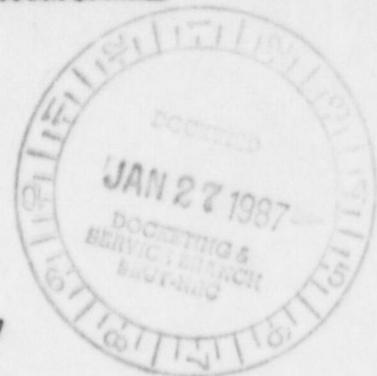




RICHARD F. CELESTE
GOVERNOR

2323

STATE OF OHIO
OFFICE OF THE GOVERNOR
COLUMBUS 43266-0601



January 14, 1987

SERVED JAN 28 1987

Lando W. Zech, Chairman
Nuclear Regulatory Commission
Washington, DC 20555

Dear Chairman Zech:

As you recall, in August, 1986, I wrote to inform you that I had withdrawn my support from Ohio's plan for responding to emergencies at nuclear power plants because of my concerns about the adequacy of the plan to protect Ohioans.

I appointed a Cabinet level group to re-evaluate the adequacy of the plan. The Emergency Evacuation Review Team has completed its review, and I am pleased to provide you with a copy of its report. I am in full agreement with the report's conclusions and recommendations.

The report concludes that the current emergency response plan is inadequate and, as a result, I have decided to pursue every legal and administrative action possible to compel Perry and Davis-Besse to operate at low-power until the deficiencies in the plan are corrected.

In the meantime, I would hope that the Nuclear Regulatory Commission would reassess its position and not allow these plants to operate above low-power in the absence of an adequate emergency response plan.

The report also raises serious questions about the basic assumptions underlying current emergency response planning standards. I intend to work with my colleagues and with Congress to create a national blue-ribbon commission of independent experts to investigate the potential for severe accidents, review the existing standards for containment safety, and evaluate the lessons of Chernobyl for U.S. reactor safety and emergency response.

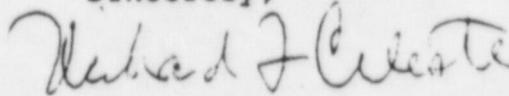
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Lando W. Zech
January 14, 1987
Page two

I hope that we will be able to discuss these issues soon.

Sincerely,

A handwritten signature in cursive script, appearing to read "Richard F. Celeste".

Richard F. Celeste
Governor

RFC/ej

cc: Commissioner James Asselstine
Commissioner Frederick Bernthal
Commissioner Kenneth Carr
Commissioner Thomas Roberts

OFFICE OF THE GOVERNOR'S PRESS SECRETARY

**GOVERNOR OPPOSES FULL-POWER AT PERRY, DAVIS-BESSE
UNTIL IMPROVEMENTS IN EVACUATION PLANS ARE MADE**

Governor Richard F. Celeste today agreed with the findings of a report which showed that emergency evacuation plans at the Perry and Davis-Besse nuclear power plants are inadequate and need to be improved.

"I will do everything legally possible to prevent the full-power operation of the plants until we are confident that the emergency plans are capable of providing adequate public protection," the Governor said.

The report was prepared by the Emergency Evacuation Review Team, appointed by the Governor in August to study emergency response plans at both plants. Chaired by Highway Safety Director William Denihan, the team included Thomas Chema, Chairman of the Public Utilities Commission of Ohio, and Major General Raymond Galloway, Adjutant General.

The Review Team's first conclusion is that the state's emergency response plan is inadequate to fully protect the public. The report cited 14 specific deficiencies in the plan, including the inability of area hospitals to treat large numbers of radiation victims; the unwillingness of bus drivers to participate; unsatisfactory methods for notifying government officials and the public in the event of an emergency; the absence of provisions for providing radioprotective drugs; and incomplete planning for re-entry and ingestion zone protection.

The report makes 15 recommendations for improving the plan. Among the improvements called for in the report are a direct computer link between the power plants' control rooms and the state; more sophisticated radiation monitoring; state leadership in making emergency response decisions; planning in counties adjacent to the plants which might receive evacuees; additional testing of public notification systems; and better preparation for evacuating handicapped individuals.

The Review Team's second conclusion is that the premise for existing emergency planning, developed by the NRC and FEMA after the 1979 accident at Three Mile Island, is based on overly optimistic assumptions about the likelihood and consequences of severe nuclear accidents involving the sudden release of large amounts of radiation.

A wide range of independent experts were consulted, including prominent researchers who favor the use of nuclear energy. Their input led the Review Team and Governor Celeste to conclude that the NRC's studies of immediate-release accidents have been incomplete and inadequate.

add one

According to the report, the limited current knowledge and large uncertainties about accident sequences and the ability of containment structures to limit the release of harmful radiation demand a more conservative approach for emergency response. Assuming that severe accidents leading to sudden, massive releases of radiation are possible, these accident sequences must become an additional basis for emergency response planning.

"In the aftermath of Chernobyl, a national overhaul of emergency planning is in order to prepare for the most severe accidents," the Governor said.

Because developing a new basis for emergency response should affect planning at the 100 nuclear plants throughout the nation, not just Perry and Davis-Besse, the report recommends the formation of a national blue-ribbon commission of independent experts to investigate the potential for severe accidents, review existing standards for containment safety, and evaluate the lessons of Chernobyl for U.S. reactor safety and emergency response.

The report also recommends that states be given a larger role in the licensing of nuclear power plants because of their important public safety responsibilities.

Governor Celeste said that he would work with the National Governors Association and Congress to build support for measures to improve nuclear safety.

During an intensive, five-month review of the emergency plan, the Emergency Evacuation Review Team consulted with citizens, utility experts, state and local agency representatives who contributed to the plan, staff of the Nuclear Regulatory Commission (NRC) and the Federal Emergency Management Agency (FEMA), and independent experts who both favor and oppose nuclear energy.

♦ ♦ ♦

Contact: Brian Usher or Debra Phillips, (614) 466-5034.

REPORT OF THE EMERGENCY EVACUATION REVIEW TEAM
ON EMERGENCY RESPONSE PLANS FOR THE PERRY AND
DAVIS-BESSE NUCLEAR POWER PLANTS

Submitted to Governor Richard F. Celeste
January 7, 1987

William Denihan, Chairman
Director, Department of Highway Safety

Thomas Chema
Chairman, Public Utilities Commission

MG Raymond Galloway
Adjutant General

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INTRODUCTION

Since August 15, 1986, when you withdrew State support for The Ohio Plan for Response to Radiation Emergencies at Licensed Nuclear Facilities, the Emergency Evacuation Review Team (EERT) has conducted an intensive study of the adequacy of the emergency response plan to protect the public. This report contains the conclusions of our study and our recommendations.

At the outset, it is important to note that we undertook this review within the context of a national policy to accept and promote the use of nuclear technology to produce energy. Therefore, the EERT expresses no opinion as to whether the inherent dangers associated with nuclear energy are so significant as to justify a rethinking of that national policy.

The EERT held two well-attended public meetings in early September, one at Lakeland Community College, near the Perry Nuclear Power Plant, and the other at an Oak Harbor public school, near the Davis-Besse Nuclear Power Station. The purpose of these meetings was to hear the suggestions and concerns of people who live near the plants.

Following the public meetings, we met with numerous experts: representatives from Toledo Edison and the Cleveland Electric Illuminating Company; nuclear energy specialists from Brookhaven Institute, Ohio State University and the American Nuclear Society; the Sunflower Alliance and the Toledo Safe Energy Coalition, groups that oppose Perry and Davis-Besse; the Ohio Association of Public School Employees, which represents bus drivers; County Commissioners and representatives of county agencies who developed the local emergency response plans; and state agency employees responsible for developing the State plan. We also attended public meetings and met with many private citizens.

The EERT testified before the NRC in Washington concerning the full power license for the Perry plant on September 4. On October 28, the EERT attended a day-long informational meeting in Washington with representatives of the Federal emergency Management Agency (FEMA) and the Nuclear Regulatory Commission (NRC), and both NRC Commissioner James Asselstine and James Keppler, the NRC Regional Administrator came to Columbus on separate occasions to meet with the EERT.

Because the NRC did not respect your request to withhold approval for full power licenses until the EERT had completed its re-evaluation of the emergency response plans, Ohio has sought to delay full power operation through the courts. The EERT's preliminary findings and conclusions became an important part of that effort. Appendix A is a summary of the State's legal efforts to postpone full power operation until the completion of this re-evaluation.

CONCLUSIONS AND RECOMMENDATIONS

We have concluded that the current emergency response plan for Ohio's nuclear power plants is inadequate to protect the public and that the premise for planning may be based on unduly optimistic assumptions about the likelihood and consequences of nuclear accidents.

Our findings are divided into two parts. The first consists of objective evidence of deficiencies in the existing plan and recommendations for improving the plan. The second concerns the fundamental assumptions on which the plan is based and our recommendations for establishing emergency response measures to take into account the possibility of a sudden release of large amounts of radiation.

I. DEFICIENCIES IN THE EXISTING PLAN

A. FINDINGS

1. **The Willingness and Ability of Bus Drivers to Perform Assigned Functions:** Trained people are essential for transporting school children and others in need of transportation during an emergency. Although the plan assumes the participation of large numbers of public school bus drivers, the drivers have indicated through their union that they are unwilling to participate under existing conditions.

The Ohio Association of Public School Employees union, which represents bus drivers, has voted overwhelmingly not to participate in evacuation procedures at Perry and Davis-Besse. Most bus drivers have not volunteered for this duty, but have been volunteered by their employers. According to bus drivers who spoke at our public hearings and their union representatives, few drivers themselves have made a personal commitment to participate in the plan. Moreover, the drivers have complained of a lack of training, inadequate protection from radiation exposure, and uncertainties about their potential liability.

2. **Evacuating Special Populations:** Additional time, specially trained personnel and specialized equipment would be needed to evacuate hospital patients, nursing home residents, and physically and mentally handicapped individuals. Information about the location and special needs of the handicapped is essential.

A brief, informal EERT survey found many handicapped individuals who said that, to the best of their knowledge, no special provisions had been made for their evacuation. On that basis, the EERT concluded that there is no comprehensive list of all those individuals who may be in need of special assistance. Because the plan is based on incomplete knowledge of the numbers of handicapped people, the EERT has concluded that sufficient resources are unavailable within the immediate area to evacuate them.

3. **Capability of Area Hospitals to Treat Victims of Radiation Exposure:** Area hospitals lack the necessary equipment and sufficient numbers of properly trained personnel to treat large numbers of radiation victims. In addition, these hospitals have not been subjected to comprehensive on-site evaluations and their radiological emergency plans have not been adequately tested, according to Ohio Department of Health personnel who have been involved in the planning and exercises.

The plan's listing of the number of beds in area hospitals has no relationship to that hospital's ability and willingness to treat radiological patients. The United States Court of Appeals, District of Columbia Circuit, has invalidated this methodology for planning arrangements for medical services for contaminated injured individuals. The plan has not been changed to reflect recent NRC and FEMA guidance.

Past exercises of the plan have tested the ability of a hospital to treat a single contaminated patient, as if that were a realistic demonstration of a hospital's ability to cope with the results of a nuclear accident. While the hospitals have performed well in this limited test, it does not provide adequate assurance that they are prepared for a larger number of radiation victims.

4. **Notification of the Public in Case of Emergency:** The EERT is dissatisfied with the execution and testing of the plan's provisions for notifying the public of failures at nuclear reactors. At our public hearings in Lake and Ottawa counties, many citizens complained that they have not been able to hear the sirens during tests. Current plans do not provide an adequate level of protection for hearing-impaired individuals. We doubt that the door-to-door notification called for in the plan could be effective in alerting the public, particularly in bad weather.

5. **Planning for Recovery and Re-entry:** The emergency response plan assumes that contaminated areas could be re-occupied safely within a matter of days and therefore addresses recovery, re-entry and relocation issues in a summary manner. This segment of the plan clearly fails to take into account the possibility of a significant release of radiation.

In addition to this fundamentally flawed assumption, these elements of the plan have not been exercised, and recent draft U.S. EPA guidance on these issues has not been incorporated, according to Ohio Department of Health personnel involved in emergency response planning.

6. **Decontamination and Waste Disposal:** These issues are also summarily addressed in the plan. If a serious nuclear accident occurred, it is unlikely that the procedures outlined in the plan would be adequate to decontaminate large numbers of people or to dispose safely of large amounts of radioactive waste. Simply monitoring sewers for radiation, for example, one of the principal measures called for in the plan, is an unacceptably passive approach for dealing with these problems.

7. **Ingestion Zone Planning:** Ohio has not completed planning for ingestion zone activities, according to the Ohio Disaster Services Agency. In the event of a serious accident, the State would have to protect food and water supplies through ad hoc actions, building on a skeletal plan. In effect, the current plan consists only of a "plan-to-complete-a-plan." FEMA has acknowledged that national guidance on these issues has been inadequate and that improving this guidance will be a priority for the Agency.

8. **Radioprotective Drugs:** The emergency response plan's discussion of radioprotective drugs does not meet the minimal preparedness requirements of FEMA's planning guide.

Ohio's policy on radioprotective drugs has been under reconsideration since February, 1985, when the Director of the Ohio Department of Health rescinded the policy established by his predecessors. The Ohio Department of Health is now reviewing a new draft regulation, and we expect it will be issued in early 1987.

Currently, there is no method by which the State could coordinate the administering of these drugs to the general population or off-site emergency workers. No provision has been made for administering these drugs to those individuals whose immediate evacuation may be infeasible or extremely difficult. These capabilities are required by FEMA's planning guidance.

9. **Evacuation During Adverse Conditions:** We question whether the emergency response plan provides adequate protection if a nuclear accident were to occur under abnormal conditions. Severe snowstorms, flooding and earthquakes are among the events that could create conditions that would greatly hinder rapid, orderly evacuation. The potential for some of these events to occur in areas where Ohio's nuclear power plants are located is significant and did not receive adequate attention in the plan's formulation.

The NRC is also concerned about the potential flooding problems at Davis-Besse as a result of historic high water levels in Lake Erie. The Commission budgeted funds for a study of extreme flood probability but later canceled it for lack of money.

10. **Planning in Adjacent Jurisdictions:** Particularly in heavily populated areas, planning must take into account the potential for a large influx of evacuees into nearby areas. In Northeast Ohio, for example, it is reasonable to assume that large numbers of people-- even from areas beyond the ten-mile Emergency Planning Zone-- might flee to Summit or Cuyahoga Counties. County officials have indicated that they would be unprepared to cope with the evacuees. To date, these counties have not been closely involved in the emergency response planning efforts.

11. **Decision-making Responsibilities:** The plan gives principal authority for off-site emergency response to county commissioners, and in many cases the State acts as advisor.

This framework for making emergency response decisions is unrealistic because it fragments decision-making and diffuses responsibility among local and state officials, creating the potential for delays in responding. In addition, it permits county officials authority for making key emergency response decisions which could affect citizens far beyond local political boundaries. This arrangement undermines the authority vested in the executive branch of state government.

12. **Notification of Governmental Authorities:** Executing timely emergency response measures depends on providing governmental officials with immediate, accurate information about incidents at nuclear reactors. But the plan contains no provision for providing State officials with a source of independent information about radiation releases from nuclear reactors.

Analyzing accident sequences properly and accurately predicting outcomes is essential to selecting appropriate emergency responses. Uncertainty about accident precursor sequences can lead to delays in taking emergency measures or to taking inappropriate actions.

While the current plan includes some criteria for determining appropriate off-site emergency actions, it does not give state authorities the ability to assess changes in reactor conditions and decide earlier, by referring to established thresholds, if a particular emergency response may be appropriate.

Both these problems-- lack of timely notification and inaccurate classification a problem-- occurred during the accident at Davis-Besse on June 9, 1985. While lives were not directly threatened on this occasion, delays in providing information, and misinformation, could prevent the quick responses necessary to protect the public. Ohio's experiences demonstrate that this aspect of the plan is seriously flawed; it has lost the confidence of the public and the State.

13. **Public Information about Emergency Response Plans:** We have found that many people are uninformed and misinformed about the plan. Many people at the EERT's public hearings in Lake and Ottawa counties said that in case of an emergency they would not know how to respond. The methods of disseminating information about the plan, and the quality of that information, have been inadequate.

B. RECOMMENDATIONS

Based on these conclusions, we recommend that the State work with the utility owners of Davis-Besse and Perry and local jurisdictions to correct the deficiencies noted in the existing plan as set forth above. Further, neither plant should exceed five percent of its operating capacity until these deficiencies are corrected.

1. **Handicapped, sick, and elderly:** Provisions for identifying and evacuating especially vulnerable populations should be improved, and a procedure should be developed for updating regularly the list of those in need of special assistance.
2. **Monitoring system:** A radiation monitoring system should be established to provide the State with independent information on radiation releases in the vicinity of the plants.
3. **Cost of plan:** Utilities should bear the cost of implementing any improvements made to the emergency response plans.
4. **Bus drivers:** The State should obtain the written agreement of individual bus drivers who will participate in the evacuation. Appropriate training and protective equipment should be agreed to by the utility, the union representing the bus drivers, and the State. This training should be updated from time to time as deemed appropriate by the utility, the union, and the State. If public school bus drivers are not to be used, the utilities' proposed alternative should receive express approval of the State.

5. **Communication link:** A direct computer link should be created between the State and the nuclear facilities' control rooms to provide the State with direct information about reactor conditions.

The plan should be amended to include the identification of thresholds in various accident sequences which, when exceeded, would trigger specific emergency response actions. This would help reduce uncertainty and potential delay in responding and provide a greater margin of safety for the public in case an evacuation were required.

6. **Complete full plan:** Segments of the plan addressing ingestion zone planning, recovery and re-entry, and decontamination and waste disposal need to be completed.
7. **Other counties:** Planning must take into account the potential impact of an accident on Cuyahoga, Summit, Portage and Lucas counties.
8. **Hospitals:** The State should make on-site reviews of the capability of hospitals to treat victims of radiation exposure and make specific suggestions for improvements.

9. **Public notification/ Warning sirens:** The State should conduct an independent test of the warning sirens and other components of the public notification system.
10. **Public education:** The State should conduct a campaign to improve the public's understanding of emergency response plan procedures.
11. **Radioprotective drugs:** The Ohio Department of Health should finalize its draft regulations on radioprotective drugs. Ohio should be prepared to provide these drugs to off-site emergency workers and those individuals whose evacuation might be especially difficult or time-consuming. Ohio should encourage pharmacies to carry these drugs for the convenience of the public and require the utility to subsidize their purchase.
12. **Role of State:** The plan should be altered to make the State the principal point of contact and responsibility for making emergency response decisions.
13. **PUCO monitoring:** The Public Utilities Commission of Ohio should monitor actively the management of nuclear energy facilities to enable it to foresee potential safety problems.

Carrying out this recommendation would recognize that management deficiencies can be symptoms of looming safety problems.

14. **State position on plant operations:** The State should continue to oppose full power operation at the plants until these recommended improvements are completed.

Should the utility owners not agree to these recommendations and fail to remedy the plant's deficiencies prior to full power operation, the State should oppose full power operation through litigation, administrative action, and by working with other state, local, and federal officials to establish more appropriate nuclear energy policies.

II. FUNDAMENTAL EMERGENCY RESPONSE PLANNING ASSUMPTIONS

A. FINDINGS

1. **Arbitrary Planning Guidance:** This plan, like emergency response plans for nuclear reactors in other states, was developed on the basis of uniform, nationally prescribed guidance, NUREG-0654. While this guidance may result in an adequate plan in some situations, it falls short elsewhere because it does not take into account unique local conditions. The peculiar risks inherent in individual reactor designs, local demographics, weather conditions, traditional political relationships between governments, transportation networks and other factors all suggest that one model emergency response plan will not fit all circumstances.

While some have advocated reductions in the size of Emergency Planning Zones, we think, for the reasons set forth below, that even when planning zones are tailored for specific plants, their size should not be reduced from the current requirements.

2. Adequacy of Basic Assumptions for Emergency Planning

We have learned that:

- (1) there is still no consensus within the scientific community on the possibility, likelihood, and consequences of severe accidents at U.S. nuclear power plants that would produce large, sudden releases of life-threatening radiation;
- (2) the NRC's own assessment of a range of questions about severe accident phenomena is far from complete, and that a range of independent experts have sharply criticized its approach to those questions;
- (3) non-Communist European countries have acted quickly to install safety measures that are still only under review in the United States; and,
- (4) the severe accident at the Chernobyl plant-- notwithstanding the well-known differences between U.S. and Chernobyl-type Soviet reactors-- may have extremely important implications for emergency response planning.

(Appendix B contains a discussion of these findings.)

We have concluded that, at the very least, the limited current knowledge of severe accidents and their consequences forces us to assume that severe accidents leading to sudden and massive releases of radiation are possible. We have concluded that individual states like Ohio must rely on national expertise to assess properly severe accident phenomena, but that we cannot rely exclusively on the NRC for this expertise.

Thus we believe that planning for severe accidents must be the basis for adequate emergency response planning and that the accidents at Three Mile Island and Chernobyl reinforce the need for the most conservative emergency planning response, a response that assumes that a worst-case accident. These accidents, even if unlikely, are possible, and their consequences are potentially so grave that they must be planned for.

B. RECOMMENDATIONS

Because of what we perceive to be very serious unresolved questions about severe accidents and their possible implications for emergency response, we believe that these issues should be subjected to a renewed national debate. The complexity of these issues and the nation-wide use of nuclear power suggest that the federal government undertake these tasks, but with active involvement of concerned states.

In addition, current federal-state arrangements under the Atomic Energy Act generally fail to take into account the important role states have in protecting public health. This issue also needs to be debated at the federal level.

We recommend that the following ideas form a part of that national debate:

1. **Site-specific Emergency Planning Zones:** The NRC should develop criteria for fashioning Emergency Planning Zones based on site-specific factors.

Although emergency planning should be shaped to meet local conditions, current information does not warrant any relaxation of existing safety guidelines. In no case should Emergency Planning Zones be smaller than ten miles in radius. In fact, extensions of both generic and site-specific Emergency Planning Zones may be warranted.

2. **National Commission:** A national blue-ribbon commission should be established to investigate the potential for severe nuclear reactor accidents involving sudden and large releases of radiation and related emergency response issues.

It should represent the broadest possible range of expert opinion; its mandate should include, but not be confined to:

- (1) a review of NUREG-1150, the draft version of the NRC's new reactor safety study which is due to be released in early 1987;
- (2) a review of existing standards for containment safety, and;

- (3) an evaluation of the lessons of the Chernobyl accident for U.S. reactor safety and emergency planning, as well as current European actions to improve safety.

In the aftermath of the Chernobyl accident, renewed and increased scrutiny of severe reactor accidents is an urgent national need. The NRC and FEMA are conducting studies, but because of their narrow regulatory functions and because of the lack of public confidence in their ability and willingness to evaluate these questions with complete objectivity, they should not be charged with carrying out a thorough, independent review.

The commission could be sponsored by Ohio and other states and localities who share an interest in nuclear safety.

3. **Price Anderson Act:** The financial liability for nuclear accidents under the Price Anderson Act, which limits liability in case of accidents, should be expanded.
4. **Licensing:** The rights of states should be expanded in the licensing procedure for nuclear plants.

Because governors are specifically charged with the responsibility for protecting public health and safety, we recommend that states have expanded legal rights to become involved in the licensing of nuclear power plants. The current system of licensing nuclear power plants gives states many responsibilities but few legal rights. As Ohio has discovered, the NRC often chooses not to use its discretion to permit states limited involvement in licensing facilities.

SUMMARY OF LITIGATION TAKEN FROM STATEMENT BY ATTORNEY GENERALANTHONY J. CELEBREZZE, JR.

TESTIMONY OF ANTHONY J. CELEBREZZE, JR.,

ATTORNEY GENERAL OF OHIO,

BEFORE THE NORTHEASTERN OHIO CONGRESSIONAL DELEGATION

CONCERNING THE PERRY NUCLEAR POWER PLANT,

(DECEMBER 16, 1986, HEARING)

I appreciate the opportunity to address this hearing. My office is presently involved in a litigation effort to prevent the Perry Nuclear Power Plant from exceeding 5% power until such time as there are adequate assurances of protection for those citizens located in the vicinity of the Perry Nuclear Power Plant in the event of a radiological emergency. A review team appointed by the Governor is presently in the process of reviewing and reevaluating the current plan. This review team has uncovered numerous as well as serious flaws in the plan.

In September, 1986, Governor Celeste requested my office to initiate an attempt to intervene in the Perry licensing proceeding. On September 5, 1986 I filed a petition with the Nuclear Regulatory Commission seeking to intervene as the representative of an interested state pursuant to the Commission's Rules of Practice. We were attempting to preserve our opportunity to participate in the remainder of the Perry licensing proceedings as a formal participant. In the petition we advised the NRC that the sole issue concerning the State was the adequacy of off-site emergency preparedness at the Perry plant.

On September 19, 1986, the Cleveland Electric Illuminating Co. ("CEI"), the operator and part owner of the Perry plant, responded to the petition, urging its denial. On September 23,

1986 the NRC staff also responded, noting that the adjudicatory proceedings were closed. I replied to these requests for summary dismissal of our petition and concerns on September 29, 1986. In that reply I informed the Commission that while the adjudicatory proceedings were closed the licensing proceedings were not. The commission had not yet completed its "immediate effectiveness review" which is required before allowing an operating license to issue to a commercial nuclear facility. We informed the Commission that the State of Ohio was requesting an opportunity to advise them on the state of emergency preparedness at the Perry plant. It was my belief that cooperation between the State, the utility and the NRC could only enhance the licensing process and facilitate the adoption of an adequate evacuation plan. Since the full-power license had not yet issued, it was well within the Commission's discretion to allow the State to intervene in order to allow it to formally advise the Commission as to its concerns before the full-power license issued.

In an attempt to keep the Commission apprised of the State's review progress I supplemented my earlier filings with two subsequent memoranda, the first dated October 21, 1986 and the second dated October 29, 1986. These submissions set forth Ohio's preliminary conclusions that the emergency plan was seriously flawed in several crucially important respects. In each memoranda I again pressed our request that the Perry plant not be permitted to exceed 5% power until the Ohio review

process had been completed. The deadline set for submission of the review team's findings to the Governor is December 31, 1986.

Despite these submissions, on October 30, 1986 the Commission denied the State of Ohio's Petition for Leave to Intervene in the Perry licensing proceedings on the ground of untimeliness. On November 7, 1986 I petitioned the United States Court of Appeals for the Sixth Circuit to review the NRC's final order denying intervention. I also moved the Court to issue an emergency stay of NRC action on the full-power licensing of Perry, pending review of the merits of our case. The Sixth Circuit at first issued the stay late on Friday November 7th but dissolved it the following week, since the actual full-power license had not then issued.

On November 7, 1986 the Commission voted 4-1 to authorize the NRC staff to issue a full-power license for Perry. The license was issued on November 13, 1986. On that same date, the Sixth Circuit, finding the primary consideration to be public safety, ordered a stay of the full-power license for the Perry Nuclear Power Plant which would have allowed it to exceed its current five percent power level. Our petition to review the full power license was filed November 17, 1986. The Court consolidated both Ohio petitions with an unrelated appeal of a citizen group challenging the seismic design of the plant and set an expedited briefing schedule.

All briefing was completed by November 28, 1986. The primary issues addressed were whether the NRC's order denying

the State of Ohio formal intervention status in the Perry operating licensing proceeding was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law, and whether the NRC's issuance of a full-power license to Perry was an abuse of discretion and not in accordance with law. I argued that this is a unique case, a case where the author and implementor of an off-site emergency plan has found flaws in its own plan. While the State conceded it was attempting to intervene late in the licensing proceedings, it was doing so in a timely fashion. The State did not attempt intervention until it had serious concerns relating to emergency planning. The State responsibly cooperated with the utility and the NRC during the entire licensing proceedings. It was not until the State uncovered serious deficiencies in the evacuation plan that it attempted to intervene and to keep the plant from exceeding 5% until the evacuation plan has been reevaluated and improved.

The Sixth Circuit heard oral arguments on the merits on December 3, 1986. The stay remains in effect pending the resolution of the matter. I am awaiting the outcome. In the meantime the State's review team is diligently reviewing the Perry off-site emergency plan, and work is advancing according to schedule. The review team has assured me that their findings will be submitted to the Governor on December 31, 1986.

This is an up-to-date summary of the legal effort in the Perry licensing proceedings. I hope that it will assist you in your assessment of the effect of the Perry plant on the affected community. Once again I wish to express my appreciation for the opportunity to address this hearing.

Respectfully submitted,

ANTHONY J. CELEBREZZE, JR.
ATTORNEY GENERAL OF OHIO

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3067E

APPENDIX B

SEVERE ACCIDENTS AND EMERGENCY PLANNING: UNRESOLVED ISSUES

No Consensus on Severe Accidents

The nuclear utility industry and some scientists have asserted that severe accidents are impossible, or so improbable that emergency planning need not be based on them. They have also asserted that a Chernobyl-type accident is not possible at a U.S. reactor.

While also emphasizing the differences between Chernobyl-type reactors and most U.S. reactors, the NRC and FEMA have asserted the importance of understanding a range of severe accident phenomena and the implications of the accidents at Three Mile Island and at Chernobyl for U.S. reactors and emergency response planning. The NRC staff in 1986 completed a major study of source terms (i.e. the type, amount, and timing of radiation releases associated with some accident sequences). A draft NRC report on severe accident sequences, designed as successor to the Reactor Safety Study of 1975, is due for release early in 1987. Both reports are almost certain to be used to evaluate and possibly revise current assumptions about emergency response planning.

The EERT welcomes the opportunity this NRC work may provide for public discussion of the possibility and consequences of severe accidents at U.S. nuclear plants. However, many independent experts have made serious criticisms of the NRC's treatment of severe accident phenomena-- criticisms that have sometimes been supported within the NRC itself. (Appendix C consists of a list of experts and a selected bibliography consulted in the preparation of this part of the report.) This criticism has been aimed at excessively optimistic NRC assumptions about the possible sequences of severe accidents (accidents resulting in serious core damage), containment performance, and radiation releases, as well as the adequacy of NRC methods for evaluating the risk to the public.

Neglected Accident Sequences: Steam Explosions
and Other Phenomena

Accident sequences involving steam explosions have been neglected by the NRC in its assessment of severe accident phenomena. The NRC's current position, apparently, is that steam explosions that threaten containment integrity are virtually impossible. According to some of the experts the EERT consulted, however, this NRC optimism is based on the evaluation of its Steam Explosions Review Group (SERG), and this evaluation is not credible. SERG members were simply asked to make a subjective quantitative guess of the probability of a severe in-vessel steam explosion rupturing containment, with their guesses varying by many orders of magnitude and with no consensus on how to model steam explosion phenomena.

Dr. Marshall Berman, Supervisor of the Severe Accident Containment Response Division of Sandia National Laboratories, which performs major research for the NRC, stated in a recent letter that he and his colleagues agreed that the benefits of nuclear power outweighed the currently understood risks. But he also wrote that:

we believe that the understanding of steam explosion phenomena is currently too weak to enable realistic assessment of risk due to such explosions. We also believe that the Chernobyl 'steam explosion' may shed some light on this situation. However, an objective analyst would err if he took an extreme approach based on a position that either the Chernobyl accident is directly relevant or has no relevance to American reactors.

And, in a October 8, 1986 paper titled "Chernobyl: Where do we go from here?", Dr. Berman states that, "To conclude that Western light water reactors are not vulnerable to steam explosions based on the presumed absence of an explosion at TMI is to make a grave error."

Steam explosions are not the only potentially dangerous accident sequences that have received inadequate attention from the NRC; others are high-pressure melt injection, station blackout, containment by-pass, and hydrogen explosions.

Different nuclear plants may be more or less vulnerable to some of these sequences, but some hydrogen or steam explosions could, conceivably, rupture even the strongest containments, and even lead to a sudden and large release of radiation.

Controversy Over Reactor Containments

In addition to the debates about the nature and possibilities of severe accidents, the EERT is also greatly concerned about the continuing controversy over the ability of reactor containments to contain radiation releases. Daniel Hirsch of the University of California at Santa Cruz has criticized the NRC's Containment Performance Design Objective panel for refusing to establish an explicit containment performance goal, because the goal that had been considered-- a ten percent chance of containment failure during a core melt accident and a 40 percent chance of a core meltdown over the lifetime of the current generation of nuclear plants-- was one unlikely to be accepted by the public if made explicit.

Furthermore, according to Hirsch, this core meltdown probability is based on the assumption that individual reactors have a core melt probability of one in 10,000 per reactor-year, but that actual risk analyses of individual plants have generally predicted a core melt probability which is three times higher (three in 10,000 per reactor-year). Of course, the greater the possibility of a core meltdown, the more urgent is the need to establish adequate standards of containment performance.

Controversy Over Accident Risk Assessment

Controversy among experts over containment performance is one part of a broader debate over the NRC's methods for assessing reactor safety and the consequences of severe accidents. In particular, the adequacy of probabilistic risk assessment, and how much it should be used to shape safety policy, is at the heart of the debate on nuclear safety. Briefly, probabilistic risk assessment assumes an accident, transient (i.e., a change of conditions, in temperature or pressure, within a nuclear reactor), or external event. It then identifies human or mechanical failures affecting the safety systems that control or reduce the consequences of the initiating event and determines the probability (or range of probability) of failure for each system.

The Union of Concerned Scientists report, The Source Term Debate, says it

is still not possible to make precise, quantitative statements about overall reactor risks... The underlying tool of nuclear risk analysis - probabilistic risk analysis - suffers from a range of shortcomings which in light of the enormous complexity of nuclear power plants, may never be overcome ... Even the simple identification - for each plant - of all the important accident sequences, internally as well as externally initiated, that should be examined is a daunting task and may not, in principle, be solvable.

Modeling the vast number of non-equilibrium chemical and physical processes and interactions that constitute these sequences is also beyond today's capabilities. Indeed it is by no means clear that all of the physical phenomena that are important in the development of these accidents have even been identified.

NRC Commissioner James K. Asselstine has rejected the NRC's use of probabilistic risk assessment to minimize the threat to the public from severe accidents. In his dissent from the NRC's 1985 policy statement on severe accidents, Asselstine writes that the range of probabilities for core meltdown at a typical reactor can range from one in one thousand per reactor-year to one in 100,000. The reliability of probabilistic risk assessment has been further reduced by its neglect of factors that could have great importance in overall plant safety-operator training, plant maintenance, equipment deterioration due to age, human error, and seismic conditions.

In his July 15, 1986, letter to Carl Walske (Atomic Industrial Forum), Asselstine says "To convey an impression that Chernobyl-type releases are impossible in this country is as inaccurate as conveying an impression that a similar disaster is a certainty . . . we do not fully understand the risks of nuclear power, and we should not be fearful of saying so."

Risk is the product of probability and consequences, and so even a very low probability accident could present great risk to the public if the consequences are severe enough. The great uncertainty and controversy around severe nuclear accidents, especially those leading to early and massive releases of radiation; the immense implications of such accidents for emergency planning; public lack of confidence in the NRC's willingness or ability to satisfactorily resolve these questions; and, the inability of individual states to completely evaluate these extraordinarily complex technical and scientific questions on their own makes imperative an independent national review of the implications for policy of severe accidents at nuclear plants.

Severe Accidents and Emergency Planning

The Chernobyl accident suggests how severe accidents may force revision of our current emergency planning assumptions. While controversy over the long-term health effects of the Chernobyl accident continues, it is clear that fall-out levels exceeding the U.S. protective action guides (PAGs) occurred, not only at ten miles or less, but as far as 1000 miles from the accident site. Moreover, one analyst has raised the possibility that if wind conditions had been different, early fatalities could have occurred in Kiev-- 130 kilometers from the Chernobyl site. The differences between Soviet and U.S. reactors have been stressed repeatedly, but a worst-case accident at a U.S. reactor, with breach of containment, could conceivably have similar long-distance effects depending on weather conditions.

The lessons of the Chernobyl accident for U.S. nuclear plants are far from exhausted. Some countries have already developed new policies because of the accident; West Germany has set up a system to monitor radiation levels throughout the country and to inform the public what measures--interdiction of milk and fresh vegetables, drinking rainwater, disposing of air filters, etc.--may be necessary in certain accidents.

According to NRC Commissioner Asselstine, European countries have acted quickly to require more safety measures-- such as installing dedicated decay heat removal systems or filtered vents-- at existing nuclear plants to increase public safety. In contrast, he has said, the NRC has studied such measures indefinitely. These European safety improvements, some of which antedate the Chernobyl accident, appear to be based, at least implicitly, on the assumption that severe accidents with major off-site consequences are possible.

The possibility of severe nuclear plant accidents at U.S. nuclear power plants, especially with early containment failure and sudden releases of radiation, forces a re-calculation of almost every aspect of emergency response planning. The issue of the appropriate size of the Emergency Planning Zone is the most obvious element of the plan to be affected. While the NRC and FEMA think that no immediate health effects would be experienced beyond a range of ten miles-- and that is a conservative estimate, in their view-- Sandia National Laboratories estimated in 1982 that, "for severe core melt accidents, early fatalities would generally not occur beyond about 15 miles, and in the worst case, would be confined to about 25 miles, while early injuries would probably be confined to downwind distances of about 50 miles" (NUREG/CR 2239, "Technical Guidance for Siting Criteria Development," Sandia National Laboratories, December, 1982).

In the opinion of several experts the EERT consulted, the present research conducted by the NRC and others on source terms does not justify relaxing existing safety standards or any reduction in the size of the Emergency Planning Zone-- an action which some utilities have proposed and which NRC staff is apparently considering. In fact, several experts the EERT consulted favor an extension of the planning zone.

Another example of the implications for emergency response planning of considering a wider range of severe accidents scenarios is that less time might be available to take emergency measures. The current plan for the Perry plant states that the two-mile area immediately surrounding the plant could be evacuated within 160 minutes under optimum weather conditions, a period of time which, the plan implies, would provide an adequate degree of protection.

Independent nuclear safety experts the EERT consulted, however, have said that only 30 minutes might be available before a radiation release results from a core meltdown. In the worst cases, the time between the start of an accident and a massive release of radiation could be as little as an hour. Even if the probability of such accidents are low, great uncertainty about their probability and their severe consequences means that emergency planning must take them into account.

Our conclusion that sudden, large releases of radiation must be considered possible suggests that a reformulation of the entire emergency response plan might be in order if the public is to be provided adequate protection from such events.

APPENDIX C

LIST OF EXPERTS AND SOURCES CONSULTED

I. Experts

- 1) **Dr. Jan Beyea**, Senior Staff Scientist, National Audobon Society.
- 2) **Steven Sholly**, MHB Associates (energy consulting firm); co-author of Source Term Debate of the Union of Concerned Scientists.
- 3) **Daniel Hirsch**, Director, Stevenson Program on Nuclear Policy, University of California at Santa Cruz.
- 4) **Dr. Gordon Thompson**, Executive Director, Institute for Resource and Security Studies, Cambridge, MA.
- 5) **John Austin**, technical aide to NRC Commissioner James Asselstine.
- 6) **Dr. Christoph Hohenemser**, Professor of Physics, Chair, Program on Environment, Technology, and Society, Clark University.
- 7) **Robert Pollard**, Nuclear Safety Engineer, Union of Concerned Scientists.
- 8) **Dr. Marshall Berman**, Supervisor, Severe Accident Containment Response Division, Sandia National Laboratories.
- 9) **Dr. Richard Wilson**, Professor of Physics, Harvard University.
- 10) **Gary Wright**, Illinois Department of Nuclear Safety.
- 11) **Michael Marriote**, Acting Executive Director, Nuclear Information and Resource Service.
- 12) **Ray Fraley**, Staff Director of Advisory Committee on Reactor Safety.
- 13) **Dr. James Mackenzie**, World Resources Institute.
- 14) **Robert M. Ryan**, Director of the Office of Radiation and Nuclear Safety at Rensselaer Polytechnic Institute.
- 15) **Thomas B. Cochran**, Senior Staff Attorney of the National Resources Defense Council.

II. Documents (Partial Listing)

1. Reassessment of the Technical Bases for Estimating Source Terms, Final Report (NUREG-0956): U.S. Nuclear Regulatory Commission, July 1986.
2. ACRS Comments on NUREG-0956, "Reassessment of the Technical Bases for Estimating Source Terms - Draft Report for Comment", Advisory Committee on Reactor Safeguards, U.S. Nuclear Regulatory Commission, December 12, 1985.
3. Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident. International Safety Advisory Group, September 1986.
4. "Chernobyl: An Early Report," C. Hohenemser et al, Environment, June 1986.
5. "The accident at Chernobyl: A report on risk management at a local hot spot in West Germany," Annual meeting of the Society for Risk Analysis, Boston, November 1986.
6. "Chernobyl and the U.S. nuclear industry," Bulletin of the Atomic Scientists, November 1986.
7. A Guide Book to Nuclear Reactors, Anthony V. Nero Jr., University of California Press, 1979.
8. The Source Term Debate, Steven Sholly and Dr. Gordon Thompson, Union of Concerned Scientists, 1986.
9. "The Lessons of Chernobyl," Science, September 1986.
10. "Implications of the Chernobyl-4 Accident for Nuclear Emergency Planning for the State of New York," prepared for the State of New York Consumer Protection Board by MHB Technical Associates, June 1986.
11. "Chernobyl: Assessing the Accident," Dr. Richard Wilson, Issues in Science and Technology, Fall 1986.
12. "Summary Paper on the Chernobyl Transient Overpower Accident and its Implications for U.S. Power Reactors," Argonne National Laboratory, Reactor Analysis and Safety Division, August 1986.
13. Technical Guidance for Siting Criteria Development, Sandia National Laboratories, 1982. (NUREG/CR-2239: SAND81-1549).

14. "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants," with Dissent of Commissioner James K. Asselstine, Nuclear Regulatory Commission, August 1985.
15. "Comments on Draft Report, Reassessment of the Technical Bases for Estimating Source Terms, NUREG-0956," Illinois Department of Nuclear Safety, January 1986.
16. "Comments on NUREG-0956" by MHB Technical Associates for Suffolk County, New York, January 1986.
17. Memorandum, "Steam Explosions," Joram Hopenfeld, Reactor Systems Research Branch, Division of Accident Evaluation, NRC, January 1985.
18. Letter to W. H. Trevor Pratt, Brookhaven National Laboratory (10-30-86 dissent from final report of the NRC's Containment Performance Design Objective panel) and "Assessing the Need for Containment Performance Design Objectives for U.S. Nuclear Reactors "(July 29, 1986) by Daniel Hirsch, Director, Program on Nuclear Policy, University of California at Santa Cruz.
19. "Implications of the Chernobyl-4 Accident for Accident Management," "Chernobyl: Where Do We Go From Here?," 1986; "Comments on Draft Summary of the Steam Explosion Review" (16 January 1985) and "Commentary on the Deliberations and Conclusions of the Steam Explosion Review Group (SERG)" (28 February 1985), Dr. Marshall Berman, Severe Accident Containment Response Division, Sandia National Laboratories.
20. Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654/FEMA-REP-1 Rev. 1, 1980.