA then hired another research organization to analyze Milham's statistics to see if another result could be determined. It did.

In 1975, Mancuso was told his study contract was to be transferred to ERDA's Oak Ridge facility for administrative reasons.

One year later, in the summer of 1976, Mancuso came up with results similar to Milham's. Workers at the Hanford facilities, according to Mancuso, exposed to low levels of radiation showed a 6 per cent greater level of cancer than that found in the general population.

ERDA officials in 1976 worked to delay Mancuso's publication of his results. They developed criticisms of the findings and circulated them among the scientific community.

In December, 1977, however, Mancuso and his two colleagues, Dr. Alice Stewart and Dr. George Kneale, published their findings in Health Physics, the premier journal in the occupational radiation field.

Recently, ERDA's successor agency, the Department of Energy, started an inspector general's investigation to establish why Mancuso was dropped, as of this year, as the chief government-supported researcher into the long-term health of Hanford and Oak Ridge nuclear facility workers.

Behind the Milham and Mancuso controversies is the bitter fight that has raged for years within the scientific community over the possible long-term cancer-causing effects of low-level radiation.

Those who believe the safety level in current government standards is too lax, have claimed that scientific papers have been censored by the government and federal research grants canceled to suppress additional criticism.

Federal officials and their supporters counter that critical findings have come from poor research techniques or self promotion by groups and individuals.

A new National Academy of Sciences panel has been convened to take another look at the government low-level standard. The current battle will be carried on before that body.

It has also reached the courts.

In Las Vegas, two widows have filed suit against the government, claiming that their husbands died of leukemia as the result of radiation they received in December 1970, when a nuclear underground test called Baneberry vented and sent fallout into the air.

The two men, guards, were among 100 persons exposed at a camp near the test site. Another guard also recently died of leukemia.

In the Baneberry case, the government plans to produce scientific witnesses who say the dose received was too low to produce leukemia. The widows have as their chief witness Dr. Shields Warren, former director of the Atomic Energy Commission Division of Biology and Medicine, who will say the dose could have caused the disease. Warren was also for eight years U.S. representative to the U.N. Scientific Committee on the Effects of Nuclear Radiation.

The battle over the standards will also be played out before the House Subcommittee on Health and the Environment, which on Jan. 23 plans to begin a series of hearings on low level radiation.

One specific subject for inquiry will be the Mancuso study.

Another area will be Smoky, the 1957 nuclear weapon test in Nevada where the Army marched GIs in the vicinity of ground zero within two hours after the 44-kiloton shot (three times that of Hiroshima) was detonated.

One of the six leukemia cases already found among Smoky's 2,235 Army participants is a constituent of Rep. Tim Lee Carter (R-Ky.), ranking minority member of the subcommittee, headed by Paul G. Rogers (D-Fla.).

A key witness at the hearing is expected to be Dr. Karl Z. Morgan, now a professor at Georgia Tech but for more than 23 years the director of the Health Physics Division at the government's Oak Ridge nuclear facility.

A man of international reputation in the radiation health field, Morgan has worked from the start of the nation's atomic bomb program on the dangers of cancer from radioactive material, particularly plutonium.

Morgan is no stranger to the government's alleged penchant for pressuring its critics in the radiation field.

In the summer of 1971, Morgan, still Oak Ridge's director of health physics, drafted a paper critical of the health dangers he saw in the fast-breeder nuclear reactor. The paper was to be delivered to an International Atomic Energy Agency conference in Germany.

However, his AEC Superiors at Oak Ridge censored material critical of the breeder reactor and the plutonium it used, and sent the new version to Germany with instructions to Morgan that he was to retrieve the earlier copies and deliver their version.

Morgan complied, not wanting, he said recently, to cause a stir in his last years at the agency.

Now, looking back upon the episode, Morgan says there is a danger in "pressures on research from funding agencies that can be brought to bear against those who disagree."

He has become a major combatant in the Manicuso affair. It was a Morgan letter to Energy Secretary James R. Schlesinger Jr. questioning Mancuso's dismissed that reportedly led to the current inspector general investigation.

For Morgan, the "censorship" involved in the Mancuso case is more important than the findings of the study itself.

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Effects of Nuclear Tests on GIs Probed

By Walter Pincus
Washington Post Staff Writer

New details about the use of troops during nuclear weapons tests in Nevada in the 1950s are expected to emerge from hearings this week before the House health and environment subcommittee.

Sparked by discovery that at least six GIs of 2,235 who participated in a 1957 test developed leukemia—a blood cancer associated with radiation—the congressional inquiry is expected to disclose, among other findings, sloppy procedures in the handling of film badges, the primary means used to measure individual radiation exposure.

At some tests, film badges were not given every soldier, according to several participants. A Pentagon report from the 1957 nuclear test series noted that many soldiers either lost or misplaced their badges.

Allan M. Harris, a California insurance man, was a Marine who observed a 1952 shot and thereafter was marched into the vicinity of ground zero. Harris said in a recent interview that no badges were given his unit. Seven years later, Harris said, he developed skin cancer for which he still receives treatment.

A former top Atomic Energy Commission official in the health field, Dr. Karl Z. Morgan, said that at early 1950s tests where he was present, only a few soldiers in each unit were given badges, and radiation levels for all were determined by averaging.

The military had a volunteer program where individuals, both in and out of the services, were placed in trenches just over one mile from large shots so blast, thermal and radiation effects would be measured on human beings. According to one source, after the 42 kiloton blast of 1953 one volunteer lay in his trench with blood over his face.

Altogether, the Army has put together a list of 30 GI volunteers from tests in 1953 and 1955, but no apparent effort has been made recently to find these men.

Troops often were marched into the immediate vicinity of ground zero shortly after major shots.

After a 74 kiloton device called Hood was set off in Nevada in July 1957, Marines were marched to within 400 yards of ground zero, according to a recently declassified report.

The Department of Energy, which controls the records of the AEC, said through a spokesman recently that to compile a complete list of some 230,000 civilian and military observer and test participants could require six years.

Lack of usable lists will hinder efforts to explore whether low levels of radiation absorbed at the tests can be related many years later to an increased risk of leukemia or other forms of cancer.

On Tuesday the first witnesses related to Smoky will appear before the House subcommittee chaired by Rep. Paul Rogers (D-Fla.) Ranking Republican on the subcommittee is Rep. Tim Lee Carter (Ky.), a physician whose constituent, Donald Coe, is a Smoky veteran now suffering from leukemia.

He and several others who were at Smoky will testify Wednesday.

One witness will be Russell Jack Dann, who was at Smoky and Galileo, another shot two days later. Dann said recently his film badge was collected after the first test and he had none at the second.

Dann, then a paratrooper and the blast from the 43 kiloton Smoky shot "knocked me 15 to 20 feet" from where he was kneeling some two miles from ground zero. It tore off his steel helmet, leaving only the plastic liner which was secured by a chin strap.

Dann said recently that, within a year of the tests, "I lost my teeth, my hair fell out in blotches . . . my joints ached and I had a low sperm count." Several years later Dann developed a dizziness problem and now is a paraplegic as the result of an accident.

Rogers and Carter want to use the hearings to make certain there is no delay in finding out what happened to all the Smoky participants.

A bureaucratic battle has been under way within the executive branch for control over the study.

Up to now the Center for Disease Control in Atlanta has spearheaded the effort, while the Army and Department of Energy gave hesitant support.

Last month, an interagency meeting held at the Pentagon decided a long-term study of Smoky should be handled by the National Research Council of the National Academy of Sciences, rather than by CDC.

The congressmen objected that such an effort would be financed and directed by Pentagon and Energy officials having an interest in the outcome.

In a letter to President Carter, Rogers and Carter pressed for leaving the study with CDC, which is part of the Department of Health, Education and Welfare.

"I lost my teeth, my hair fell out in blotches, my joints ached and I had a low sperm count."

THE WASHINGTON POST Thursday, January 26, 1978

Pentagon Plans to Hunt Data on GIs in A-Tests

By Walter Pincus
Washington Post Staff Writer

A Defense Department official told Congress yesterday that the Pentagon will undertake a "crash program" to collect records of GIs who were exposed to nuclear weapons test in the 1950s.

Peter R. Haas, deputy director of the Defense Nuclear Agency, announced the move to a House subcommittee on health and the environment toward the close of a day-long hearing on possible radiation induced illnesses of troops who participated in the tests.

Throughout the hearing committee members criticized the Defense Department for what they described as haphazard efforts to monitor the medical effects of the nuclear tests.

Specifically, the Pentagon and other agencies were taken to task for not cooperating with a Center for Disease Control study on the possibility that the troops were exposed to increased risk of contracting leukemia and other forms of cancer as a result of the 1957 nuclear test, nicknamed Smoky.

Subcommittee Chairman Paul G.

See RADIATION, A8, Col. 1

RADIATION, From A1

Rogers (D-Fla.) said it was "unbelievable" that the Defense Department failed to give "high priority" to the location of soldiers who took part in the tests.

The subcommittee was informed yesterday that "a statistically significant" number of leukemia cases—the number now reaches eight—has been found among 2,225 soldiers who took part in maneuvers after Smoky, a 15-kiloton tests hot detonated in Nevada on Aug. 31, 1957.

Dr. Glen G. Caldwell of CDC cautioned the subcommittee, however, that more information is needed before any cause-effect conclusions could be reached on the relationship between test exposures and later cancers.

His boss, CDC Director Dr. William H. Foege, said his personal view was "When you have eight cases you have to go on the assumption that it is out of the normal range."

The normal probability for occurrence of leukemia from a group of 2,225 young men would be two, Foege said. In the course of his testimony Foege read a letter to Rogers from Health, Education and Welfare Secretary Joseph A. Califano Jr., who said CDC's Smoky study would "be expedited to the maximum extent possible."

Caldwell told the subcommittee that he found 29 additional cancers in reviewing the records of 500 Smoky participants—a number he said was still below what could be expected statistically from the entire Smoky group.

Of 1,300 individuals who participated in other military nuclear tests, said the CDC official, 32 said they had leukemia and another 211 had some form of cancer.

Earlier, an Army witness, Maj. Alan Skerker, had told Rogers that for the past year he had been the only Army officer in the Pentagon trying to locate information on soldiers in the Smoky nuclear test, "and only for about 25 percent of my time."

Skerker also said he had found the names of three soldiers who had higher than allowable doses at Smoky but that he had not looked for them.

In his prepared statement, Skerker described several other tests which, he said, should have a "follow-up program."

One he noted was a March, 1953, shot called Nancy, a 24-kiloton device detonated from a 300-foot tower.

"Film badges were not issued to each man," Skerker noted, though there was "heavy fallout in the maneuver area."

Skerker noted that the radiation safety monitors went into the contaminated area without giving readings to their commanders.

When the radiation safety officers directed the troops to be withdrawn, some 7.0 yards from ground zero, "the unit commanders experienced difficulty in withdrawing their troops."

Skerker also told of finding that a Tennessee Air National Guard group had flown a photo mission over the Smoky site after detonation. He added that he could not locate any record of the men or who ordered them to perform that mission.

The Tennessee unit had come to his attention, Skerker told the subcommittee, through Caldwell.

He added that Caldwell told him one of 10 men in the Tennessee group had turned up with leukemia.

The subcommittee's initial witnesses yesterday were veterans of the Smoky blast.

Russell Jack Dann of Albert Lea, Minn., testified from a wheelchair, describing how he was knocked over by Smoky from his position on a hill "3,000 yards from the tower."

Dann said that after the test, "I lost my hair in blotches, then it grew back gray and turned to my natural color. My teeth began falling out and I lost hearing in my left ear." Dann also said he had been told by his doctors that he has a low sperm count, a situation associated with radiation exposure.

900 Were Exposed To A-Tests Radiation

By Walter Pincus
Washington Post Staff Writer

A Department of Energy official told a House subcomitteee yesterday that at least 900 persons at atmospheric nuclear weapons tests in Nevada and the South Pacific from 1951 to 1962 received radiation exposure doses that exceeded then permissible levels.

In answer to questions from members of the House Commerce subcommittee on health and environment, Dr. Donald M. Kerr, acting assistant energy secretary for defense programs said his agency presently has no plans to conduct follow-up medical examination of the individuals involved.

His statement drew criticism from Chairman Paul Rogers (D-Fla.), who is directing the investigation into possible increased risk of leukemia and other cancers for soldiers who participated in nuclear weapons tests in the 1950s.

Rep Tim Lee Carter (Ky.), ranking GOP member of the subcommittee, asked Kerr about Baneberry, a 1970 underground shot run by DOE's predecessor agency, the Energy Research and Development Administration.

Baneberry vented and sent radioactive fallout 20,000 feet in the air. The fallout drifted over a nearby tent city where 900 test site employees had to be evacuated and 86 of them examined for higher, than normal radiation levels.

Since then, three persons involved in the accident have died of leukemia.

Two widows are suing the government.

Carter asked the DOE officials whether the fallout had caused the leukemia. The response was that DOE expert witnesses will testify at the lawsuit that the radiation that day did not.

"What did they do, eat some chocolates?" Carter a doctor himself, asked sarcastically.

Carter asked if DOE had done a followup on the 900 Baneberry victims and was told none had been done.

"How do you make a judgement unless you study these people?" Rogers asked.

Rogers noted that as successor agency to the Atomic Energy Commission, DOE carries on research to determine radiation effects on humans.

After being told that $6 million is being spent this year studying Japanese survivors of Hiroshima and Nagasaki, Rogers exploded, saying, "Nothing near that is being used to follow American soldiers who were used in these [nuclear weapons] tests."

On Wednesday, the subcommittee was told that eight leukemia cases have been discovered among 50) soldiers who took part in one 1957 test nicknamed Smoky

"You took no action on Smoky," Rogers told the DOE officials who were testifying. "It has to be activated by" the Altanta based federal Center or Disease Control.

Rogers added bitterly, "We'll never find out if low level radiation has any effect if we don't look."

Kerr told the subcommittee that the Department of Defense in 1953 requested and received control for the radiological safety of military troops used in the Nevada tests.

At the time of Smoky, Kerr said, the Army forces "were independent and furnished their own radiological safety and support."

Kerr testified that since the "AEC was not responsible for troop activities" during Smoky, it was the Defense Department's responsibility to do any medical follow-up.

Dr. William Burr, DOE's deputy director of the division of biomedical and environmental research who controls human radiation research programs, said a study of the soldiers exposed to radiation in Smoky and other nuclear tests would be difficult because film badges, which registered some radiation exposures, were not given to all the troops.

Kerr said after the hearing, "It makes the scientific people nervous to make assumptions" as they would have to if they took up a study of the exposed soldiers.

Another committee member, Rep. Douglas Walgren (D-Pa.) also criticized the DOE witnesses for the lack of interest in the soldiers who had been exposed to radiation at the nuclear tests.

"We have a record that is developing evidence bf low level radiation being a serious health hazard," the Pennsylvania congressman said, "and you people [referring to the DOE officials] institutionally or personally have not been suspicious . . . I'd feel much more comfortable if we had someone skeptical enough to believe that something adverse may be happening."

CERTIFICATE OF SERVICE

I hereby certify that copies of "Intervenors' Brief in Support of Exceptions to the Initial Decision of December 19, 1977, dated January 30, 1978, have been served on the following by deposit in the U.S. Mail, First Class, postpaid, this 30th day of January, 1978.

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ATTACHMENT G

Intervenors' Appeal to the Commission
for a Stay of the Initial Decision

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Nuclear Regulatory Commission

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY, et al.	)	Docket No. 50-320
	)	
(Three Mile Island Nuclear Generating Station, Unit 2)	)	

INTERVENORS' APPEAL TO THE COMMISSION OF A STAY OF THE INITIAL DECISION

Under the authority of Part 2.788 of the Commission's Rules, the Intervenors' request that the Commission issue a stay of the Initial Decision (ID) of Dec. 19, 1977, in this proceeding. This action is requested because the ID issued by the Licensing Board contains numerous flagrant violations of the Administrative Procedure Act of 1946 (APA), the Atomic Energy Act of 1954, as amended, (AEA), the National Environmental Policy Act of 1969, (NEPA), the Energy Reorganization Act of 1974 (ERA), and the Commission's Rules. This action is requested of the Commission because an appeal for a stay made to the Atomic Safety and Licensing Appeal Board (AB)(Dec. 29, 1977, and Supplemental Memorandum, Jan. 13, 1978) was rejected with little indication that the AB either read or understood the filings or was aware of the requirements of the APA, 5 U.S.C. 557(c) or its other statutory responsibilities reaching its decision of Jan. 27, 1978, (ALAB-456). This appeal will by the limitations of space be a very condensed version of the Intervenors' Brief of Jan. 30, 1978, and will discuss the criteria of 10 CFR 2.788(e) in order.

1. The analysis upon which the Licensing Board and the Staff relied fraudulently concealed vital information and required that the Board and Staff turn their backs on the laws of both physics and man, as shown below. The Staff additionally must disregard the statements of the Staff's own Witness, Dr. Gotchy, who wholly and completely corroborated the basic thrust of the testimony of Intervenors' Witness Kepford. The subject here was the quantity of radon-222 released to the environment from abandoned mill tailings piles of one year's operation of TMI-2. Kepford had shown that there were three separate sources or radon-222, each producing enormous quantities of radon (Kepford testimony, Table 2). The thorium-230 initially present in the tailings piles would produce about 320 million curies, while the small amount of unrecovered uranium-238 would produce about 2 trillion curies, and the depleted uranium-238, about 13 trillion curies. The environmental impacts of these emissions have never been

acknowledged by the Staff, let alone considered and evaluated. It should be noted, however, that when Staff Witness Gotchy was recalled to the witness stand by the Staff to rebut Kepford's testimony, he acknowledged that he could not argue with the numberKepford had produced (tr. 2890).

The end result has been that the Staff and Licensing Board relied on an inadequate survey of the health effects of the uranium fuel cycle, a seriously defective cost-benefit analysis for TMI-2, and an equally defective analysis of alternatives to the operation of TMI-2. The ID is not supported in the evidentiary record by reasoned judgments, full disclosure of environmental damage, or evaluations of environmental damage "to the fullest extent possible," in violation of the APA, AEA, and NEPA, and the Commission's own Rules 2.760(c).

Instead, the Staff Licensing Board andAppeal Board relied on the discredited Table S-3 of 10 CFR 51. 20(e) to exclude from consideration by far the largest sources of radioactive emissions from the entire uranium fuel cycle--the abandoned mill tailings piles. The Staff "Appendix" of Jan. 20, 1978, states clearly that all emissions from the abandoned piles are <u>not</u> included in Table S-3 (Lowenberg Affadavit, page 14).

Neither the Staff nor the Commission itself has the statutory authority to use the Commission's Rules to conceal important environmental information. NEPA specifically prohibits administrative regulations which prevent "full compliance with NEPA." (NEPA, Sec. 103). Any further reliance on the 74.5 curies of radon-222 number in Table S-3, in knowing exclusion of the appropriate numbers, billions of times larger, (Kepford testimony, Table 2) is nothing short of fraudulent. (One must wonder just how many licenses have been issued by the Commission, with full knowledge of the glaring dishonesty in Table S-3).

In dismissing Kepford's testimony in the ID, the Board relied totally on assertions that the radon-222 releases attributable to the operation of TMI-2 would be small compared to background releases of radon-222 (ID, para. 125) and the number of deaths caused by the operation of TMI-2 would be small compared to the people who would die from all other causes in the same time period (ID para. 125).

The Staff, Applicant Licensing Board and Appeal Boards, have all failed to shoulder the "burden of proof" (10 CFR 2.732), articulate the relevance of these two arguments (In contrast, see tr. 2863, 2865, 2869, 2875). The Intervenors have, however, shown these arguments to be wholly without merit.

Since the health effects of alternative fuel cycles are being compared, any cause of any health effect which operates equally upon all options does not affect the comparison. Thus, the level of background releases of radon-222, the number of people dying from natural causes over any time span, or the deaths due to bites by poisonous insects and reptiles, play no part in the comparative analysis. Furthermore, NEPA calls for an analysis of the project itself, not in comparison with any non-related subjects.

The woefully inadequate nature of Table S-3 was further illuminated by a memorandum of Dr. Walter Jordan of the ASLB, (dated Sept. 21, 1977) which discussed only the thorium-230 contribution to radon-222 emissions. He found Table S-3 in error by a factor of 100,000, and an error of the same magnitude in the population exposure of 100 person-rem listed therein.

The Staff "Appendix" of Jan. 20, 1978, added further evidence against the 74.5 curie number of Table S-3. Here it is shown that this 74.5 curies number reflects the radon-222 emissions during active mill operations, and excludes all contributions from the abandoned mill tailings piles (Lowenberg Affadavit, para. 14). The Staff has yet to discuss justification of including in Table S-3 this 74.5 curie number, while excluding the annual emissions of 110 curies of radon-222 from the abandoned tailings piles which go on for billions of years (Magno Affadavit, para. 9).

The Staff "solution" to the problem of radon-222 is nothing more than a short term expedient, since the solution is designed to fail well before 1000 years expires, less than one-eightieth of the first half-life of thorium-230 (Gotchy Affadavit, page 4). The Staff still conceals the overwhelming quantity of radon-222 to be released to the environment as a result of just one year's operation of TMI-2, in defiance of the AEA and NEPA.

The Gotchy testimony was entered into the proceeding as a supplement to the FSFES (tr. 2097). This testimony was offered to Federal agencies for comment on Sept. 29, 1977, and a revised version of the testimony reflecting agency and public comments has yet to be issued. The ID was issued in advance of the completion of this portion of the FSFES, in violation of NEPA.

The mere promise of the Commission to consider on a generic basis the mill tailings problem at some future date (41 Fed. Reg. 22430-1, 42 Fed. Reg. 13874-5) does not allow the Staff, Board or Appeal Board to shirk their respective duties under NEPA and refuse to consider the factual nature of the radon-222 emissions in this proceeding. None of the advocates of this "major Federal action" has yet to show that a complete and "full NEPA review" is not required prior to this licensing action.

This plant cannot be legally licensed until the Staff and Licensing Board have fully considered the entire radon-222 problem. By defining 74.5 curies as the only quantity of radon-222 to be discussed in reactor licensings as the Appeal Board would dictate in ALAB-456, the Commission conceals trillions of curies of radon-222 and fraudulently denies the existence of the radon by ignoring the laws of physics governing radioactive decay. Neither the Staff, Licensing Board, or Appeal Board have any authority under any statute to withhold or refuse to consider such information, to commit fraud on a continuing basis, or to repeal the laws of physics.

No attempt was made by the Intervenors to invoke Sec. 2.758(b) of the Commission's Rules since this rule only applies to unique circumstances. Furthermore, in the short time between the submission of the Gotchy testimony by the Staff and the commencement of cross-examination (May 21, 1977 and June 7, 1977, respectively) the Intervenors were too deprived of the necessary time, energy, manpower,and money, for yet another unnecessary filing. As a result, cross-examination proceeded on the supposed "forbidden" subject, as described above. It should also be reitterated that the Commission has no legal authority to deceive and perpetuate fraud upon the Intervenors and the public or to prevent legitimate inquiry into the basis, if any, of licensing actions.

TMI-2 cannot be legally licensed to operate until the environmental impact of the largest single quantity of radioactive emissions in the entire fuel cycle, radon-222 has been discussed honestly and openly, to the fullest extent possible, in an environmental impact statement. To date, no adequate environmental impact statement has ever been filed covering the long-term emissions from the abandoned mill tailings piles.

Under the authority of 10 CFR 50, Appendix D, the Board is required to conduct a "full NEPA review" (ID, paras. 80-130). The Board's review, if indeed it ever took place, is nothing but an unquestioning rubber-stamp approval of any Staff and Applicant filings. The Board chose to ignore new information on the enhanced effectiveness of low-level radiation in causing cancer (tr. 253-63, 2331-9), reactor decommissioning(tr. 263, 2390-97) (See also Answers of Peter N. Skinner to Suggested Questions of Full Participants on Behalf of the State of New York, Docket No. RM-50-3, Dec. 2, 1977, p. 21-27), the ultimate disposal of the depleted uranium-238 generated to fuel TMI-2 (Kepford testimony, page 3), and the issues put before the Board by, among others, Mr. Larry Arnold and Dr. Carl Jarbos. This is not an exhaustive list; it is a representative list of issues the Board failed to consider in its supposed and nonexistent "full NEPA review".

The Commission practice of denying funding to Intervenors creates an extraordinary imbalance among the parties with regard to the ability of the various parties to protect their rights. This practice of denying the Intervenors the right and ability to present a direct case further subsidizes the Applicant since it eases the Applicant's burden of case perparation and removes illegally from the Applicant the burden of proof. This is particularly important when a subject like the airplane crash issue arises. Here the Applicant stated it would take months of highly technical work to establish whether or not TMI-2 could withstand the crash of a larger than design-basis aircraft (tr. 615, 640-1). With less than $500 to cover all expenses for this entire proceeding, the Intervenors were precluded from obtaining the kind of expert technical assistance needed to fully rebut even the testimony that was offered by the Staff and Applicant.

Furthermore, the ID and ALAB-456 do not meet the requirements of the APA and the AEA, Sec. 181. The Intervenors have a right to know why these extensive findings were rejected, since the APA requires that a reasoned and articulated justification of agency decisions "shall show the ruling on each finding, conclusion, or exception presented" (5 U.S.C. 557(c)). In this proceeding, the Intervenors filed on Aug. 15, 1977, Findings of Fact and Conclusions of Law covering 109 points of fact and law. The ID contained reference to only 2. ALAB-456 is equally deficient. This Commission practice of issuing ridiculously incomplete and illegal decisions has the effect of shifting the burden of going forward upon the Intervenors, since the Intervenors must then act promptly, yet in the dark, to prevent an illegal decision from becoming effective, as in the present case. This practice is beyond the statutory authority of the Commission under the APA, AEA, ERA, and NEPA.

This practice is particularly repugnant in this proceeding, since one of the reasons the Intervenors are deeply in debt is because of previous involvement with the Commission regarding the issuesof Intervenor financing and the burden of proof. See York Committee for a Safe Environment v. USNRC et n. 13 (D.C. Cir., 1975)(tr. 247-51).

Contention 5 of the Intervenors' Petition alleged that the safety-related structures of TMI-2 are of insufficient strength to withstand the impact of aircraft above 200,000 lbs. All parties conceded that this statement was a statement of fact (ID, para. 40). Further, none of the parties refuted the concern of the Intervenors that such an impact might lead to radiological consequences greater than the admittedly unacceptable levels of 10 CFR Part 100.

The aircraft crash into a nuclear power plant, as TMI-2, creates a spectre unlike any other externally propagated hazard, with the possible exception of earthquakes. The problem here rests solely with the ability, or inability, of the safety-related structures to withstand aircraft crashes. The record remains totally void of any information on the nature or degree of any subsequent failures of the plant safety boundaries and the consequences of such failures. Thus, the point made by Staff Witness Read, "You never accept the probability if the consequences are too high." (tr. 709-10) fell on deaf ears. In reality, the Staff and Applicant crash probability assumptions were given complete acceptance by the Board, with only the most vague of references to consequences, even though the Board explicitly had expressed concern over whether or not a large aircraft could initiate a Class 9 accident (tr. 727-8). The Board relied on unquestionable numbers obtained from inserting data of unknown accuracy and applicability into unverifiable models.

This reasoning by the Board does not even satisfy 10 CFR 2.760(c), is arbitrary and capricious, and fails to meet the requirements of the AEA, NEPA and ERA to protect the health and safety of the public. The Board obviously prefers to play bookie when other peoples' lives are at stake. The Board has no such authority.

The question of who looks after the health and safety of the public during and after a reactor accident was discussed in this proceeding. Various Staff witnesses established that the Applicant has the sole responsibility of assessing population exposure inside the Low Population Zone (LPZ)(tr. 1770), that the State would monitor exposure to the public outside the LPZ(tr. 1075), and that it was NRC policy not to measure population exposures (tr. 1065). The record is clear that no one was able to say who has the legal responsibility for protecting the health and safety of the public outside the LPZ (tr. 1770-1).

The record shows conclusively that the Commission has no mechanism to determine whether or not the State can even carry out its role in the event of an accident (tr. 1078, 1745-6, 1812). This is of particular importance since the State has indicated itself that it anticipates severe problems in this area (tr. 1109). In addition, in a draft report made available to the Intervenors in January, 1978, entitled Proceedings: Workshop on the October, 1976 Fallout Radiation Incident (USEPA, Region III, Phila., Pa., undated), Mr. Thomas Gerusky states clearly and candidly that while the State could handle the fallout incident, he doubted seriously if it could respond acceptably to a reactor accident emergency (Proceedings, pages 23-4). Gerusky is the Director of the Bureau of Radiological Health of Pennsylvania, the agency to which the Comm sion has

delegated the authority to protect the health and safety of the public (tr. 1075). The statements of Gerusky regarding the lack of preparedness of the State were concealed from the Board by two parties to this proceeding, the State and the Applicant, (a representative of the Applicant also attended this Workshop), a violation of 10 CFR 51.20(d).

The Price-Anderson Act was intended to require that the Commission improve the prospects that a claimant might be able to establish the causal connection between radiation exposure and subsequent injuries. As described in the Intervenors' Brief of Jan. 30, 1978, and as shown in the TMI-2 proceeding, the Commission now requires the Applicant to be the initial, primary, and essentially sole source of radiological information in the event of a radiological accident (ID, para. 53). But Sec. 190 of the AEA prohibits victims of a nuclear accident from using data reported by the Applicant in a suit for damages. By relying exclusively upon the Applicant to monitor during a radiological accident, the Commission, in view of Sec. 190, denies the right to compensation which the Commission itself is required to protect and advance under the Price-Anderson Act. Commission reliance upon the Applicant for information thus denies victims of a nuclear accident the opportunity to introduce in court the only evidence likely to establish a claim under the Price-Anderson Act. The Commission thereby violates the AEA, NEPA, and ERA, and illegally denies victims of a nuclear accident their constitutional rights of due process and equal protection.

This crucial assessment of public radiation exposure is of major import to protection of "the health and safety of the public," and cannot be delegated haphazardly by the Commission, the Staff, or the Board. The Board is not concerned that the Applicant exercises complete control over the information used to make the initial decisions which trigger the beginning of this crucial assessment (ID, para. 53), and has therefore exceeded its statutory responsibilities under the AEA and 10 CFR 2.760(c).

The failure of the Staff and Board to look significantly beyond the confines of the LPZ to protect the health and safety of the public in the event of an accident constitutes a failure to conform with the mandate of the AEA, ERA and NEPA. New information on the effects of low-level radiation on humans (tr. 2331-8) likewise prevents the Board and Staff from relying on this narrow interpretation of the area which could be affected by a nuclear accident.

The violations of law and the Commission's Rules discussed above are by no means the only ones in this proceeding; they are included here as being representative of the contempt shown for the APA, AEA, NEPA, ERA, the Commission's own

rules and the applicable constitutional guarantees by the Applicant, Staff, Licensing Board, and Appeal Board in this proceeding. The Intervenors submit that even a single violation is sufficient grounds for the granting of a stay of the ID. The numerous independent violations of the law perpetrated by the Applicant, Staff, Licensing Board and Appeal Board require the granting of a stay.

2. The loading of fuel into TMI-2 will have been preceeded by uranium ore mining, milling, and all the preceeding steps in the fuel cycle. The milling of the ore,with the attendant creation of mill tailings piles and depleted uranium-238 masks the beginning of a billion-year public health problem the Commission has yet to examine as required by NEPA. The known latency period of cancer precludes the identification of the individuals for whom the mill tailings piles pose an immediate threat. That does not mean irreparable injury will not be done, as soon as the mill tailings piles are created, since it has yet to be established that the mill tailings problem or the depleted uranium-238 problem can be permanently solved at all. The fuel which the Applicant protests is destined for TMI-2 can be used to fuel an already licensed reactor. This would prevent the production of further mill tailings and would prevent irreparable injury due to the operation of TMI-2.

In addition, the initial achievement of fission in the core of TMI-2 transforms TMI-2, irrevocably into a heap of radioactive waste in need of decommissioning at some future time. Reactor decommissioning is yet another subject which the Staff has given only the most superficial treatment (FSGES, p. 9-20, 21). No discussion is offered concerning the nature or degree of decommissioning problems, the range of cost estimates, or the long-term aspects of the problem. Neither the Applicant, Staff, any Board, or the Commission has the right or authority to make TMI-2 irrevocably radioactive prior to the exhaustion of all appeals to the Commission by the Intervenors.

The allowing of TMI-2 to become radioactive also constitutes an irreparable injury to the Intervenors, since the Board cannot, consistent with the law, grant an operating license to TMI-2 as shown above.

The Intervenors and other members of the public are harmed irreparably once the plant becomes radioactive because they will bear the <u>full</u> cost of decommissioning which the Staff, Licensing Board and Appeal Board have refused to fully evaluate.

3. The Intervenors submit that no party to this proceeding will be harmed by the stay of this decision pending the exhaustion of all reviews provided for in the Commission's rules. The Applicant has, for its own reasons, delayed the completion date of TMI-2 for about 4 years (see, for instance, Construction Status Report, July, 1977, NUREG-0030-77/7). The Applicant has made no mention who decides to cause this delay and how much this delay has escalated the cost of TMI-2, and who must pay for it. Furthermore, it is questionable whether or not the power is needed. A Dec. 13, 1977 news release from the Department of Energy (FE-87) reports a 55.5% excess generating capacity in the Mid-Atlantic area, which includes the Applicant's service area. Furthermore, the bringing of TMI-2 into service will increase electricity costs to the Applicant's customers (tr. 1257) If the Applicant was truly interested in immediate, lawful operation of TMI-2, the Applicant could have encouraged the development of an ID whose legality was beyond question. Instead, the Applicant relied on the Staff and the Licensing and Appeal Boards to protect the Applicant and move the burden of proof on to the Intervenors, as described earlier. The Applicant has no vested right to demand an operating license prior to a final finding by the Commission that the plant can be lawfully licensed. Nor does the Applicant have the right to dream up damages in an attempt to justify the issuance of an illegal operating license. The Commission's fundamental responsibility is to protect the health and safety of the public. This statutory responsibility cannot be ignored to suit the Applicants' fantasies particularly where such illegal action would also cause irreparable injury to the Intervenors and the general public.

4. The public interest is best served when the legal and constitutional rights of all parties concerned in the proceeding have been protected. The denial of the right to present a full line of witnesses in this proceeding due to the practice of forcing a unique financial burden on the Intervenors by the Commission destroys the Intervenors' rights. The public interest is not served by allowing an illegally and fraudulently licensed TMI-2 to become irrevocably radioactive to placate the Applicant. As discussed in part 1 of this Appeal, the illegalities committed by the Staff, Applicant, Licensing Board, and Appeal Board, as outlined in the Intervenors' filings of Aug. 15, 1977, Dec. 20, 1977, Dec. 30, 1977, and Jan. 13, 1978, have yet to be fully responded to according to the law. As summarized above, NEPA, ERA, AEA, and the Commission's Rules have been flouted and mocked by the Staff, Applicant, Licensing Board, and the Appeal Board. These law violations do not serve the public interest.

The public interest is also served when agency decisions are arrived at legally and licensing hearings are conducted openly, honestly, unpartially, and according to the applicable statutes. The "kangaroo court" nature of this proceeding, with the eventual outcome never in doubt, is an abysmal example of model agency procedures. The public interest would also be served by the issuance of a decision to this Appeal according to the requirements of the AEA, Sec. 181, and the APA. The public interest dictates that until the Commission has ruled that the operation of TMI-2 is legal and proper, the Applicant has no vested right to even risk irreparable injury to any party to this proceeding, or anyone else. The public has a right to have agencies of government follow the dictates of the law. The ID must be stayed and reversed in order to restore public confidece and trust in the Commission and its attitudes toward its statutory obligations.

Respectfully submitted,

Feb. 8, 1978

Chauncey Kepford

Chauncey Kepford
Representative of the Intervenors
433 Orlando Avenue
State College, Pennsylvania 16801

ATTACHMENT H

News Release Announcing Issuance of
an Operating License for Three Mile Island, Unit 2

UNITED STATES
NUCLEAR REGULATORY COMMISSION
Office of Public Affairs
Washington, D.C. 20555

VOLUME 4, NUMBER 7 WEEK ENDING FEBRUARY 14, 1978

NEWS RELEASES

No. 78-28
Contact: Frank L. Ingram
Tel. 301/492-7715

FOR IMMEDIATE RELEASE
(Mailed - February 10, 1978)

NRC STAFF BEGINS REVIEW OF EBASCO SERVICES STANDARDIZED "BALANCE-OF-PLANT" DESIGN

The Nuclear Regulatory Commission has accepted for detailed review an application from Ebasco Services, Inc., for approval of its standardized "balance-of-plant" design for a nuclear power plant. The application was submitted under a Commission policy to encourage standardization of nuclear plant designs.

Ebasco's design is intended to be compatible with a pressurized water reactor using standard designs of nuclear steam supply systems already reviewed or under review by the Commission.

Following its review of the "Ebasco Standard Safety Analysis Report" (ESSAR), the NRC staff will prepare and publish a Safety Evaluation Report on the proposed design. The Commission's Advisory Committee on Reactor Safeguards also will review the proposed design and issue a report.

If Ebasco receives NRC staff approval of its standardized design, utility applicants who select the design for their nuclear plants will be able to reference the design in their construction permit applications. Those aspects of the design already approved would not undergo additional NRC staff review at the construction permit stage.

A copy of ESSAR is available for public inspection in the NRC Public Document Room, 1717 H Street, NW, Washington, D.C. 20555.

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No. 78-29
Contact: John Kopeck
Tel. 301/492-7715

FOR IMMEDIATE RELEASE
(Mailed - February 10, 1978)

NRC STAFF ISSUES FINAL ADDENDUM TO ENVIRONMENTAL STATEMENT ON PALISADES NUCLEAR PLANT IN MICHIGAN

The Nuclear Regulatory Commission Office of Nuclear Reactor Regulation has issued a Final Addendum to the Final Environmental Statement (FES) issued in 1972 in connection with Consumers Power Company's application for an operating license for its Palisades Nuclear Generating Plant near South Haven, Michigan.

The Addendum was prepared in connection with the company's application for conversion of its provisional license to a full-term license and for an increase in authorized power level from about 2200 thermal megawatts--about 686 megawatts electrical--to a proposed design power level of 2638 thermal megawatts, which would generate an electrical output of about 786 megawatts. Subsequently, the plant was authorized on November 1, 1977 to operate at 2530 thermal megawatts, about 770 megawatts electrical, as a preliminary step to the potential final power level of 2638 thermal megawatts.

The plant, which uses a pressurized water reactor, is located on Lake Michigan in Van Buren County.

Based on information contained in the Addendum, and after weighing the environmental, economic, technical and other benefits of the plant against environmental costs, the NRC staff concludes that the full-term operating license at 786 megawatts should be issued subject to certain conditions.

The conditions include steps to be taken if unexpected harmful effects or evidence of serious damage are detected during plant operation and if use of corrosion inhibiting chemicals in the recirculating cooling water system is necessary.

Copies of the Addendum will be available for public inspection at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C., and the Kalamazoo Public Library, 315 South Rose Street, Kalamazoo, Michigan. Copies may be purchased in about two weeks from the National Technical Information Service, Springfield, Virginia 22161 for $6.50 for paper copy or $3.00 for microfiche. For identification purposes, the document is designated NUREG-0343.

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No. 78-30
Contact: John Kopeck
Tel. 301/492-7715

FOR IMMEDIATE RELEASE
(Mailed - February 10, 1978)

NRC ISSUES OPERATING LICENSE FOR UNIT 2 OF THREE MILE ISLAND NUCLEAR PLANT IN PENNSYLVANIA

A license authorizing operation of Unit 2 of the Three Mile Island Nuclear Station in Dauphin County, Pennsylvania, was issued on February 8 to Metropolitan Edison Company, Jersey Central Power and Light Company and Pennsylvania Electric Company by the Nuclear Regulatory Commission's Office of Nuclear Reactor Regulation.

Unit 2 uses a pressurized water reactor and at full power will have an electrical output of about 900 megawatts. The station is located on Three Mile Island in the Susquehanna River in Londonderry Township, about 10 miles southeast of Harrisburg. The adjacent Unit 1, which has an electrical output of about 819 megawatts, has been licensed for operation since April 1974.

While the lic[illegible] authorizes full power operation, license conditions [illegible] for certain preoperational tests, startup tests and o[illegible] items, some of which must have further Commission approval, to be completed before entering the various operational mod[illegible] required to reach full power.

Issuance of the license was authorized by a December 19, 1977 decision of the Atomic Safety and Licensing Board which conducted a public hearing on the operating license app[illegible]tion.

Before the license was issued, the facility was inspected by NRC representatives to assure that the facility has been satisfactorily constructed and is ready for fuel loading and operation under the specified conditions.

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No. 78-31 FOR IMMEDIATE RELEASE
Contact: Frank Ingram (Mailed - February 10, 1978)
Tel. 301/492-7715

NRC STAFF AUTHORIZES SOME CONSTRUCTION WORK
AT PROPOSED YELLOW CREEK NUCLEAR PLANT IN MISSISSIPPI

The Nuclear Regulatory Commission Staff has issued a Limited Work Authorization (LWA) to the Tennessee Valley Authority permitting certain construction work to be carried out on the proposed two-unit Yellow Creek Nuclear Plant in Tishomingo County, Mississippi.

As proposed, each unit of the facility would use a standardized pressurized water reactor with a net electrical generating capacity of 1300 megawatts. The proposed 1160-acre site is on a peninsula between the Yellow Creek embayment and the Pickwick Lake, about nine miles north of Iuka.

The LWA was issued under NRC regulations which permit a utility to perform certain work, at its own financial risk, before a decision is made on issuance of construction permits. Issuance of the LWA follows a public hearing and favorable findings on February 3 by the Atomic Safety and Licensing Board on environmental considerations and the suitability of the site for construction and operation of nuclear power plants of the type proposed.

Work permitted under the LWA includes preparation of the site for construction of the power plants, including land clearing, grading and excavations; installation of construction support and service facilities; construction of some non-safety related facilities such as the turbine buildings, security buildings, switchyards, transmission lines, site roads and railroads and water treatment plants and buildings. The LWA contains a number of conditions for protection of the environment recommended by the NRC staff and called for by the Licensing Board.

Construction permits for the Yellow Creek plant may not be issued unless and until the Licensing Board following further hearing makes favorable findings on radiological safety matters. A date for the hearing to consider remaining radiological health and safety matters has not yet been set.

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ATTACHMENT I

Telegrams to the NRC from Intervenors

western union Mailgram

UNITED STATES POSTAL SERVICE

[illegible] 02/17/78 ICS IPMMIZZ CSP MGGA
[illegible] 8142373900 MGM UNIT STATE COLLEGE PA 02-17 1233P EST

JOHN ARTHUR C KETFORD
433 ORLANDO AVE
STATE COLLEGE PA 16801

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

8142373900 MGM UNIT STATE COLLEGE PA 46 02-17 1233P EST
PMS OFFICE OF THE SECRETARY NUCLEAR REGULATORY COMMISSION, TLX
WASHINGTON DC 20555

SIRS
RUMOR HAS REACHED THE INTERVENORS IN PROCEEDING DOCKET #50-320 THAT
SOME SORT OF OPERATING LICENSE HAS BEEN GRANTED. AS OF MAIL DELIVERY
FEBRUARY 17 1978 THIS DECISION HAS NOT BEEN SERVED UPON THE
INTERVENER. LETTER FOLLOWS
CHARLOTTE KETFORD REPRESENTATIVE OF THE INTERVENERS 433 ORLANDO
AVE STATE COLLEGE PA 16801

1237 EST

MGMCOMP MGM

MAILGRAM SERVICE CENTER
MIDDLETOWN, VA. 22645

western union Mailgram

4-060196C053002 02/22/78 ICS IPMMTZZ CSP HBGE
1 8142373900 MGM TDMT STATE COLLEGE PA 02-22 0437P EST

JJOHNSRUD
433 ORLANDO AVE
STATE COLLEGE PA PA 16801

POOR ORIGINAL

THIS MAILGRAM IS A CONFIRMATION COPY OF THE FOLLOWING MESSAGE:

8142373900 MGM TDMT STATE COLLEGE PA 100 02-22 0437P EST
ZIP
OFFICE OF THE SECRETARY
CARE NUCLEAR REGULATORY COMMISSION
WASHINGTON DC 20555

BY THIS THIRD REQUEST FOR ILLEGALLY WITHHELD LICENSE INTERVENORS URGENTLY REQUEST IMMEDIATE STAY OF OPERATING LICENSE OF 3 MILE ISLAND UNIT TWO TO PREVENT IRREPARABLE DAMAGE TO INTERVENORS.

THIS LICENSE ISSUED FEBRUARY 8 1978 HAS NOT YET BEEN SERVED UPON INTERVENORS. IMMEDIATE RESPONSE REQUESTED

CHAUNCEY KEPFORD
REPRESENTATIVE OF THE INTERVENORS
433 ORLANDO AVE
STATE COLLEGE PA 16801

1639 EST

MGMCOMP MGM

87 123

ATTACHMENT J

Intervenors' letter to the Commission

February 18, 1978

Dr. Joseph M. Hendrie, Chairman
Dr. Victor Gilinsky, Commissioner
Mr. Peter Bradford, Commissioner
Mr. Richard T. Kennedy, Commissioner

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Three Mile Island Unit 2
Operating License Proceeding
Docket #50-320

Dear Sirs:

I raise my voice in outrage over the dishonest, deceitful, totally biased, illegal, and fraudulent behavior of the Nuclear Regulatory Commission and its subordinates, the Atomic Safety and Licensing Board, the Atomic Safety and Licensing Appeal Board, and the Director of Nuclear Reactor Regulation, in issuing the Initial Decision (Dec. 19, 1977), an Appeal Board decision (Jan. 27, 1978), and Final Decision (date unknown) in the operating license proceeding for Three Mile Island, Unit 2, Docket No. 50-320. In reaching these conclusions, the decisionmakers have established very clearly throughout these proceedings that no information will be considered by them which might cast any doubt whatsoever on the licensing of Three Mile Island, Unit 2. Nor will these gentlemen ignore the most unsupported opinion, glaring procedural error, outright illegality, or the commission of pure unadulterated fraud in covering up for the incompetence of the Applicant or the NRC Staff in support of the licensing action. These are strong words, but I can think of no other applicable or accurate terms. They result from an intimate knowledge of the proceeding, from beginning to end. In this protest of these decisions, I will briefly describe just a few of the many issues and facets of this totally biased proceeding, best described as a "kangaroo court."

1. Three Mile Island Unit 2 is a 900 MW(e) PWR situated on an island in the Susquehanna River in southern Pennsylvania. The reactor itself is a relatively short distance from the glide path approach to Harrisburg International Airport. The largest aircraft in the world, the Lockheed C-5A, flies in and out of this airport on an almost daily basis (transcript 557, 618). The reactor containment and fuel handling structures were designed to be

hardened to withstand the crash of an aircraft weighing 200,000 lbs. traveling at 200 knots; the C-5A can weigh over 800,000 lbs. The NRC Staff witness testified that there is no certainty that the plant can withstand the crash of even a 200,000 lb. aircraft, since no qualification testing of rigid, steel reinforced concrete structures has been done since shortly after World War II (tr. 24-5, 631). Yet, note Staff and Applicant witnesses relied on the use of unverified predictive models to predict that the C-5A type crash was of too low a probability of occurrence to be considered by the Board. Both predictive models used to calculate the crash probabilities were, by their very nature, not only unverified but also unverifiable (tr. 562, 653-4). The input data was acknowledged to be inapplicable to the situation at hand (tr. 555-7). Neither witness would place confidence limits on the input data (tr. 562, 607, 653-4). The Board, in sanctioning full operation of this plant, ultimately relied upon numbers to which confidence limits cannot be assessed (tr. 562, 654), obtained by inserting inappropriate numbers of unknown accuracy into unverifiable aircraft crash models. The Board refused to consider consequences to the public of such an aircraft crash. Thus, as described in Intervenors' filings in this case, the true risk to the public of an aircraft crash into TMI-2 remains unknown.

2. The hearing record shows conclusively that the largest sources of radioactive emissions in the entire nuclear fuel cycle--trillions of curies of the radioactive gas radon-222--have yet to be even acknowledged by the NRC. The environmental impacts of these emissions have not been considered, as required by NEPA. Nor has the health impact of these enormous quantities yet been assessed by the NRC. As a result, the cost-benefit analysis for TMI-2 is hopelessly incomplete and inadequate since the record shows that the long-term health effects from radon-222 dwarf the short-term effects. Any reliance by any Commission body upon the Table S-3 number of 74.5 curies of radon-222, now known to be a clearly deceptive and enormously inaccurate representation of radon-222 emissions, can only be considered fraudulent. The NRC has no statutory authority to attempt to use its rules (Table S-3) to conceal such enormous radioactive releases as this proceeding has revealed.

In addition, the Final Supplement to the Final Environmental Statement (FSFES) issued by the NRC Staff in December, 1976, was subsequently modified

again when the Staff introduced a further Supplement to the FSFES on May 21, 1977 (after tr. 1883; see also tr. 2096-7). Subsequently, this document "Supplemental Testimony Regarding Health Effects Attributable to Coal and Nuclear Fuel Cycle Alternatives," was submitted to other Federal Agencies on Sept. 29, 1977, for comment, as required by NEPA, only after the Intervenors in this proceeding had noted that the Commission had failed to circulate the document for comment. It has not yet been issued in final form. As a result, TMI-2 has been licensed to operate with an as yet incomplete final environmental statement.

3. TMI-2 appears to have been licensed to operate in full knowledge of the fact that two parties to the proceeding--the Applicant and the Commonwealth of Pennsylvania--had knowingly withheld information from the Licensing Board, as described in Intervenors' filings in this case. This information revealed that the State is incapable of responding in an acceptable manner to a reactor accident. Despite this fact, the Appeal Board relies upon the State to monitor radiation levels to determine actual exposure levels to the public outside the Low Population Zone, knowing that the State cannot do so.

4. The Licensing Board relied on a sadly deficient transcript upon which to concoct its decision. The record is deficient because the Intervenors were denied the right by the Commission to present expert witnesses and even to obtain the minimal protection of their rights by having legal advice, let alone the expert legal advice which was available to every other party. Thus, only the proponent's case is presented for each contention, with the sole exception of the comparative health effects issue, where the Intervenors' representative in the proceeding offered what turned out to be a factually unchallenged and unrebutted testimony that radon-222 emissions from mill tailings piles will cause more than one million future health effects per year of operation of TMI-2. This is not justice, it is not a fair proceeding. nor has there been any even faint hint of impartiality in this proceeding.

5. But, the decisionmakers chose to delay the issuance of the Initial Decision so that the Applicant could complain of imaginary damage to the Applicant if a full, fair Commission review of the decision were made

available to the Intervenors--aided by the Appeal Board which also chose to further this injustice. These decisionmakers have saved the crowning insult, the ultimate injustice, for the end. The Commission's rules state that a Final Decision can be appealed to the Commission for review within 10 days of issuance of the decision (10 CFR 2.771). In this proceeding, the rights of the Intervenors have been further denied by the fact that this decision has not yet, after delivery of mail on February 18, 1978, been served upon the Intervenors. The only way the Intervenors have become aware that a final decision has been issued is through a newspaper reporter's requests for Intervenors' comments on the decision said to have been issued February 8, 1978.

The Licensing Board has amply demonstrated that this Board has had no intention of paying the slightest attention to any arguments advanced by the Intervenors in this proceeding, nor of even fulfilling its obligation under the NRC rules of practice to base its Decision on "the whole record...supported by reliable, probative, and substantial evidence". (10 CFR 2.760(c)).

The colloquialism, "a bum's rush," seems to apply here to the treatment given the public-interest Intervenors. The actions of these Boards seem expresely designed to ensure that this nuclear reactor will become irrecoverably radioactive, and thereby cause irreparable damage to the Intervenors, <u>prior</u> to the lawful exhaustion of administrative reviews.

The Commission has withheld delivery of the Final Decision, rumored to have been issued on February 8, 1978, from the Intervenors. The Intervenors are entitled to a timely delivery in order to file their petition for reconsideration of the final decision within the ten days after the date of the decision, as required by the rules of practice (10 CFR 2.771(a)). The failure of the Commission, as of February 18, 1978, to serve the Final Decision on the Intervenors thus confirms this apparent intent to compromise all remaining legal and constitutional rights due the Intervenors--those remaining rights that have not already been denied.

This appeal for reversal of the Final Decision is sent to you, the Chairman and Commissioners of the Nuclear Regulatory Commission, because of the demonstrated refusal of the Licensing Board and the Appeal Board apparently to even fully read, let alone fully respond to, the Intervenors'

timely and detailed findings of fact, exceptions and supporting briefs submitted since the closing of the record on Docket No. 50-320 on July 5, 1977.

With this request for reversal of the Final Decision, Intervenors also petition the Commissioners to review the full record, including all filings submitted by the Intervenors in the proceeding.

If, as the Intervenors submit, the licensing and operation of this reactor are illegal, this fact must be determined before the reactor becomes radioactive--and hence radioactive waste-- which will occur with achievement of the first fission reaction.

Intervenors request that the Commissioners of the NRC reverse these illegal Initial and Final Decisions in Docket No. 50-320. Justice demands this action.

Respectfully submitted,

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