

REPORT ON EMERGENCY PREPAREDNESS
FOR AN ACCIDENT AT
PILGRIM NUCLEAR POWER STATION

I. INTRODUCTION

Since my December, 1986, report, local, state, and federal authorities have been active in numerous ways concerning safety at Pilgrim Nuclear Power Station. The Boston Edison Company, owner and operator of Pilgrim Station, has also taken a number of actions regarding nuclear management, reactor safety, and emergency preparedness. Nonetheless, it is still my opinion that Pilgrim Station should not be permitted to restart at this time. Until fully revised plans have been developed and found by the state to be adequate, I must continue to make the finding that there are not presently adequate plans for response to an accident at Pilgrim Station. Thus, in spite of progress which has been made, I cannot yet say that all safety issues pertaining to Pilgrim Station which were discussed in my December, 1986, report have been satisfactorily addressed.

Subsequent to December, 1986, other bodies have made reports on safety at Pilgrim Station and reached the same conclusion we did, that public health and safety would be compromised by the continued operation of Pilgrim Station unless and until substantial remedial action had been taken. These reports include a study by the Massachusetts Legislature's Special Joint Commission to Study Safety at Pilgrim Nuclear Power Station, the U.S. Nuclear Regulatory Commission's (NRC) Systematic Assessment of Licensee Performance (SALP), and a Self-Initiated Review of emergency response plans by the Federal Emergency Management Agency (FEMA).

The Federal Emergency Management Agency has issued an assessment of the plans for response to an accident at Pilgrim. FEMA concluded that their earlier 1982 interim finding that Pilgrim's emergency plans were adequate was no longer valid and was superseded by a new finding that the plans as most recently revised in 1985 were not adequate. This new finding was transmitted to the Nuclear Regulatory Commission, which has taken the position that issues raised in the FEMA assessment must be "addressed" before restart is permitted. The NRC has

never articulated what it means by "addressed." The NRC's position does not go far enough to assure protection of public health and safety. In our view, adequate plans must be in place before Pilgrim Station is allowed to restart.

In particular, the FEMA Self-Initiated Review made the finding that off-site emergency plans are not adequate to provide reasonable assurance that the public can be protected in the event of an accident at Pilgrim Station. The SALP report, which grades utility performance in several areas, gave Boston Edison the lowest possible grades for critical safety functions. The Special Legislative Joint Commission report made several recommendations which Commission members feel must be fulfilled before the plant is authorized to resume operation.

Since December 16, 1986, action has been taken on several fronts by state government to respond to the findings of my report.¹ The Massachusetts Civil Defense Agency and Office of Emergency Preparedness (MCDA/OEP) has initiated a comprehensive three phase process to completely revise emergency plans for the communities surrounding Pilgrim Station. The state legislature has established and provided initial funding for a Nuclear Safety Emergency Preparedness Program within MCDA/OEP, which is responsible for off-site emergency preparedness for all three licensed nuclear power plants within and adjacent to Massachusetts.² On October 6, 1987, the Governor submitted a supplementary budget request of \$700,000 for the new program (House Bill 6086, see appendix one). Prompt action on this request is important.

An important aspect of the process to improve safety at Pilgrim is that state officials meet regularly with local officials, interested citizens, and representatives of Boston Edison to discuss problems and issues related to safety at Pilgrim. MCDA/OEP and Executive Office of Public Safety

¹Since our September, 1986 decision that adequate emergency planning for Seabrook is not possible, it is the policy of the Commonwealth that there should not be participation by Massachusetts in attempts to draft plans for that unlicensed plant.

²In addition to Pilgrim Station, the Yankee Nuclear Power Station in Rowe, Massachusetts, and the Vermont Yankee Nuclear Power Station in Vernon, Vermont, have emergency planning zones within Massachusetts.

officials meet regularly with senior management representatives of both Boston Edison and the Yankee Atomic Electric Company to discuss nuclear safety issues. The Executive Office of Public Safety and MCDA/OEP also participate in and monitor meetings of federal regulatory authorities.

The Boston Edison Company has taken several actions in part as a response to my report. The company has offered support to local governments under section 15 of chapter 639 of the acts of 1950, to assist in enhancing local response to an accident at Pilgrim and to renovate local emergency operations centers. As of this writing, four of the seven EPZ and host communities have accepted the Boston Edison support and the remaining three communities have the offer under consideration.

Boston Edison has issued studies and surveys, including a new Evacuation Time Estimate, a survey of shelter in beach areas, and a survey of special needs populations in the EPZ. Under supervision of the NRC, Boston Edison has also restructured the management of Pilgrim Station and initiated a reactor "Safety Enhancement Program." Boston Edison has installed a new radio system to assure prompt notification of off-site authorities in the event of an accident at Pilgrim Station.

In regard to off-site emergency planning, Boston Edison is supporting the efforts of local officials to develop improved plans and procedures by making resources, including professional emergency planners, available to each of the seven EPZ and host communities under section 15 of chapter 639 of the acts of 1950. Under the same provision of the Massachusetts General Laws, Boston Edison is also providing each community with material resources to support emergency response and is making physical improvements to each local emergency operations center. This offer to each community includes funding for a full-time civil defense director for the operating life of Pilgrim Station. Four of the seven EPZ and host communities have signed agreements with Boston Edison to accept this assistance.

The Nuclear Regulatory Commission and the Federal Emergency Management Agency are continuing to exercise their regulatory authority over Pilgrim Station. FEMA is responsible for certifying to the NRC that off-site emergency plans and response are adequate. In a report dated August 6, 1987, FEMA stated that "[t]he results of our self-initiated review indicate that the Massachusetts Plan is inadequate to protect the health and safety of the public in the event of an accident at the Pilgrim Nuclear Power Station..."³

³The FEMA Self-Initiated Review is discussed in greater detail in section IV.

The NRC closely monitoring all developments concerning emergency planning, the safe operation of the reactor, and on-site safety and management. For instance, the NRC has three resident inspectors assigned to monitor operations at Pilgrim Station rather than the one inspector assigned to most other nuclear plants. However, on one recent weekend when there were eight problem events at Pilgrim Station, only two NRC resident inspectors were assigned to the facility and no inspections were made during the period the events occurred. Since that time I have requested that the NRC agree to provide, at a minimum, daily random monitoring of operations at Pilgrim Station. The NRC is issuing a status report on the facility every two weeks, and this practice should certainly continue.

II. STATE RESPONSE TO THE DECEMBER, 1986 REPORT ON SAFETY AT PILGRIM STATION

A. Revisions to Off-Site Emergency Plans

One of the most critical findings of my report on safety at Pilgrim was that state and local plans for response to an accident at Pilgrim Station were not adequate to protect the public. The Massachusetts Civil Defense Agency and Office of Emergency Preparedness, which is responsible for off-site nuclear power plant emergency planning under st. 1979, c.796, has responded by establishing a three phase program designed to develop the best possible emergency plans for all EPZ and host communities.⁴ They will be assisted in this effort by the new Nuclear Safety Emergency Preparedness Program discussed in section II.B. Since emergency response is first and foremost a responsibility of local government, MCDA/OEP has sought to establish a system whereby local authorities take the principal role in plan revision with advice and assistance from state officials. Further, since state and local resources available for this purpose remain strictly limited, support for this effort has been received from Boston Edison as discussed above.

Federal regulatory guidance suggests that nuclear utilities should support the costs of off-site emergency preparedness as a responsibility of operating commercial

⁴The five communities comprising the Pilgrim EPZ are Carver, Duxbury, Kingston, Marshfield, and Plymouth. Presently there are two host communities, Taunton and Bridgewater. It should be noted that similar programs have been initiated for the communities within and serving the Rowe and Vernon EPZs.

nuclear reactors.⁵ The Massachusetts General Laws establish authority for local governments to accept assistance from private entities for the purpose of emergency preparedness.⁶ Under these provisions, Boston Edison has agreed to support the efforts of local governments in the MCDA/OEP directed process for revising radiological emergency response plans.

The new Nuclear Safety Emergency Preparedness Program established within MCDA/OEP this year in response to an initiative by the Governor is supported entirely by state funds which are recovered from the nuclear operators through an assessment by the Department of Public Utilities.

The first phase of the planning process was to make all obvious corrections to the plans. Phase II is to undertake the major planning necessary to address the findings in our December, 1986 report and other reviews of the plans, and to resolve all issues raised by each community in the phase I process. Phase III will be to train all personnel with an emergency responsibility and to hold a graded exercise of all plans and facilities. However, at the conclusion of the three phase process or at any time, we may determine that no emergency plan for the Pilgrim site is or can be adequate to protect the public health and safety.

During phase one of the three phase planning process, staff of MCDA/OEP worked with each of the seven communities to completely review existing plans and identify all necessary changes. To facilitate this process, MCDA/OEP suggested that each community establish a planning committee composed of at least of the directors of all critical local departments. Some towns also chose to include citizen representatives on their committees. These planning committees have reviewed all work in progress.

Each Friday since March, 1987, MCDA/OEP has held a staff meeting at Area II headquarters in Bridgewater. The civil defense directors and other representatives of all seven communities as well as representatives of FEMA have been invited to these meetings to discuss problems and issues encountered in the revision process. Representatives of the Boston Edison Company have also attended these meetings. Phase one corrections were completed by the third week in August and phase II was begun immediately. Staff of MCDA/OEP continues to work closely with each community, and the Friday staff meetings

⁵NUREG-0654, at page 25, paragraph G.

⁶Section 15 of chapter 639 of the acts of 1950

are attended regularly by the civil defense directors of most of the EPZ and host communities.

An essential component of the phase II process is that local plans will be reformatated so that they are organized according to NUREG-0654 planning criteria. This will enable more efficient checks on progress and easier determination of compliance with federal regulatory planning requirements. The many issues raised in my earlier report and other reviews of the plans must be resolved before the phase II process can be completed. Section VI of this report contains an item-by-item discussion of progress on these matters.

Certain aspects of the third phase of the process are presently under way. The training officer of MCDA/OEP in cooperation with a representative of the state Department of Education has begun to develop a revised training curriculum for all emergency response personnel. MCDA/OEP and Boston Edison have already begun to offer certain essential training courses to local officials. For instance, training is being given for the newly installed emergency notification radio system (see section III of this report) and for operation of public alert siren systems. Whether or not Pilgrim Station restarts, it will at least in the short run remain a high-level waste storage area, so local officials must know how to operate these systems because there is always a potential need for off-site response to an accident at the facility, whether or not it is on line.

The remainder of phase III training will be offered to state and local personnel as the plans are further developed and as the curricula are better defined. Boston Edison is assisting with development of technical training modules for all emergency response disciplines. If we determine that adequate plans have been developed through the phase II process and that all emergency personnel have received or will receive required training, then the possibility of holding a full-scale emergency exercise will be considered.

While MCDA/OEP and other state and local agencies are pledged to complete the three phase process as quickly as possible given available staff and resources -- our target date is to produce a preliminary version of the plan by the end of the calendar year -- it is a emphasis that there is no absolute deadline for this work. Whatever time is required to develop the best possible plans will be spent on this process, and the only measure of satisfactory plans will be that of public safety.

B. Establishment of the Nuclear Safety Emergency Preparedness Program

In his Fiscal Year 1988 budget, Governor Dukakis proposed development of a state program to be responsible for

all planning, training, and exercises in support of emergency preparedness for an accident at any of the three nuclear power plants licensed to operate within or adjacent to Massachusetts. The Fiscal Year 1988 budget enacted by the legislature and signed by the Governor creates such a program within the Massachusetts Civil Defense Agency and Office of Emergency Preparedness, allocating \$175,000 for its first year of operations. All funds expended for this purpose will be reimbursed to the Commonwealth through an assessment of nuclear utilities by the state Department of Public Utilities.

The FY '88 budget authorized eleven positions for the new division. However, insufficient funds were appropriated to fill all of these jobs. The first five of these positions have been filled. The Governor has submitted to the legislature a request for an additional \$700,000 (HB 6086, see appendix one) so that all remaining positions created for the new program can be filled as early as January, 1988. Establishment of this new program is an important step towards assuring that the best possible plans can be developed, tested, and if found to be adequate, maintained for response to an accident at a nuclear power plant and for allocating the planning costs to those responsible for the hazard.

C. Expansion of the Emergency Planning Zone

Federal regulatory guidance contained in NUREG-0654 suggests that the plume exposure emergency planning zone be ten miles, more or less, with adjustments made for political boundaries and other geographic considerations. The limits of the EPZ as of December, 1986, had actually been established in 1979, and included all of the towns of Duxbury, Kingston, and Plymouth, and only those portions of Marshfield and Carver lying within ten approximate miles of Pilgrim Station. After consultation with officials of Marshfield and Carver, these towns in their entirety have been designated as part of the EPZ, see appendix two. This was done to be sure that in the event of an accident at Pilgrim Station, state officials can make and implement protective action recommendations on a consistent "whole town" basis, thus reducing potential confusion regarding those actions. This is the same protective action policy which is used for the Yankee Rowe and Vermont Yankee Massachusetts EPZs.

Small portions of Bourne, Plympton, and Wareham lie within ten miles of Pilgrim, and officials of each of these communities have indicated their interest in being designated part of the EPZ. Representatives of MCDA/OEP have met with each town to assure them of our support for expanded planning, and have discussed with them the responsibilities implied by this designation. State officials must still complete consultation with FEM and the NRC regarding this expansion of the EPZ before final designation is made.⁷

⁷The House Ways and Means Committee recently gave approval to section one of H.B. 5383 which would, among other things, establish a 50 mile EPZ in Massachusetts. We support this initiative but would require additional resources to implement it.

It is our feeling that full attention must be focused on assuring that adequate plans are developed for all areas within ten miles of Pilgrim Station before undertaking new planning for areas in the expanded EPZ. Therefore, the designation of Carver and Marshfield in their entirety, and the potential designation of all or portions of Bourne, Plympton, and Wareham, should be considered the beginning of the process and not the end. State officials must still consult with federal and local authorities to determine what level of planning is appropriate and will be required for all areas added to the plume exposure EPZ.

It also should be noted that we remain fully committed to the goal of expanded planning that we discussed in our December, 1986 report. Thus we support House Bill 5383 which would in part define an expanded planning zone to fifty miles. It should be noted that the resources associated with HB 5383 are significant and will not be addressed by passage of our supplementary appropriation request.

D. Off-Site Monitoring

The state Department of Public Health is continuing with its program for off-site monitoring of radiation in the vicinity of Pilgrim Station. In addition, the Department of Public Health has agreed to implement a system of obtaining weekly reports of radiation levels within the boundaries of Pilgrim Station to better determine if there are low level radioactive releases from the power facility.

The state of Illinois has installed a complex system to continuously monitor the engineering parameters and radioactive releases of nuclear power plants. The Department of Public Health has prepared a report about this system and estimates that it would cost approximately \$1 million to install in the Commonwealth in Pilgrim Station, see appendix three.

E. Revisions to the State and Area II Plans

In addition to the seven local radiological emergency response plans, the response plans for the State and for MCDA/OEP Area II were also found by our report to be deficient. The staff of MCDA/OEP in cooperation with representatives of other state agencies and the nuclear operators is working to upgrade these documents. However, because the State and Area II plans address the coordination and support of activities along the EPZ and host communities, these revisions cannot be completed before revisions to local plans are finished. A task force under the authority of the state Director of Civil Defense meets regularly to review work in progress. Under H.P. 5086, recently approved by the House Ways and Means Committee, funds would be made available to the Department of Public

Health to further study the feasibility of an off-site monitoring system.

The State Radiological Emergency Response Plan must discuss actions to be taken in response to accidents at Yankee Rowe and Vermont Yankee Nuclear Power Stations in addition to Pilgrim Station. Work on these revisions is being coordinated with the Yankee Atomic Electric Company as well as with the Boston Edison Company. Representatives of the utilities meet regularly with the task force of state personnel to review work in progress.

F. Discussions with the Governor's Advisory Council on Radiation Protection

In response to issues raised in my report on safety at Pilgrim Station, we have discussed with the Governor's Advisory Council on Radiation Protection development of a state multi-hazard materials incident response team and enhancing the state's ability to monitor the safe operation of nuclear power plants.

The Incident Response Team (IRT) would be composed of professionals from state agencies, private corporations, and academic institutions who have particular expertise which the state can use in evaluating response to an accident at Pilgrim, Rowe, or Vernon Stations, or the accidental release of another hazardous material. Members of the IRT would report to the state emergency operations center to advise the state Director of Civil Defense, the Commissioner of the Department of Public Health, and other people in positions of authority on the possible consequences of the accident and the appropriate mitigating measures. In regards to an IRT for nuclear matters, members of the Governor's Advisory Council can form the core group for such a team.

The state does not at present employ nuclear engineers or other personnel who can represent the state in nuclear facility site inspections and safety meetings. The discussions at these inspections and sessions involve highly technical matters which could possibly affect public safety. The Governor's Advisory Council has been asked to advise the state regarding NRC site safety inspections and discussions through use of appropriate state personnel or through expert consultant services. Arrangements for state participation in NRC safety activities are also discussed in section II.H., following.

G. State Participation in NRC Safety Inspections and Meetings

Vermont, New Jersey, and other states around the nation have entered into formal agreements with the Nuclear Regulatory Commission whereby they are permitted to attend and, to a limited degree, participate in safety inspections and meetings

for nuclear power plants, see appendix four. The Commonwealth is considering making such arrangements. Under an appropriate agreement, a representative of the state would be permitted to attend the on-site inspections and subsequent discussions and have the right to file dissenting or concurring findings. Designated state representatives would be trained and certified by the different utilities for unescorted access to each nuclear power station.

Since these inspections and meetings involve detailed discussions of the most technical aspects of nuclear power generation, the individuals who represent the state would have to be qualified nuclear engineers. The state does not presently employ anyone with the skills and experience necessary to participate in these matters in a meaningful way.

We are reviewing agreements between other states and the NRC and are engaged in discussions with the NRC. We expect to conclude an appropriate arrangement for participation in on-site safety matters.

III. BOSTON EDISON RESPONSE TO RECOMMENDATIONS OF THE BARRY REPORT

Our report made several recommendations for action by the Boston Edison Company which directly relate to off-site emergency response. These recommendations concerned improved equipment for off-site emergency notification, production of a new evacuation time estimate (ETE), certification of the alarm alert and notification system, addressing the ability to protect beach area populations, addressing shelter as a protective action, production and distribution of improved public information material, improving procedures for protection of special needs and school aged populations, and submission to the state and NRC of a probabilistic risk assessment which considers accident scenarios initiated by both internal and external events and which specifically based on Pilgrim's design features to assess the containment conditional failure probability.

In response to the documented need for an improved system to promptly notify off-site authorities of an accident at Pilgrim Station, Boston Edison purchased and has installed a radio system called BECONS through which state and local authorities can be given immediate notification of events at the power facility. This system is now in the final stages of testing and of receiving licenses for operating frequencies. The Federal Communications Commission is in the process of final review of the frequency licenses, and approval is expected before the end of December. Material has been developed by the utility to train state and local officials in the use of BECONS. BECONS units have been installed in all town warning points, at NCEA/OEP Area II Headquarters, Bridgewater, and at Massachusetts State Police Troop D, Middleboro.

Boston Edison commissioned the New York firm of KLD Associates to undertake a new Evacuation Time Estimate and traffic management plan for the Pilgrim area. The draft document was delivered to state officials on August 20, 1987 and revised pages based on preliminary comments were delivered to MCDA/OEP on September 8. Staff of MCDA/OEP is coordinating review of the ETE by a task force of other state agencies and by officials of all concerned local jurisdictions. While this review is not complete, serious questions regarding the ETE methodology and results have surfaced. These issues are covered in greater detail in section VI.A. of this report.

Throughout its history of operation, the public alert siren system which was installed throughout the EPZ by Boston Edison has been plagued by siren failures and the spontaneous sounding of alarms, especially during thunder storms. Boston Edison has replaced malfunctioning units and done other repair and maintenance to the siren system. FEMA has reviewed all proposed improvements to this siren system and has monitored the results of monthly system tests. The monthly siren system tests which have been conducted by Boston Edison since 1986 indicate that system reliability exceeds FEMA standards.⁸

FEMA conducted a full test of the siren system in the Autumn of 1986 which included a telephone survey to determine the percentage of the population which heard the alarms. FEMA has reported that better than 85% of the population heard the sirens. A three-minute-cycle siren test was held for Pilgrim on October 15, 1987, and we have gathered information about the results.

Protection of beach populations during the Summer months is a principal public safety concern raised in our Report. Boston Edison has proposed to the Nuclear Regulatory Commission in a letter dated June 4, 1987, that the results of the new ETE combined with the results of survey of shelter available at beach areas demonstrates that this vulnerable population can be protected. Staff of MCDA/OEP have reviewed the shelter survey and find it deficient in several aspects, see appendix five. Also, our review of the new ETE, while incomplete, leaves several questions not answered to our satisfaction. Therefore, we cannot agree that Boston Edison Company has resolved the issue of protection for beach populations.

⁸MCDA/OEP receives and reviews monthly siren system test reports which Boston Edison submits to FEMA. These are not sound tests, but tests of the system's electrical circuits.

Our December, 1986 report requested that Boston Edison "commission a comprehensive shelter survey." The survey which was delivered to and reviewed by the staff of MCDA/OEP was made only for an area between one half and one mile of the coast. Since the survey did not cover the remainder of the EPZ, and for other reasons discussed in section VI.B. of this report, this recommendation has not been fulfilled.

The Boston Edison Company produces an annual public information brochure in cooperation with MCDA/OEP for distribution throughout the EPZ. MCDA/OEP staff were working with Boston Edison and the utility's consultants with a goal of issuing a new EPI brochure by September, 1987. However, because certain critical planning decisions had not been made -- principally whether or not a third reception center is required to replace Hanover Mall -- preparation of the brochure has not been completed.

Boston Edison informed MCDA/OEP in August that it was conducting a study to determine the adequacy of two reception centers instead of three, and that the results would be available in early September. We indicated that we would evaluate such a report within fourteen days. To date, we have not received the Boston Edison analysis although we have requested it on several occasions. Therefore, we are unable to complete preparation and distribution of an EPI brochure. In the alternative, an interim Public Information Brochure will be distributed throughout the EPZ. This interim brochure will explain the aspects of emergency response which are not fully addressed at present and which will be completely resolved before a final EPI brochure is distributed in 1988. Our position is clear that in no case should Pilgrim be permitted to restart until a final and complete EPI brochure has been approved by MCDA/OEP and distributed.

IV. FEMA INTERIM FINDINGS

On September 29, 1982, FEMA and the Regional Advisory Committee (RAC) issued its interim findings on the adequacy of Pilgrim EPZ and host community plans. The 1982 review indicated that the plans were adequate to protect the public. On August 6, 1987, the Federal Emergency Management Agency transmitted to us the results of their Self-Initiated review of Pilgrim area emergency plans, finding that, "[b]ecause of the changed circumstances discussed in the FEMA review, our finding of adequacy contained in the Interim Finding of September 29, 1982 no longer applies and has been superseded by the enclosed finding." This information was also transmitted to the NRC.

The FEMA Self-Initiated Review found the emergency plans to be deficient in five specific areas; 1) evacuation of schools, 2) reception center, 3) beach population, 4) special needs populations, and 5) transportation dependent populations.

Each of these items was identified in our December, 1986 report as a deficiency. The steps being taken by the Commonwealth and by Boston Edison to address these deficiencies are discussed throughout this report.

At least one finding of the Self-Initiated Review is based upon a misimpression by FEMA. In evaluating resources available for transport dependent people, FEMA contended that the Commonwealth would not use MBTA buses if they are needed to assist an evacuation in the Pilgrim EPZ. In fact, the Commonwealth will endeavor to make these buses and all other public resources available to assist in emergency response if they are needed to supplement resources available in the more immediate vicinity of Pilgrim. FEMA apparently misconstrued our earlier statement to the effect that we no longer believed that it was appropriate to rely upon ad hoc measures in planning for emergency action to indicate that we would not use available resources.

The NRC has not stated as of this date if the changed FEMA Interim Finding will be used as the basis for preventing the re-start of Pilgrim station. In a meeting between representatives of Boston Edison and the NRC at the NRC's offices in Bethesda, Maryland, on September 24, 1987, the NRC indicated only that off-site planning issues must be "addressed" before restart is allowed. This is not an adequate response on the part of the NRC, and we believe that all off-site safety issues must be resolved prior to restart.

The NRC has asked Boston Edison to present an "Action Plan" for addressing the deficiencies cited in the FEMA report, and Boston Edison submitted the first draft of the Action Plan to the NRC on September 17, 1987. We reviewed the utility's Action Plan which was forwarded to the NRC and support Boston Edison's stated goal of completing plan revisions as soon as possible. We think that it is useful to establish goals and objectives to guide planning. However, as this progress report demonstrates, the planning process has a long way to go.⁹

⁹For example, the NRC has yet to receive from Boston Edison a final copy of the utility's proposed restart plan. A second revision of a restart plan was submitted to the NRC by Boston Edison on October 26, 1987, and was transmitted to us on November 12. We are awaiting receipt of the final version of the material and will review it thoroughly as soon as it is available to us. A third party expert evaluation of this plan is under consideration.

V. STATUS OF SPECIFIC BOSTON EDISON ACTION ITEMS

A. Management Issues

Our December, 1986 report to the Governor was highly critical of Boston Edison's management of Pilgrim Station. This finding has been echoed in reports by the NRC, especially in their "Systematic Assessment of Licensee Performance" (SALP) reports, which thoroughly review a variety of characteristics indicating management performance. The latest SALP report for Pilgrim Station was issued by the NRC on April 8, 1987, and evaluated utility performance for the period November 1, 1985 through January 31, 1987.

The SALP report analyzes 12 performance criteria, assigning a grade of 1, 2, or 3 for each criterion. Category 1 is the best grade and indicates that reduced NRC attention may be appropriate. Category 2 indicates that NRC attention should be maintained at normal levels. Category 3, the lowest grade, indicates that both NRC and licensee attention should be increased. The April 8, 1987 SALP report indicated that management of Pilgrim Station was not good and had, in fact, deteriorated in certain respects since the previous SALP covering the period October 1, 1984 to October 31, 1985.

In the 1987 report, Boston Edison received two Category 1 grades, five Category 2 grades, and five Category 3 grades. For three criteria in the 1987 SALP, Boston Edison received lower grades than for the previous reporting period, for two criteria the grade increased, and for three criteria the grade remained unchanged. The four remaining criteria had not been separately evaluated previously. These results are cause for concern under any circumstances but particularly in light of the fact that the plant was shut down during most of the inspection period.

Since December, 1986, Boston Edison has reorganized its Pilgrim management and has hired a number of individuals to fill key positions. Most notably, Boston Edison has hired a new Senior Vice President, Nuclear, Mr. Ralph Bird, who reports directly to the company's chief executive officer. Mr. Bird was recruited from outside of the Boston Edison Company. The new Senior Vice President also serves as the Vice President for Nuclear Operations and personally supervises all activities pertaining to Pilgrim Station.

Under Mr. Bird's direction, other positions relating to the safe operation of the reactor and to emergency planning have recently been filled by professionals recruited from outside Boston Edison, and a few Boston Edison employees have been promoted to fill vacancies. The following other key management positions have been filled by recruits from outside the company:

- Executive Assistant to the Senior Vice President, Nuclear,
- Director of Planning and Restart,
- Emergency Planning Assistant to the Senior Vice President, Nuclear,
- Operations Section Manager,
- Nuclear Security Group Leader,
- Fire Protection Group Leader, and
- Radiological Section Manager.

In addition, the Director of Outage Management was promoted to Plant Manager in early 1987.

While there are indications that the new management organization and personnel may be taking more effective control of Pilgrim Station, recent events suggest that Pilgrim Station continues to have serious management problems. The NRC is considering a fine against Boston Edison for failure to implement plant security procedures, and there have been reports of critical plant personnel working excessive over-time. We also have concern over the way a decision was implemented to disengage one of two emergency generators during a period when Pilgrim station lost access to off-site power on November 12, 1987.

In addition to these issues, the Senior Vice President of Boston Edison ordered all work on the Pilgrim reactor and systems halted after eight individual work related problems occurred over the weekend of November 7 and 8, some of which were similar to problems which have recurred at Pilgrim Station over several years. Four of these problems resulted in the on-site release of radiation and slight worker contamination. Two of the problems were related to security.

The security violations are of particular concern because in the 1987 SALP report "Security and Safeguards" had deteriorated from a Category 2 to a Category 3. Officials of Boston Edison have met with the NRC to explain their remedial actions concerning plant security. We have seen no official report on the question of over-time worked by personnel detailed to critical safety aspects of Pilgrim Station. Boston Edison public information officers have indicated that five percent of the Pilgrim work force is authorized to work more than sixty hours per week. Since there are presently more than four thousand people employed at Pilgrim Station, a significant number may have been working long and perhaps excessive hours.

In view of Boston Edison's long history of management failure at Pilgrim Station, we feel that sustained management of the nuclear facility at a high level must be demonstrated before the plant should be allowed to restart. Events of the past several months raise more questions than they answer and make it more imperative that, in addition to other safety requisites, we have objective evidence of sustained performance at the highest level of quality, including but not limited to

top grades in the next SALP report, before restart, even though the next SALP report will not reflect evaluation of actual on-line operation of the reactor.

B. Reactor Safety

Our report to the Governor examined aspects of the safe operation of Pilgrim Station, particularly the capacity of the General Electric Mark I containment structure to prevent the release of radiation in a severe accident. Since December, 1986, the nuclear industry has continued its inconclusive debate on the integrity of the Mark I containment structure. We do not expect that this issue will be settled soon by the NRC.

The Nuclear Regulatory Commission is developing a "Draft General Letter" on reactor safety and the Mark I containment structure which will identify plant-specific analyses necessary to implement the NRC's "Severe Accident Policy Statement." However, no letter has been released and there is presently no schedule for its publication and, therefore, no way to assess the adequacy of or estimate the time it will take to implement the NRC's ultimate recommendations. The NRC has been considering this matter for more than a year and has discussed structural improvements and other operating concepts for Mark I units with the Boiling Water Reactor Owners Group.

Absent specific federal requirements and guidance, Boston Edison is implementing a "Safety Enhancement Program" (SEP) to improve reactor safety for Pilgrim Station and includes both emergency operations procedure improvements and equipment modifications. The utility has indicated that they have spent approximately \$30 million on this program. One key element of the equipment modifications is installation of a direct torus vent. Boston Edison has indicated that they are prepared to complete installation of the torus vent as soon as they are so authorized by the NRC.

According to Boston Edison, the torus vent, if installed, could be used to relieve pressure in the reactor containment during a severe accident. The venting system would "scrub" containment effluent of solid and liquid matter and release radioactive gases to the environment. The release of these gases, by relieving the containment pressure, would prevent a rupture of the containment structure and the subsequent release of more damaging solid and liquid radioactive materials. In theory, a gaseous radioactive plume would dissipate quickly and present less threat to public health than a liquid and solid release which could deposit long-lived radioactive elements on inhabited ground and structures.

There are, however, conflicting views on whether a direct torus vent would provide effective containment pressure relief in the event of a rapidly developing accident. Therefore, it must be demonstrated that the direct torus vent would significantly increase public safety under certain accident scenarios.

C. Policy Issues Regarding the Torus Vent

The torus vent introduces a vital policy question. Under what and whose authority can one plan in advance to make use of the vent? Activating the vent would result in the release of a gaseous radioactive plume. Thus, if the equipment is installed and a severe accident does occur, who may authorize torus venting and the subsequent radioactive release? The utility is responsible for the safe operation of the reactor, for controlling an accident, and for preventing insofar as possible the unauthorized environmental release of radiation. The NRC regulates utility execution of these responsibilities. However, state and local government share exclusive responsibility for the protection of public health and safety for all areas beyond the boundaries of the power station.

Boston Edison has not installed the torus vent, pending direction from the NRC. It is our understanding of the NRC licensing scheme, that it would be necessary to amend Pilgrim's operating license before a torus vent could be installed. Such an amendment would involve "significant hazards considerations" and, as such, would require that a hearing be held prior to the amendment's authorization. If the NRC authorizes installation, it is not clear what role -- if any -- the Commonwealth can or should play in that decision. If the vent is installed, with or without concurrence from state authorities, a question arises that the state will have to resolve as to what authority is available to state officials to advise for or against venting during a severe reactor accident.

It is presumed that gases can be held in the containment system for a period of time before venting. During this period, state officials must decide the best protective action for the public, either to shelter or evacuate, based upon accident assessments made by the state Department of Public Health and the utility. The length of time that gases can be held and the expected duration and composition of the release, when compared to the expected evacuation time, the shelter available to the population at risk, and the time it is expected for the affected population to take to shelter, will determine the most appropriate action.

Thus, state officials must at least coordinate implementation of the best protective action with the containment venting. Before the NRC authorizes Boston Edison to install the torus venting system, there should be an

evaluation of these policy matters and what if any role state agencies and officials can or will take in the event of a severe accident at Pilgrim Station. This proposal raises such significant safety issues that a public hearing should be required so that the Commonwealth would have an opportunity to express its opinions on the matter.

During the September 24, 1987 meeting between Boston Edison and the NRC, Dr. Murley of the NRC indicated that he still had reservations about authorizing torus vent installation. Dr. Murley stated his reservations about authorizing installation of the torus vent in a letter to Boston Edison dated August 21, 1987. We are not at present aware of any Boston Edison response to the NRC letter.

D. Need for a Pilgrim-Specific Probabilistic Risk Assessment

It is important to note that until a plant-specific "Probabilistic Risk Assessment" (PRA) is available for Pilgrim Station, it is impossible to determine the relative level of risk of a severe accident at Pilgrim Station and the dominant sequence of events that would lead to a severe accident. A PRA, as we discussed in our December, 1986 Report, is a comprehensive analysis of plant mechanical and operations systems conducted to ascertain the sequences of events that could lead to a severe accident. Given that every nuclear power plant is unique, both in mechanical and operating systems, a plant specific PRA is necessary to determine the specific scenarios that could lead to severe accidents, as well as to isolate the specific vulnerabilities of each plant.

Although the NRC recognized that plant-specific design and equipment characteristics are important factors in a plant's vulnerability to a severe accident, it has not required a Pilgrim-specific PRA, but has relied on the analysis of the NUREG-1150 program. The NUREG-1150 program performs PRAs for representative reactor and containment types. In the case of the General Electric Mark I type plant, the NRC relies upon a PRA for the Peach Bottom plant in Pennsylvania. The use of representative PRAs is open to criticism and plant-specific PRAs are being developed by some utilities.

Although I am informed that the Pilgrim PRA is under development, Boston Edison has not to date made it available to the state, taking the position that it is not yet final. In light of the importance of the PRA in determining the risks posed by Pilgrim Station, I recommend that the plant not be allowed to restart until we have been provided with a Pilgrim-specific PRA and have had the opportunity to verify and assess its results.

STATUS OF SPECIFIC OFF-SITE EMERGENCY PLANNING MATTERS

Our report focused attention on several inadequacies of the plans for response to an accident at Pilgrim Station. The most significant action taken to address inadequacies in the plans was the implementation by the Massachusetts Civil Defense Agency and Office of Emergency Preparedness of the three phase process discussed in section II.A., above. This work has been supported by Boston Edison through assistance given to each EPZ and host community under section 15, chapter 639 of the acts of 1950. Substantial progress has been made through the three phase process towards completely revising all radiological emergency response plans. However, the process is far from complete and our position remains that at present the emergency plans for Pilgrim are not adequate, and we reserve the right to determine if the plans ultimately are adequate to protect the public.

Draft revisions to the local plans exist in part for each of the five EPZ communities. In some cases, the draft revisions are up to 85% complete as of this writing. When officials of all communities and staff of MCDA/OEP indicate that initial drafts are complete, the drafts will be submitted to the Federal Emergency Management Agency for informal technical review. FEMA's assessment will provide an independent professional assessment of plan adequacy. However, the Commonwealth has the responsibility to make our own final evaluation of the plans.

Following is an item by item discussion of certain off-site emergency planning issues which were raised in the Barry report or which have surfaced since December, 1986.

A. Evacuation Time Estimate and Traffic Management Plan

In our Report to the Governor, we recommended that Boston Edison, "proceed with all dispatch to complete the preparation of a new Evacuation Time Estimate study." Boston Edison commissioned the New York firm of KLD Associates to prepare a new Evacuation Time Estimate (ETE) and Traffic Management Plan for the Pilgrim area.

An Evacuation Time Estimate (ETE) is essential as a planning tool and as a critical resource in evaluating protective actions should there be an actual emergency at a nuclear power plant. The ETE available when we made our evaluation in December, 1986 was produced in 1979, based upon 1970 census data, and was inadequate. On August 8, 1987, Boston Edison transmitted to us a new ETE and traffic management plan, and revised pages were received on September 8. Although we have not yet completed review of the new ETE and have many reservations about it as discussed below, it is a significant improvement over previous material.

Since the revised pages were received, a task force of state employees has met regularly to review the ETE and traffic management plan. The charge to this task force has been to evaluate whether the traffic management plan upon which the estimates of evacuation times are based are reasonable and feasible, and to determine what resources are needed for its successful implementation. If the traffic management recommendations cannot be implemented successfully, the estimated evacuation "clear times" are without meaning.

The group will not finish its review before the end of November, but certain findings are emerging. The Commonwealth does not have adequate resources to implement the traffic management plan. Therefore, the clear times in the ETE cannot be achieved. For instance, the Massachusetts State Police, Troop D, Middleboro will be responsible for establishing control of traffic seeking to enter the emergency zone, as well as for directing traffic on state roads within the evacuation area. Officers of Troop D have indicated that they would not normally have sufficient personnel available to implement all of their actions in a timely manner. Troop D is continuing to evaluate available personnel against personnel needs as documented in the ETE.

In addition, Troop D may not have adequate radio frequencies and hardware to manage emergency communications. This is especially true because of the expected high volume of emergency communications during a nuclear accident and the need to coordinate the actions of state and various local police departments. The Commonwealth has only one State Police mobile command post which is normally stationed at Troop A, Framingham, although at any time it may be in use anywhere in the state. It may be necessary to have a mobile command post available immediately to effectively manage traffic access points in areas as remote as the intersection of Routes 128 and 3 in Braintree and the Cape Cod bridges.

All of these findings are reflected in a memorandum from Troop D, Middleboro, see appendix six.

The traffic management plan goes to great detail in evaluating the traffic control devices which will be required to implement an orderly and prompt evacuation. These devices include traffic cones, traffic barricades, warning lights, and special evacuation route signs. The State Department of Public Works is evaluating the resources it has available against the requirements documented in the ETE. The DPW can draw upon its resources state-wide, however, it is not yet clear how long it would take to deliver all required material to the EPZ.

The recommended resource requirements in the ETE include 364 cones, 389 barricades, and 203 warning lights. State and local police agencies and departments of public works have been asked to evaluate these recommendations based upon their own experience. However, it is necessary to assure

delivery times for these resources before one can be assured of adequate plan implementation. The State DPW only has emergency mobilization procedures for snow removal and certain highly localized events. These procedures may or may not in fact be adequate to meet needs during a mass evacuation, and MDPW is reviewing them to determine if new protocols are needed and if material delivery times can be verified.

An examination of the details for traffic control points indicates that very few are recommended to be staffed by more than one traffic guide. However, for many of these points, the guide must fulfill several functions, including directing traffic in the recommended pattern, answering questions for vehicle occupants, checking his or her personal dosimetry, clearing vehicles to travel against the recommended pattern if the driver can demonstrate that he or she is an emergency worker, has a need to return to pick up family, or has another reasonable purpose. It is doubtful that one guide can accomplish all of these functions and, therefore, quite possible that the personnel requirements -- especially for local police officers -- of the traffic management plan are underestimated.

The largest burden of controlling an evacuation falls to local police departments. MCDA/OEP has provided all local chiefs of police¹⁰ with a copy of the ETE and asked for their comments and observations. As of this date, we have not received comments from any local jurisdiction.

Besides effective and timely implementation of the traffic management plan, the other most critical element of the ETE is the estimation of traffic demand. That is, the number of vehicles which would be on the road at any one time an evacuation is declared must be estimated, as well as the time that it takes for drivers to mobilize and start their evacuation trip. Further, the need for supplementary transportation resources, including ambulances, buses, and chair vans must be established and their mobilization, arrival, pick-up, and total travel times must be estimated.

The new ETE goes into exhausting detail to document traffic demand estimation. However, certain assumptions and findings remain open to question. In particular, the estimated population at the EPZ beaches and ponds is a critical issue not yet addressed to our satisfaction, and the estimated

¹⁰In addition to EPZ and host communities, traffic and access control recommendations must be implemented by the communities of Penbrooke, Hanson, Halifax, Plympton, Wareham, Bourne, Sandwich, and Braintree.

transportation requirements for people with special needs must be examined further.

The ETE estimates that peak use of area beaches and ponds is 8,211 persons using 2,998 vehicles. The evacuation times for the beaches are based upon surveys of the parking capacities at individual beach and pond areas. It does not appear that these figures include people who are at beaches and ponds but do not have access to personal transport, such as children who were dropped off by parents or people who have walked, bicycled, or otherwise gotten to a beach but who would be picked up by a vehicle in the event of an evacuation. The ETE must treat in greater detail the issue of people who will drive to the beaches and ponds to pick up family and friends after an evacuation has been declared. In other words, the total beach and pond population must be estimated and an accounting must be made of the departure of the entire beach and pond population.

The ETE's recommendations regarding transportation for special needs populations is based upon a survey undertaken by Boston Edison in the Summer of 1957. Representatives of the state Office of Handicapped Affairs and the Plymouth Commission on Handicapped Affairs have indicated that the Boston Edison survey was poorly conceived and does not make an accurate estimate of the EPZ's special needs populations.¹¹ Nonetheless, the Boston Edison survey has provided more information on special needs requirements than has been available previously. However, it is clear that further work has to be done in this area before we will have an adequate estimate of the transportation requirements of people with special needs.

This additional work can perhaps be done through a further survey, through a statistical analysis of the general population, or some combination of these methods. With a better knowledge of the requirements for ambulances, chair vans, and buses for people requiring special transportation assistance, we will be able to determine if the ETE has properly estimated the evacuation times for this population. An estimation of available resources to assist people with special needs is being undertaken as a part of Phase II of the three phase planning process. Until that evaluation is complete, we cannot say if adequate resources are available.

¹¹The Boston Edison survey may not have reached all residents of the EPZ and was not worded in a way to elicit a response from all people who might need assistance in evacuating or taking shelter.

One broad consideration which is not examined by this ETE and Traffic Management Plan is the effect that will be felt from the failure of any one component. That is, the clear times appear to be based on the assumption that all all traffic management recommendations will be successfully implemented in a timely manner. However, there is no basis for this assumption and the failure to properly man and control a "priority 1" traffic control point can have a profound effect on traffic patterns.

Further, a major unanticipated event, such as an over-turned truck on a major route, even if cleared rapidly, might quickly cause wide-spread traffic problems. The ETE should investigate and recommend alternative evacuation strategies in the event that any one of the major evacuation routes, such as Route 3, were blocked. Also, it does not appear that the ETE has given consideration to the possibility of a severe Winter storm of the magnitude which can occur in Southeastern Massachusetts.

We are particularly concerned about the matter of Winter storms because of the possibility of converging events. In the very recent past, a severe storm resulted in Pilgrim's loss of access to off-site power. Subsequently, Pilgrim lost one of two emergency generators. If the reactor had been on line at the time, this sequence of events could have resulted in an accident requiring off-site response at the same time that there were more than ten inches of snow on the ground. Given these possibilities, we feel that the ETE should more extensively document expected evacuation times during severe storms.

The ETE is computed from highly complex traffic models which are beyond the understanding of all but the most knowledgeable professional specialists. Professionals employed by the State Department of Transportation's Central Transportation Planning Staff have done a review of "I-DYNEV," the model developed and used by the firm preparing the ETE. CTPS is continuing to review the model and its results based upon information supplied by consultants who examined I-DYNEV for the Seabrook adjudicatory process. A letter from CTPS staff shows that they do have certain reservations about the Pilgrim ETE modeling, see appendix seven.

At the present time we are not prepared to determine if the new ETE is an adequate basis for the development of plans for response to an accident at Pilgrim Station. Further study by state officials is necessary and I intend to have the ETE and the model upon which it is based evaluated by an independent third party expert in evacuation modeling.

B. Shelter as a Protective Action

Our report recommended that Boston Edison "commission a comprehensive shelter survey." In the event of an accident at Pilgrim Station, there are two main actions which can be recommended to protect the public; evacuation and shelter. In order to assure that the public can be adequately protected, it is necessary to establish two findings in regards to shelter; that, a) the highly vulnerable beach population can take adequate protective cover in the event of a rapidly escalating accident with an early release of radiation, and b) that each EPZ community can provide adequate protective shelter for the resident and transient population seeking assistance.

On August 20, 1987, Boston Edison delivered to MCDA/OEP a shelter survey which was reviewed by agency staff and found to be deficient in several respects. For example, the survey was completed only for areas lying between one half and one mile from the coast. The survey also failed to adequately evaluate the quality of shelter available in individual structures but was, rather, an undifferentiated catalogue of structures proximate to beach areas.

In a memorandum, see appendix five, transmitted to Boston Edison by State Director of Civil Defense, MCDA/OEP staff make several recommendations on developing adequate information so that Civil Defense personnel in each EPZ community can develop "Shelter Utilization Plans." Until shelter utilization plans have been developed, it is impossible to say that shelter as a protective action has been addressed.

Shelter utilization plans are especially important for beach areas. They must consider not just the available shelter space, but the time it will take people in remote beach areas to reach adequate shelter. Duxbury beach is approximately seven miles long and portions of Plymouth beach is as much as two miles from the nearest structure.

Until Boston Edison produces an adequate shelter survey which is adequate in the opinion of the MCDA/OEP staff, and until each community has had the opportunity to develop a shelter utilization plan, this issue remains an open and deficient planning topic.

C. Protective Actions for People with Special Needs

Among the planning issues discussed in my earlier report, none demand more attention than provisions for people with special needs. This population may include the elderly and the infirm, people who are mobility impaired, visually impaired, have a hearing loss or are profoundly deaf, and people with a number of other conditions which might be cause for a special service in the event of an accident at Pilgrim Station. People with special needs may require attention in

involvement in this effort, in June of 1987, Boston Edison undertook a survey of special needs people without the knowledge, advice, or participation of any state agency or personnel. Representatives of the state Office of Handicapped Affairs and the Plymouth Commission for Handicapped Affairs have indicated that the Boston Edison survey was poorly conducted. The results of the survey, representing the response of about 1,400 individuals, have been provided to the State Director of Civil Defense and are subsequently being turned over to designated public safety representatives in each of the five EPZ communities. This information would also be useful in and available for response to other life threatening situations such as a chemical spill.

It is the policy of state public safety officials that every individual in the EPZ be given the opportunity to identify his or herself and his or her need. However, it may not be necessary or even prudent to compile exhaustive lists of special needs populations. What is most important is to have an understanding of the dimensions of the special needs population and to be prepared to provide the variety of services -- alert and notification, transportation, special medical care, et cetera -- to the numbers of people expected to need assistance.

D. Medical Services for Radiological Victims

While not specifically addressed in our December, 1986 report, a recent Guidance Memorandum from the Federal Emergency Management Agency¹² has focussed attention on the topic of medical services for people who are contaminated by radiation and physically injured, for people who have ingested radioactive material, and individuals who are severely irradiated. The issue is receiving more serious public attention as a result of the formidable medical response which the Soviet Union mounted after the Chernobyl accident. It is incumbent on state officials to demonstrate that adequate medical facilities are available to meet the demand after a severe accident at any of the nuclear power facilities in New England, even though federal regulatory guidance does not set minimum requirements for treatment capacity.

Boston Edison is also working to identify appropriate medical facilities for off-site contaminated injured people in accordance with FEMA Guidance Memorandum MS-1.

¹²FEMA GM MS-1, "Medical Services." Washington, D.C., November 13, 1986.

three main areas of radiological emergency response; alert and notification, evacuation, and reception and long term shelter.

In response to this topic, MCDA/OEP organized an informal task force of representatives of several state agencies which represent special needs constituencies and representatives of local special needs agencies. The task force has met several times to discuss the complex details of providing the required services and is presently formulating recommendations for action by the state and utility to insure that all needs are met.

As one of the first actions under the new Nuclear Safety Emergency Preparedness Program, MCDA/OEP has formed a formal task force to address emergency planning for special needs populations. The Task Force on Special Needs is formulating guidelines and recommendations for state agencies and the Boston Edison Company for undertaking a statistical analysis of expected special needs in the Pilgrim EPZ and the resources which will be needed to fulfill those needs. The task force is also examining the need for a further survey of individuals with special needs. Based upon the estimated demand and resources needed for providing emergency notification to, and transportation and care for people with special needs, plans and procedures will be developed for each EPZ and host community plan and for the State and Area Radiological Emergency Response Plans.

In regard to alert and notification, people who are profoundly deaf will be unable to hear sirens or route alert loud hollers which will notify the public of a severe accident. Further, they will have difficulty communicating with emergency facilities and public safety personnel. The task force met with representatives of Boston Edison and urged that the utility install teletype equipment in each town warning point so that there could be immediate and effective communications with the deaf population throughout the EPZ. The utility has agreed to make teletype equipment available to all homes and facilities where there is a need. Staff of the state Commission for the Deaf and Hard of Hearing have agreed to advise Boston Edison on the installation of teletype equipment and training for its operation.

Boston Edison is proceeding with these recommendations, but it is not yet known when all equipment will be installed in town warning points, when training will be provided to all shifts of local town warning officers, or how many teletype units have been distributed throughout the EPZ.

Following my December, 1986 report, MCDA/OEP took the initiative of forming a group of state agencies concerned with services for special needs populations who met with Boston Edison officials on several occasions to discuss a cooperative effort to better identify EPZ residents with special needs in the event of a nuclear accident. Notwithstanding our active

The Massachusetts Department of Public Health's Radiation Control Program is responsible for maintaining the handbook of the state Nuclear Incident Advisory Team (NIAT). The NIAT handbook contains a list of all hospitals throughout the state which are prepared to treat victims of severe irradiation or who are contaminated and injured. The list includes the treatment capacity of each facility. DPH is also responsible for certifying hospitals for treatment of radiation victims.

E. Emergency Communications

As indicated in section III, above, Boston Edison has responded to the recommendation of the our December, 1986 report that they install a new radio system for notification of off-site authorities in the event of an accident at Pilgrim Station. This system, called BECON, is, as of this writing, in the final stages of testing and is awaiting a radio frequency license from the Federal Communications Commission. Action on that license is expected before the end of December, 1987.

Boston Edison has also begun compliance with another recommendation regarding emergency communications, by reviewing how the organizations providing buses which serve schools in the Pilgrim EPZ contact drivers when buses are needed for early dismissal. Boston Edison has determined that tone alert radios are not needed in school buses, as discussed in my December, 1986 report. Boston Edison is, however, considering whether or not they will provide paging devices to school bus drivers.

The utility has purchased tone alert radios and will make them available to special facilities such as nursing homes and schools throughout the EPZ and to homes and businesses which may have difficulty hearing public alert sirens. As indicated in section VI.C., Boston Edison has indicated that they will comply with the recommendation of MCDA/OEP and the state special needs task force, that teletype equipment be installed in each town warning point and is offered to all EPZ residents with a severe hearing loss, to assure that provisions have been made for emergency communications with the profoundly deaf.

F. Procedures for Protection of School Aged Children

As noted in our report to the Governor, procedures for the emergency response of schools were weak or non-existent in earlier versions of the Pilgrim plans. This is a matter of the gravest concern, and the development of new and enhanced procedures for the protection of school-aged children has been a priority issue in phase II planning. It is our intention to see that each school has its own definitive plan on alert and notification, shelter, and evacuation. Since planning for response by schools is a peculiarly local matter, development

of these plans has been a responsibility of local school and public safety officials, working with their town planning committee and school officials. However, staff of MCDA/OEP will provide assistance throughout the process and review the plans for adequacy and effectiveness.

Planning for protection of school children is based upon identifying an adequate number of buses and drivers to assure evacuation with single bus trips. In the event of an evacuation children would be taken to a designated reception center and remain in the care of school personnel until the child is reunited with his or her family. Parents of school children will be notified annually of the school's designated reception center and, in the event of an actual evacuation, the Emergency Broadcast System would make frequent official announcements on the precise destination of the children of each school in the EPZ. Regular and coordinated training programs are essential if these plans are to be effective. Contrary to what some teachers have maintained, it is our belief and a present operating assumption of the planning process that teachers will respond in a professional manner, remaining with and not abandoning the children who have been given to their care.

Phase III of the MCDA/OEP planning process will include training for teachers, bus drivers, and other school personnel on their roles and responsibilities in emergency response.

C. Procedures for Special Facilities

The development of adequate special facilities procedures has been a major goal of Phase II of the three phase process implemented by MCDA/OEP in cooperation with local officials and supported by Boston Edison. Boston Edison has done an inventory of special facilities in each of the five EPZ communities. This information, along with draft emergency response procedures for individual special facilities, will be supplied to local public safety officials for their review as part of the utility support offered under section 15, chapter 639 of the acts of 1950.

The Phase II work of discussing plans and procedures with the operators and responsible officials of special facilities is only just beginning. In the town of Plymouth, alone, nearly fifty special facilities have been identified. Each local civil defense director working with the town's planning committee will be reviewing evacuation and early closing plans and procedures with the superintendents of their schools. Hospitals are required to have and to test evacuation plans and procedures as a state licensing requirement.

Phase III of the MCDA/OEP planning process will include training for the personnel of special facilities on their roles and responsibilities in emergency response and a review of

these plans will be a part of the planning process.

H. Provision of Emergency Public Information

Our December, 1986 report recommended that Boston Edison improve delivery of Emergency Public Information (EPI), and, "report on additional methods that could be utilized to convey EPI to the public..., and study the extent to which EPI information reaches the residents of the EPZ and is understood by those people." To date, no report has been received from Boston Edison by officials of the Commonwealth on this matter.

Federal regulations require that an EPI brochure be distributed annually to all residents of a nuclear power station EPZ. In the past, Boston Edison has made this distribution in August or September of each year. Because several critical planning issues remained unresolved, Boston Edison informs us that they will delay their annual distribution until December.

Boston Edison has taken one step to broaden the reach of their EPI by purchasing space in all EPZ telephone directories. These directory pages give basic emergency information and suggest that readers contact a Boston Edison telephone number for additional information.

MCDA/OEP arranged for a meeting between members of the state special needs task force and Boston Edison's EPI consultant contractors in June, 1987. At that meeting several recommendations were made for improving access to EPI for the entire EPZ population. Members of the task force will review the EPI brochure to see to what extent their recommendations have been incorporated into the next final edition and to make recommendations for improving future brochures. It must be emphasized that an interim Public Information Brochure will be distributed throughout the emergency planning zone, as discussed in the end of section III of this report. One of the most critical issues which must be fully addressed prior to distribution of a final EPI brochure is procedures for assisting special needs populations.

I. Resources for Emergency Response

In my December, 1986 report, it was noted that plans for response to an accident at Pilgrim Station lacked evidence of the ability to provide sufficient emergency resources on a timely basis. In particular, it is necessary to demonstrate that an adequate number of buses, ambulances, and chair vans will be available for all transport dependent persons, and that these vehicles will be available in a timely manner to support a safe evacuation.

Boston Edison is conducting a survey of all private transportation companies in southeastern Massachusetts to determine what vicarious transport resources are available nearby. Individual agreements must be negotiated with all operators of buses, ambulances, and chairvans to make available their equipment and drivers to the EPZ communities in support of response to a nuclear accident. This process must also identify an adequate pool of drivers to assure rapid and full mobilization of all necessary vehicles. These arrangements need to be concluded as a part of Phase II of the MCDA/OEP three phase process to revise Pilgrim area plans. All appropriate documentation will be reviewed by staff of MCDA/OEP before it is included in local plans and in the revised MCDA/OEP Area II plan.

No guarantee can be given that all drivers will respond to a nuclear emergency, and written agreements offer no absolute assurance. However, we feel that adequate training will help reassure drivers of their safety in emergency response. The state, with the support of Boston Edison, will provide training in personal radiation protection for all drivers who might respond to an accident at Pilgrim. The curriculum for this training is presently being developed under the direction of the MCDA/OEP training officer, and the training will be offered as a part of Phase III of the agency's three phase process for revising the Pilgrim plans.

J. Reception Centers

Replacement of Hanover Mall as a reception center for the northern portion of the EPZ remains one of the most difficult pending issues regarding off-site emergency response for an accident at Pilgrim Station. The Boston Edison Company has been asked to study the physical facilities at Taunton State Hospital and Bridgewater Community College. The study was expected to be completed in September, 1987, but is not now expected until December according to Boston Edison officials. This study will determine what physical alterations must be made, what equipment must be provided, and what additional plans must be developed so that we can with only two reception facilities meet the needs of the EPZ population for reception, radiological monitoring, and, if necessary, decontamination of people and vehicles, either with or without a third reception center.

Once we have received this study from Boston Edison, it will be reviewed by staff of MCDA/OEP to determine if it is accurate and if its recommendations are reasonable and implementable. Based upon the study and upon other documentation including the Evacuation Time Estimate, we will determine if the two current facilities are adequate -- given the completion of recommended improvements -- and if a third reception center is necessary.

There is no federal or state requirement for three reception centers for the Pilgrim EPZ. Federal guidance states only that reception and radiological monitoring services be provided for up to twenty percent of the total EPZ population and that radiological monitoring must be accomplished within twelve hours. However, the legitimate concern of EPZ residents that their protection has diminished through loss of the Hanover reception center will be taken into consideration throughout this process.

K. Pilgrim Restart Process

Since Pilgrim Station remains shut down under a confirmatory action letter by the U.S. Nuclear Regulatory Commission, The Boston Edison Company must follow a regulatory procedure leading to full operation of the power plant. Boston Edison has not as yet made a formal request to the N.R.C. for permission to restart Pilgrim Station. Boston Edison repeatedly has stated that they will not seek permission from the NRC to restart Pilgrim until approval is first received from the company's board of directors.

Moreover, the NRC Region I staff has indicated that an intensive on-site inspection will be conducted and evaluated before any decision is made to recommend restart. Ultimately, the restart decision will be made by the NRC Commissioners. There is disagreement about the opportunity to be given to the state and public to be heard prior to restart. We want the NRC to hold a full adjudicatory hearing in the EPZ while the NRC has recommended only that they hold public meetings. We will continue to insist, as you and the Attorney General have done through the filing of your recent petition, that no consideration be given to restarting Pilgrim Station until a full adjudicatory hearing is conducted.

The NRC has not indicated what consideration will be given to off-site emergency preparedness in their restart deliberations. This is very troubling. When the rules and guidance regarding emergency planning were first issued in 1980, planning was said to be as critical to safety as engineering to the extent that the NRC declared that emergency planning issues must be fully addressed for all nuclear power stations. The Pilgrim case will test the extent to which the NRC remains committed to this fundamental tenet.

VII. CONCLUSION

Our position remains the same as it was in December of 1986. Federal authorities should not permit Boston Edison to restart Pilgrim Station unless and until all safety issues have been fully resolved, including sustained improvement of the nuclear management as demonstrated through, among other indicators, the highest grades in an NRC Systematic Assessment

of Licensee Performance, implementation and completion of a reactor safety program which satisfies all questions regarding the Mark I containment, and development of adequate off-site radiological emergency response plans. We also feel that a successful graded exercise of all off-site plans and facilities must be held, and that the NRC must hold a full adjudicatory hearing within the Pilgrim EPZ before Pilgrim Station is authorized to restart. The process which leads to the satisfactory resolution of all of our safety concerns cannot succeed without a cooperative effort of state and local officials, the Boston Edison Company, and federal regulatory authorities.

12/16/87
Date

Charles V. Barry
Charles V. Barry
Secretary of Public Safety

APPENDIX ONE

The Commonwealth of Massachusetts

In the Year One Thousand Nine Hundred and Eighty-Seven.

AN ACT MAKING AN APPROPRIATION FOR THE FISCAL YEAR ENDING JUNE THIRTIETH, NINETEEN HUNDRED AND EIGHTY-EIGHT, TO PROVIDE FOR SUPPLEMENTING A CERTAIN EXISTING APPROPRIATION.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same, as follows:

SECTION 1. To provide for supplementing a certain item in the general appropriation act, the sum set forth in section two subject to the provisions of law regulating the disbursement of public funds and the conditions pertaining to appropriations in chapter one hundred and ninety-nine of the acts of nineteen hundred and eighty-seven, for the fiscal year ending June thirtieth, nineteen hundred and eighty-eight, the sum so appropriated to be in addition to any amounts available for the purpose.

SECTION 2.

EXECUTIVE OFFICE OF PUBLIC SAFETY, Civil Defense Agency

8800-0100 For matters pertaining to nuclear safety emergency preparedness; provided, that the director of the office of civil defense and emergency preparedness may enter into agreements with other state agencies for the purposes of undertaking this effort; provided further, that the costs of this effort, including fringe benefits and indirect costs, shall be assessed on nuclear regulatory commission licensees operating nuclear power generating facilities in the commonwealth; provided further, that the department of public utilities shall develop an equitable method of apportioning said assessments among said licensees; provided further, that said assessments shall be paid during the fiscal year as provided by the department of public utilities and shall be credited to the general funds; provided further, that funds appropriated herein may be spent for the development and evaluation of radiological emergency response plans for nuclear generating plants licensed to operate at full power and located within the common-

provided further, that in no case may funds from this account be used for the development, evaluation or implementation of radiological emergency response plans for Seabrook station; provided further, that the secretary shall file a report with the joint committee on energy on or before December first, nineteen hundred and eighty-seven, detailing the activities undertaken with regard to this line item provided further, that no expenditures may be made on this item without the prior approval of the secretary of public safety including not more than eleven positions

\$700,000.

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SECTION 3. This act shall take effect upon its passage.

Peter Agnos

7-2275

APPENDIX TWO



MICHAEL S. DUKAKIS
GOVERNOR

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT

CIVIL DEFENSE AGENCY AND OFFICE OF EMERGENCY PREPAREDNESS
400 WORCESTER ROAD
P.O. BOX 1496
FRAMINGHAM, MASS. 01701-0317



ROBERT J. BOULAY
DIRECTOR

July 24, 1987

Mr. Edward A. Thomas, Chief
Natural and Technological Hazards Division
Federal Emergency Management Agency
John W. McCormack Post Office and Court House
Boston, Massachusetts 02109

Dear Mr. Thomas:

This is to advise you that in accordance with Massachusetts law, St. 1979, c. 796, codified as Massachusetts General Laws c. 33 Appendix, section 13-2b, and federal regulations, 10 CFR 50.47 and 44 CFR 350.7, the Commonwealth of Massachusetts has determined that the plume exposure pathway emergency planning zone for the Pilgrim Nuclear Power Station should be reconfigured.

The reconfigured EPZ will include the entirety of the towns of Carver and Marshfield, both of which presently have only a portion of their jurisdiction within the EPZ. Accordingly, based upon our analysis of local conditions and geographical boundaries, the history of off-site emergency planning at Pilgrim Station, and our consideration of the views of state, local, utility, and federal officials, we request that you acknowledge this determination.

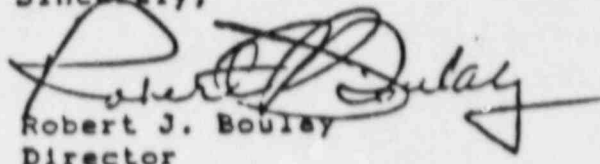
On July 14, 1987, we held a consultation meeting in accordance with 44 CFR 350.7 and 10 CFR 50.47 which was attended by representatives of this agency, the Executive Office of Public Safety, the U.S. Nuclear Regulatory Commission, and the Boston Edison Company.

As discussed at the July 14 meeting, it is also our intention to designate other towns which have a portion of their geographical territory within ten miles of Pilgrim

Station as part of the EP2. This designation will take place after we have completed consultation with each of the concerned communities.

Thank you for your cooperation with this very important matter. ;

Sincerely,



Robert J. Boulay
Director

cc: Assistant Secretary Peter W. Agnes, Jr.
Deputy Director John L. Lovering
Assistant Commissioner Gerald Parker, MDPH
Mr. Ralph Bird, Boston Edison Company
Area II Director Rodger
Mr. Al Slaney, MCDA Area II
Chief Executives of Carver and Marshfield
Civil Defense Directors of Carver and Marshfield



MICHAEL S. DUKAKIS
GOVERNOR

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT

CIVIL DEFENSE AGENCY AND OFFICE OF EMERGENCY PREPAREDNESS
400 WORCESTER ROAD
P.O. BOX 1486
FRAMINGHAM, MASS 01701-0317



ROBERT J. BOULAY
DIRECTOR

July 24, 1987

Mr. William T. Russell, Administrator
U.S. Nuclear Regulatory Commission, Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Thomas:

This is to advise you that in accordance with Massachusetts law, St. 1979, c. 796, codified as Massachusetts General Laws c. 33 Appendix, section 13-2b, and federal regulations, 10 CFR 50.47 and 44 CFR 350.7, the Commonwealth of Massachusetts has determined that the plume exposure pathway emergency planning zone for the Pilgrim Nuclear Power Station should be reconfigured.

The reconfigured EPZ will include the entirety of the towns of Carver and Marshfield, both of which presently have only a portion of their jurisdiction within the EPZ. Accordingly, based upon our analysis of local conditions and geographical boundaries, the history of off-site emergency planning at Pilgrim Station, and our consideration of the views of state, local, utility, and federal officials, we request that you acknowledge this determination.

On July 14, 1987, we held a consultation meeting in accordance with 44 CFR 350.7 and 10 CFR 50.47 which was attended by representatives of this agency, the Executive Office of Public Safety, the U.S. Nuclear Regulatory Commission, and the Boston Edison Company.

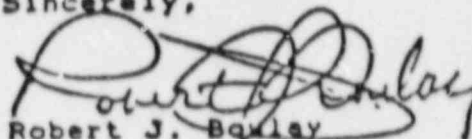
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Station as part of the EPZ. This designation will take place after we have completed consultation with each of the concerned communities.

Thank you for your cooperation with this very important matter.

Sincerely,



Robert J. Bowley
Director

cc: Assistant Secretary Peter W. Agnea, Jr.
Deputy Director John L. Lovering
Assistant Commissioner Gerald Parker, MDPH
Mr. Ralph Bird, Boston Edison Company
Area II Director Rodger
Mr. Al Slaney, MCDA Area II
Chief Executives of Carver and Marshfield
Civil Defense Directors of Carver and Marshfield



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
831 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

SEP 29 1987

OCT 29 11 AM '87

Commonwealth of Massachusetts
Civil Defense Agency and Office
of Emergency Preparedness
ATTN: Mr. Robert J. Boulay
Director
P.O. Box 1496
400 Worcester Road
Framingham, Massachusetts 01701-0317

Dear Mr. Boulay:

In your letter of July 24, 1987, you requested we acknowledge that you have determined the plume exposure emergency planning zone (EPZ) should be reconfigured for the Pilgrim Nuclear Power Station to include the towns of Carver and Marshfield in their entirety. We subsequently understand that this reconfiguration has now been deferred to enable priority attention be given to your ongoing efforts with the current EPZ communities, the Boston Edison Company and FEMA in improving emergency planning and preparedness within the current EPZ. We encourage these efforts to improve emergency preparedness.

Sincerely,

William T. Russell
William T. Russell
Regional Administrator

cc:
E. Thomas, FEMA I
R. Bird, BeCo

130

DIP
2160 - SEC. AREA
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APPENDIX THREE



Bairus Walker, Jr. Ph.D., M.P.H.
COMMISSIONER

The Commonwealth of Massachusetts
Executive Office of Human Services
Department of Public Health
150 Tremont Street
Boston 02111

NUCLEAR POWER PLANT REAL TIME MONITORING SYSTEM (TELEMETRY)

The Massachusetts Department of Public Health is investigating the feasibility and usefulness of a real time monitoring system for nuclear power plants which would involve the transmission of ongoing radiation levels at selected locations within the boundaries and off-site of nuclear power plants to a State facility. This system would allow a State agency to know immediately if and when radiation was released into the environment. Presently only the State of Illinois has a comprehensive real time telemetry system in place. Most of our information has been received from Illinois and the cost estimates are developed based upon figures obtained from the manufacturer of the equipment used in this system.

The program in Illinois involved approximately six years development time and once in place needs constant attention. Since the state-of-the-art in this area changes rapidly, the equipment must be constantly up-dated, modified, or replaced.

The Illinois Department of Nuclear Safety's Remote Monitoring System (RMS) incorporates three major components: gross gamma detectors radially positioned around each nuclear power station; on-line automated, isotopic gaseous effluent monitors which sample from major engineering release points; and an on-line reactor parameter data communication link to each facility's on-site computer. In addition, on-line liquid effluent monitors, which will be located at each plant's liquid discharge points, are scheduled for installation at two sites within the next year. All RMS components are connected through dedicated data communications links to the Illinois Department of Nuclear Safety Radiological Emergency Assessment Center (REAC) located in Springfield, Illinois. At the REAC technical staff, comprised of nuclear engineers, health physicists, and other nuclear safety specialists review the data and perform analyses of plant conditions. This REAC staff is divided into two analytical groups, one concerned with the status of reactor safety systems and the other with environmental assessment.

An estimate of the cost of a monitoring system similar to the existing system was obtained from Reuter Stokes in Cleveland, Ohio. The following is an estimate for a basic system for a single power plant which would allow Massachusetts to add on as needed or as new technology becomes available:

Breakdown of Costs

Remote Sensor	\$16,000	16x16,000	=	\$256,000
Computer (This computer should be able to handle up to 64 remote sensors)	\$100,000			\$100,000
Spare parts	\$18,000			\$ 18,000
Installation per sensor	\$12,000	16x12,000	=	\$192,000
Phone charges	\$2,000/month	12x2,000	=	\$ 24,000
Personnel (One of Each - Scientist, Electronic Engineer, Computer Operator, & Clerical)	\$150,000			\$150,000
Calibration	\$400/unit	16x400	=	\$ 6,400
Maintenance & Repairs	\$30,000			<u>\$ 30,000</u>

Total Estimated Cost \$776,400
(Per power station per
year with 16 remote sensors)

It should be noted that each power station in this country that employs this telemetry system has had 10-16 remote sensor stations. Outside of the U.S. (e.g. Finland or Korea) an average of 10 is common. The State of Illinois estimates that their cost of the telemetry system average calls for two million dollars/reactor. This was due to the cost of development of the system, as well as the fact that the cost of the remainder of the Radiation Control Program was included in their budget process. The Massachusetts' estimates above are based on a proposed program for monitoring a single nuclear power plant.

Information sheets on the Illinois emergency planning and assessment activities are attached.

:pjd

Attachments (5)

THE ILLINOIS PLAN FOR RADIOLOGICAL ACCIDENTS

The Illinois Plan for Radiological Accidents (IPRA) details the program for state-wide, integrated management of nuclear accidents, especially those which might occur at a nuclear power reactor. The primary purpose of the Plan is to provide a coordinated response by state and local governmental officials for the protection of the citizens of Illinois. The Plan includes: general planning to cover the urgency of any nuclear accident; site-specific planning to protect citizens living near nuclear plants; a concept of operations so that the Plan can be effectively carried out; and an effective allocation of resources and personnel. The Plan pre-assigns the duties and responsibilities that would be taken by all the respondents to a nuclear accident, thus enabling actions to be made quickly and efficiently.

The Illinois Department of Nuclear Safety (IDNS) and the Illinois Emergency Services and Disaster Agency (IESDA) share the responsibility for developing the Plan. Specifically, the IDNS is responsible for the technical functions of this effort, and the IESDA is responsible for the operational aspects. The Plan is updated annually for accuracy, and appropriate components are distributed to 18 state, 10 county, and 37 municipal organizations in Illinois, as well as to appropriate organizations in the contiguous states of Iowa and Wisconsin.

Major operations specified in the Plan include:

- o Accident Classification.
- o Operational Response Level.
- o Initial Notification.
- o Accident Assessment.
- o Command and Coordination Responsibilities.
- o Protective Actions: Shelter; Evacuation; Traffic and Access Control; and Food, Water and Milk Control.
- o Parallel Actions: Public Information; Radiation Exposure Control; Law Enforcement and Crime Prevention; Fire and Rescue; Emergency Medical Services; Social Services; and Re-entry.
- o Operation Centers: Location and Responsibilities.
- o Notification of the Public.
- o Emergency Announcements: Information, Shelter, and Evacuation.

RADIOLOGICAL EMERGENCY ASSESSMENT CENTER

The Radiological Emergency Assessment Center (REAC) in Springfield is the command center for the Illinois Department of Nuclear Safety in the event of a nuclear emergency occurring in the State of Illinois. REAC houses the custom-designed, state-of-the-art integrated computer system which continuously identifies and measures all radioactive components being released by nuclear facilities into the environment. The REAC Commander, supported by a highly trained and experienced technical staff, directs the implementation of all tasks associated with the radiological aspects of a nuclear incident.

Support features of the REAC computer system include:

- o Computer Room, 24-hour Radio Communications Center, Commander's Office, and Emergency Command Center.
- o Dedicated air conditioning, emergency standby generator, and special power conditioning to maintain operability during a potential power failure.
- o Eight computer graphics monitors to display engineering drawings, color maps, graphs, and charts.
- o A giant screen projector used to provide a seven-foot-wide image for large group presentations.
- o Status boards to record the changing technical conditions of each power station and in the immediate environs.
- o Maps of the 10-mile and 50-mile Emergency Planning Zones for each reactor.
- o Radio console capable of communication with emergency field teams around nuclear power reactors.
- o Forty-channel tape recorder for permanent records of all communications.
- o An extensive technical library of controlled documents including detailed operating procedures and design features of each Illinois nuclear power station (includes over 50,000 engineered drawings).

REACTOR PARAMETER DATA LINK

The Illinois Department of Nuclear Safety (IDNS) has installed a direct data communication link between the Department's central computer and each nuclear reactor's control room computer for the monitoring of nuclear power reactors and their safety systems. This DNS Data Link (DDL) was developed for early notification of events that could lead to nuclear accidents. DDL is an essential element in providing continuous plant safety assessment, early detection of abnormal conditions, and evaluation of nuclear plant transients.

The DDL signals received in the Radiological Emergency Assessment Center (REAC) are the same signals available to the nuclear plant personnel on-site. The Department selects particular parameters to be transmitted to REAC from an index containing all available plant system information. Parameters selected by the Department provide detailed information on the operating characteristics of all essential plant safety systems.

Major features of the DDL include:

- o 1000-1300 parameters (signals) per reactor transmitted every two minutes.
- o 9 reactors currently providing data and 4 additional reactors to submit data prior to commencing operation.
- o Technical parameters include: reactor power levels, reactor water levels, steam generator water levels, containment temperatures, engineered safety system availability, and essential pump flow rates.
- o System software for displaying either current or historical multiple signals.

Features to be developed include:

- o Analytical software to monitor current data and set off an alarm upon detection of abnormal conditions.
- o Expert System software to diagnose abnormal indications and predict the probable sequence of future events faster than the accident progresses.
- o Continuing software development will increase the speed and reliability of analysis, thereby further ensuring the protection of the health and safety of the citizens of Illinois.

THE RADIOACTIVE GASEOUS EFFLUENT MONITORING SYSTEM

The Illinois Department of Nuclear Safety utilizes a custom-designed automated system to monitor gases routinely released by nuclear power plants. The Radioactive Gaseous Effluent Monitoring Systems (RAGEMS) is designed to identify and quantify the radioactive components of the gaseous discharges to the environment so that appropriate emergency actions can be initiated in the event of a nuclear accident. Although a complete system is currently installed only at the LaSalle nuclear power plant, units will be installed at the Zion and Dresden nuclear power plants in the Fall of 1986. The Department will be installing this equipment in the rest of Illinois's nuclear power stations over the next five years.

The RAGEMS is a state-of-the-art, computerized system which continuously transmits data from the nuclear power plant to the Department's central computer which is located in the Radiological Emergency Assessment Center (REAC) in Springfield. This system includes the following features:

- o Dedicated computer at the power plant sites for operation and analysis.
- o Minimum detection level of $10^{-4.3}$ microCuries/cubic centimeter.
- o Maximum accident detection limit of 10^5 microCuries/cubic centimeter.
- o Collection and analyses of radiation in three forms: Iodines, particulates, and noble gases.
- o Automatic background level checks.
- o Automatic check source verifications.
- o Remote computer access to determine operational status and data.
- o Signal alarms in the event of high radiation levels or failure of a system function.
- o Detection of specific isotopes based on radiation energy.
- o Accelerated operation rates designed to maximize data collection during an accident.

ENVIRONMENTAL RADIATION MONITORING SYSTEM

A ring of environmental radiation monitors (pressurized ion chambers) is installed around each reactor site that would measure a change in radiation levels resulting from a radioactive release at the reactor site. This system serves a multitude of purposes. It will define the existence of a radioactive release sufficiently large to impact upon the environment, as well as detect a release through an unmonitored release path. In addition, the system provides a backup capability should the effluent monitoring system be inoperable and also reveals the presence of atmospheric conditions (wind shear) which could result in plume dispersal not following anticipated direction of travel.

The Environmental Radiation Monitoring System has the following features:

- o Up to 16 monitors per site (one detector for each 22.5 degree segment) at a distance of approximately two miles from the reactor site.
- o Minimum detection level of one microRoentgen per hour. (Natural background levels are approximately 7-10 microRoentgens per hour.)
- o Maximum detection limit is 10 Roentgens per hour (one million times normal background levels).
- o Automatic transmission of radiation readings to Radiological Emergency Assessment Center computer system every eight minutes.
- o Transmission of alarm signals to REAC in the event of high radiation levels or failure of environmental monitoring system components.

APPENDIX FOUR



November 5, 1982

- cc: J. Allan
- R. Starostecki
- T. Martin
- R. Shepherd
- F. Breneman
- R. Hoefling
- W. Kerr, OSP
- Resident Inspectors of PA facilities

Commonwealth of Pennsylvania
 Department of Environmental Resources
 ATTN: Thomas M. Gerusky, Director
 Bureau of Radiation Protection
 Post Office Box 2063
 Harrisburg, Pennsylvania 17120

FNB - 11/15/82

Dear Mr. Gerusky:

Thank you for your letter of August 24, 1982 and your interest in having personnel of the Pennsylvania Department of Environmental Resources accompany NRC regional-based or resident inspectors as observers on inspections of nuclear power plants located in the Commonwealth of Pennsylvania.

For any inspection that you wish to observe, your point of contact in the Region I office is Richard Starostecki, Director, Division of Project and Resident Programs. If accompaniment is approved by regional management, he will make appropriate arrangements with either the regional or resident inspectors. Usually one week's advance notice will be required of your interest in accompanying our inspectors. You should make separate arrangements on a continuing basis with specific licensees to assure your entrance to their facilities.

Because of the nature of investigations, which are normally conducted by a separate office of the Commission, and the requirement for a degree of confidentiality in the conduct of investigations, accompaniment of investigators normally would not be permitted.

Enclosed with this letter is a Protocol for Accompaniment on NRC inspections that you are requested to complete and return to this office. The Protocol summarizes NRC policy in NRC inspection accompaniment and your agreement to abide by the criteria contained therein.

Again, thank you for your interest in our regulatory program and we look forward to cooperation with you.

Sincerely,


 Ronald C. Haynes
 Regional Administrator

Enclosure:
As Stated

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Protocol for Accompaniment on NRC Inspections

Persons employed by the Pennsylvania Department of Environmental Resources may accompany NRC staff on inspections conducted by NRC Region I inspection personnel, under the following terms and conditions:

1. Specific approval for each accompaniment will be obtained from the NRC Region I Office prior to accompanying an NRC inspection.
2. Accompaniment is limited to no more than two individuals on any single inspection.
3. Individuals accompanying NRC inspectors shall not, in any manner, interfere with the orderly conduct of the inspection. NRC inspectors are authorized to refuse to permit continued accompaniment by an individual whose conduct interferes with a fair and orderly inspection or whose conduct does not follow the terms and conditions included within this Protocol. The reports of information obtained by State participants under this Protocol should be subject to supervisory review as are all findings of NRC inspectors.
4. NRC inspectors will not normally object to the presence of individuals accompanying them during inspections or discussions with the licensee regarding inspection matters covered by the accompaniment. The NRC reserves the right to exclude such individuals on a case-by-case basis from any portion of an inspection or a discussion if the presence of such individuals has the potential for impeding the inspector's ability to carry out his inspection.
5. Notwithstanding the other provisions of this Protocol, individuals accompanying NRC inspectors will not normally be provided access to proprietary information or information concerning the physical security plan for a facility. Exceptions to this provision will be considered on a case-by-case basis and may require execution of appropriate non-disclosure agreements.
6. Individuals accompanying NRC inspectors pursuant to this Protocol do so at their own risk. The Nuclear Regulatory Commission will accept no responsibility for injuries and exposures to harmful substances which may occur to such individuals during the inspection and will assume no liability for any incidents associated with the accompaniment. Individuals accompanying NRC inspectors agree to waive all claims of liability against the Commission.

7. The NRC will not make arrangements for the persons accompanying the NRC inspector to gain access to the licensee's facility, but will inform the licensee that the NRC has no objection to the specific individuals accompanying the NRC inspectors. Arrangements to gain access to the licensee's facilities are the responsibility of the accompanying individual, subject to not disclosing the date of the inspection.

Thomas M. Shively
For the Commonwealth of Pennsylvania

11/8/82
Date

SUBAGREEMENT 1
PERTAINING TO LOW-LEVEL RADIOACTIVE WASTE PACKAGE AND
TRANSPORTATION INSPECTIONS
BETWEEN THE
COMMONWEALTH OF PENNSYLVANIA
AND THE
U.S. NUCLEAR REGULATORY COMMISSION

This Subagreement is entered into under the provisions of the Memorandum of Understanding between the Commonwealth of Pennsylvania and the United States Nuclear Regulatory Commission effective November 4, 1986.

The Commonwealth of Pennsylvania, in fulfilling its obligations under the Low-Level Radioactive Waste Policy Amendments Act of 1985 contemplates that it will make periodic inspections of the areas of low-level radioactive waste packages and transport activities of generators located within its borders if shipments of such waste are destined for disposal at a low-level radioactive waste disposal facility.

The United States Nuclear Regulatory Commission (NRC or Commission) has the statutory responsibility to inspect its licensees to determine compliance with NRC requirements, including requirements pertaining to the shipment, packaging and transportation of low-level radioactive waste destined for disposal. In the exercise of this responsibility, the Commission regularly conducts a review of the waste packaging and transportation programs of its licensees including the licensees' procedures for quality assurance, packaging, marking, labeling and loading of vehicles. These program reviews usually have been found adequate to ensure licensee compliance with the Commission's regulations regarding low-level radioactive waste packaging and transportation without the need for Commission inspection of each individual shipment.

Under Section 2741, of the Atomic Energy Act of 1954, as amended, the Commission in carrying out its licensing and regulatory responsibilities under the Act is authorized to enter into a Memorandum of Understanding (agreement) with any State to perform inspections or other functions on a cooperative basis as the Commission deems appropriate. While the Commission does not conduct on-site inspections of every low-level radioactive waste shipment of its licensees, it desires to foster the goals of the Low-Level Radioactive Waste Policy Amendments Act of 1985, the Commonwealth of Pennsylvania, and the Appalachian Compact.

Accordingly, this Subagreement between the Commonwealth of Pennsylvania and the NRC establishes mutually agreeable procedures whereby the Commonwealth may perform inspection functions for and on behalf of the Commission at certain NRC reactor and materials licensees' facilities which generate low-level radioactive waste.

It is hereby agreed between the Commission and the Commonwealth as follows:

1. The Commission hereby authorizes the Commonwealth to perform, for and on behalf of the Commission, the following functions with respect to low-level radioactive waste, as defined in Section 2(9) of the Low-Level Radioactive Waste Policy Amendments Act of 1985, in the possession of Commission licensees located within the Commonwealth:

- (a) Inspections to determine compliance with the Commission's rules and regulations regarding waste packages and transportation of low-level radioactive waste destined for disposal at a commercial low-level radioactive waste disposal site; and
- (b) Notification of Commission licensees and the Commission in writing of any findings disclosed by such inspections. All enforcement actions (such as Notices of Violations, Civil Penalties or Orders) pursuant to this Subagreement resulting from such inspection findings will be undertaken by the Commission.

The Commonwealth agrees to utilize personnel knowledgeable in radiation safety, waste packaging requirements, and packaging and transportation regulations. The Commonwealth agrees to perform its functions under this Subagreement at no cost or expense to the NRC. NRC may provide training to employees of the Commonwealth at no expense to the Commonwealth (except travel and per diem). The Commission does not normally evaluate the Commonwealth's ability to perform such functions; however, prior to Commonwealth qualification of inspectors, Commonwealth management, accompanied by an NRC representative, will assess its inspectors preparedness to conduct independent inspections.

2. The authority to inspect NRC licensees pursuant to the preceding paragraph is limited to the licensees' low-level waste packages and low-level transportation activities. Specifically, this authority is limited to:

- (a) Review, for understanding, the licensee's written procedures;
- (b) Inspection of the licensee's written records; and
- (c) Inspection of completed packages and transportation activities.

The authority does not include assessment of the adequacy of the licensee's written procedures, plant equipment, quality control programs, training programs or staffing. Specific implementing procedures are attached hereto which may be modified, as required.

3. In taking any action authorized hereunder, the Commonwealth shall not undertake to amend or revoke Commission licenses. This Subagreement, however, shall not be construed to preclude the Commonwealth from exercising any authority lawfully available to it under its own laws.
4. Efforts will be made by both parties to avoid duplicative enforcement action against an NRC licensee for the same inspection finding. However, this is not meant to preclude appropriate complementary actions for the same inspection findings such as termination of a user permit by the Commonwealth and NRC enforcement action.

- 5. Nothing herein shall be deemed to authorize the Commonwealth to inspect or otherwise enter the premises of any licensee of the Commission which is a Federal instrumentality, without the prior consent of the licensee.
- 6. Nothing herein shall be deemed to preclude or affect in any manner the authority of the Commission to perform any or all of the functions described herein.
- 7. Nothing herein is intended to restrict or expand the statutory authority of NRC or the Commonwealth or to affect or vary the terms of any agreement in effect under the authority of Section 274b. of the Atomic Energy Act of 1954, as amended.
- 8. Nothing herein shall be deemed to permit the Commonwealth to impose packaging or transport standards beyond those contained in Federal regulations.
- 9. The principal NRC contacts under this Subagreement shall be the Emergency Preparedness and Radiological Protection Branch Chief for reactor licenses and the Nuclear Materials Safety and Safeguards Branch Chief for materials licensees, both of whom are located in the Division of Radiation Safety and Safeguards, Region I, NRC. The principal Commonwealth contact shall be the Chief, Division of Nuclear Safety, Pennsylvania Bureau of Radiation Protection.
- 10. This Subagreement shall become effective upon signing by the Secretary, Department of Environmental Resources, Commonwealth of Pennsylvania, and the Regional Administrator, Region I, Nuclear Regulatory Commission and shall remain in effect permanently unless terminated by either party on thirty days prior written notice.

Dated this 17th day of August 1987 at King of Prussia, Pa.

FOR THE NUCLEAR REGULATORY COMMISSION

William T. Russell
Regional Administrator

FOR THE COMMONWEALTH OF PENNSYLVANIA

Arthur A. Davis
Secretary, Department of Environmental Resources

SEP 1 1987

Dated: _____

IMPLEMENTING PROCEDURES-SUBAGREEMENT 1 PERTAINING TO LOW-LEVEL
RADIOACTIVE WASTE PACKAGE AND TRANSPORTATION INSPECTIONS
BETWEEN THE COMMONWEALTH OF PENNSYLVANIA AND THE NRC

1. TRAINING

A. Pennsylvania staff attendance at NRC Sponsored Courses

1. Pennsylvania staff may attend NRC sponsored training courses when mutually agreed upon by Pennsylvania and NRC.
2. Attendance at any particular course will be scheduled on a space available basis.
3. Staff applying for attendance must fulfill any necessary course prerequisites.
4. Attendance will normally be limited to 1-2 individuals at any one particular course.
5. Pennsylvania will pay any transportation and per diem expenses except for courses offered in connection with the Agreement State Program where NRC pays for travel and per diem of State personnel selected to attend.

B. On-the-Job Training

1. On-the-job training will be provided to the Pennsylvania staff in the conduct of inspections to determine compliance with the requirements in 10 CFR Parts 20, 61 and 71.
2. The training accompaniments will normally be limited to NRC licensees located in the Commonwealth of Pennsylvania.
3. The training accompaniments will follow the protocol set out in Mr. Haynes' November 5, 1982 letter to Mr. Gerusky. Under the protocol, the activities of the individual accompanying the NRC inspector will be limited to observation and familiarization

with plant activities and the NRC inspection process. The NRC inspector will be responsible for initiating action to correct any program deficiencies identified during the inspection through NRC's normal inspection and enforcement process.

4. Commonwealth of Pennsylvania staff accompanying the NRC inspector will normally be limited to two persons - the senior staff member responsible for the program and the cognizant inspector for the plant being inspected.
 5. Emphasis will be placed on training two senior Pennsylvania staff who can learn this area quickly and who, in turn, can begin to train other Pennsylvania staff.
 6. The training may also involve pre-inspection planning at the Regional office or in the NRC resident inspection office prior to the inspection. The Commonwealth inspection staff is expected to have reviewed prior inspection reports, inspection findings, and enforcement actions for the facility being inspected. It is also expected that the Commonwealth inspectors are thoroughly knowledgeable of the NRC inspection procedures and reference material cited in those procedures. These are important parts in preparing for the inspection.
 7. The training accompaniments will be provided by a Region based inspector who routinely inspects waste packaging and transport activities, not the resident inspector or TMI-2 inspection staff.
 8. The contact for the training accompaniment inspections at reactors will be the Chief, Emergency Preparedness and Radiological Protection Branch, Division of Radiation Safety and Safeguards. The similar contact for materials inspections will be the Chief, Nuclear Materials Safety and Safeguards Branch, Division of Radiation Safety and Safeguards. If either of the above are not available the contact will be the Regional State Liaison Officer.
- C. Initiation of Independent Inspections by Pennsylvania Staff
1. The Commonwealth will ensure that its inspectors are qualified in accordance with NRC Inspection and Enforcement Manual Chapter

1245, or its equivalent, and will keep NRC informed of the Commonwealth inspectors that have been so qualified and certified. Prior to Commonwealth qualification of inspectors, Commonwealth management, accompanied by an NRC representative, will assess the performance of its inspectors during an inspection to determine their preparedness to conduct independent inspections. Following the accompaniment, the NRC representative will provide a critique to the inspector and his supervisor. Periodically, Commonwealth management will accompany its inspectors during the performance of inspections to verify the inspector's continued effectiveness. Finally, NRC will inform Commonwealth management of problems identified during the NRC review of Commonwealth inspection findings for appropriate corrective action.

2. Commonwealth inspectors may periodically accompany NRC inspectors during NRC's programmatic inspections to maintain familiarity with a licensee's program and NRC inspection requirements. The Commonwealth and NRC may also meet periodically to exchange information and discuss changes in procedures. Commonwealth inspectors may also contact the region based and resident inspectors prior to or during the Commonwealth's independent inspection at the site.
3. Arrangements to gain access to any licensee's facility are a responsibility of the Commonwealth. Specifically, individuals planning to conduct inspections at reactor facilities should meet all licensee requirements for site access.

II. PROCEDURES TO BE FOLLOWED BY PENNSYLVANIA FOR INSPECTIONS CONDUCTED UNDER THE SUBAGREEMENT

- A. Pennsylvania will perform the following inspection activities relating to 10 CFR 71:
 1. Examine the licensee's written waste shipment records. As the situation allows, observe completed packages so as to:
 - a. Verify that the licensee has marked the package with the applicable general and specific package markings which are required (49 CFR 172.300 through 310).

Verify that for NRC-certified packages, or DOT-revalidated packages of foreign origin, the outside of the package is durably and legibly marked with the package identification marking indicated in the COC or the DOT Competent Authority Certificate.

- b. Verify that for non-exempted packages, the licensee provides for and accomplishes labeling of each package with the appropriate category of RADIOACTIVE (White-I, Yellow-II, or Yellow-III) label, one each on two opposite sides of the package; and accurately completes the entry of the required information in the blank spaces thereon (49 CFR 172, Subpart E).
- c. Verify that the licensee provides for and accomplishes monitoring of each completed package to assure that external radiation and removable surface contamination are within the allowable limits [49 CFR 173.475(i), 49 CFR 173.411, 49 CFR 173.443, and 10 CFR 71.87(i) and (j)].

2. Examine the licensee's written waste shipment records. As the situation allows, observe actual transport operations so as to:

- a. Verify whether the licensee prepared the required shipping paper documentation, so as to accurately include all of the applicable required elements of information, including the shipper's certificate. [NOTE: for licensee private motor vehicle shipments, the certificate is not required (49 CFR 172, Subpart C).]
- b. For non-exclusive use shipments, verify that the licensee provides to a highway carrier or applies directly to a rail vehicle, the required placards whenever he delivers any quantity of RADIOACTIVE-Yellow-III labeled packages to such carrier for transport (49 CFR 172.506 and 508).
- c. For exclusive use shipments, verify that the licensee assures that the package and vehicle radiation/contamination levels are within the regulatory limits [49 CFR 173.475(i) and 10 CFR 71.87 (i) and (j)].

Verify that except for uranium or thorium ores, the transport vehicle is placarded by the licensee when delivering to a carrier any exclusive-use shipment for which placarding is required [49 CFR 172, Subpart F, and 49 CFR 173.425(b)(7)].

For exclusive use shipments, verify that shipping paper documentation provided by the licensee to the carrier contains satisfactory instructions for maintenance of exclusive-use shipment controls [49 CFR 173.441(c) and 49 CFR 173.425(b)(9)].

Verify that for exclusive-use shipments of low-specific activity materials, the licensee has provided for the additional specific requirements [49 CFR 173.425 (b)(1) through (v)].

- d. Verify that the licensee provides for notification to the consignee before shipment, the dates of shipment and expected arrival, any special loading/unloading or operating instructions whenever any non-exempt fissile material and/or packages containing "highway route controlled quantities" are involved [49 CFR 173.22(b) and 10 CFR 71.89].
- e. Verify that the licensee provides for advance notification to the Governor of a State, or his designee, of any shipment of radioactive waste requiring Type B packaging through, to, or across a state boundary (10 CFR 71.97). [NOTE: This requirement is not the same as that required for safeguards purposes pursuant to 10 CFR 73.72.]

3. Review the licensee's records and reports to verify that a system is in place to:
 - a. Maintain on file for two years after shipment a record of each shipment of licensed material (which is not exempt therefrom) and that such records contain the required information [10 CFR 71.87 and 10 CFR 71.91(a)].
 - b. Report to the Director, NMSS, within 30 days, any instances where there has been a significant reduction in the effectiveness of any packaging during its use; providing

additionally the details of any defects of safety significance to the packaging after first use and the means employed to repair such defects to prevent their recurrence (10 CFR 71.95).

- c. Immediately report to DOT, when transporting licensed material as a private carrier, any incident that occurs in which as a direct result of the radioactive material: any person is killed; receives injuries requiring hospitalization; property damage exceeds \$50,000; or fire, breakage, spillage, or suspected radioactive contamination occurs (49 CFR 171.15 and 49 CFR 171.16).

Pennsylvania will perform the following inspection activities relating to 10 CFR Parts 20 and 61:

1. Review the licensee's records and, as the situation allows, observe actual packages and transport activities to verify that each shipment of radioactive waste intended for off-site disposal to a broker or a licensed land disposal facility is accompanied by a shipment manifest which includes all of the required information [10 CFR 20.311(b) and (c)].
2. Review the licensee's documentation and records to determine whether procedures have been established and are being maintained to properly classify all low-level wastes according to 10 CFR 61.55.
3. Review the licensee's documentation and records to determine whether procedures have been established and are being maintained, to properly characterize low-level waste in conformance with the requirements of 10 CFR 61.56).
4. Review the licensee's records and as the situation allows, observe actual packages and transport activities to verify that each package of low-level waste intended for shipment to a licensed land disposal facility is labeled, as appropriate, to identify it as Class A, B, or C waste in accordance with the classification criteria of 10 CFR 61.55 [10 CFR 20.311(d)(2)].

- 5. Review the licensee's records and, as the situation allows, observe actual packages and transport activities to verify that the licensee has forwarded to recipients or delivered to waste collectors at the time of shipment, a copy of the waste manifest. Verify that acknowledgement of receipt of the manifest is obtained. Verify that the licensee has a procedure in place to effect an investigation in any instances wherein acknowledgement of receipt of the shipment has not been received within the specified period. Verify that procedures are in place to report such investigations to the appropriate NRC Regional Office and file the required written report [10 CFR 20.311(d),(e),(f), and (h)].
 - 6. Review the licensee's records to verify that the applicable disposal site license conditions are being met. Verify that the licensee has on file a current version of the disposal site license.
- C. Inspections performed by the Commonwealth for and on behalf of the Commission are not to include those elements of NRC inspection procedures dealing with evaluation of the licensee's written procedures, equipment, quality control programs, training programs or staffing.

III. DOCUMENTATION OF INSPECTION FINDINGS

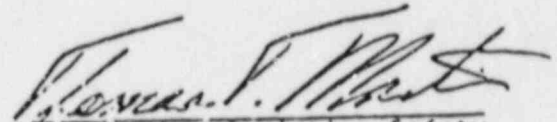
Following each inspection, the Commonwealth will document the areas covered and findings of the inspection in an inspection report using guidance set out in NRC Inspection and Enforcement manual Chapters 0610 and 0611. Following Commonwealth management approval, the report will be sent to the NRC contact listed in Section 9 of the Subagreement with a copy to the licensee. The Commonwealth will complete and forward the inspection report to the NRC within 30 days of completion of the inspection. Following appropriate NRC review, the report will be placed in the Public Document Room and a request sent to the licensee by the NRC for proper corrective action if deemed necessary. For those inspections performed by the Commonwealth which result in deficiencies in compliance with NRC regulations, the Commonwealth shall identify the deficiencies in the cover letter transmitting the report, and specify that any enforcement action is a responsibility of the NRC. In addition, when any findings which would become a violation once the shipment departs the plant gate are identified, such findings should be furnished to the licensee and the NRC Resident Inspector before the shipment departs the licensee's site. It is the Commission's sole discretion as to whether the licensee will be requested or required to take

corrective action or to respond to discrepancies in compliance with NRC regulations as a result of findings from these inspections. Commonwealth inspectors will provide support to NRC during any hearings and other meetings relating to their inspections, as required.

IV. CHANGES TO IMPLEMENTING PROCEDURES

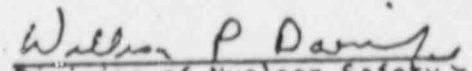
These implementing procedures may be changed by mutual written agreement between the Director, Division of Radiation Safety and Safeguards, NRC, and the Chief, Division of Nuclear Safety, Commonwealth of Pennsylvania.

FOR THE NUCLEAR REGULATORY COMMISSION


 Division of Radiation Safety
 and Safeguards

Dated: AUGUST 17, 1987

FOR THE COMMONWEALTH OF PENNSYLVANIA


 Division of Nuclear Safety

Dated: SEPT 16, 1987



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

July 13, 1987

Richard T. Dewling, Ph.D., P.E.
Commissioner
Department of Environmental
Protection
401 East State Street
CN 402
Trenton, New Jersey 08625

Dear Commissioner Dewling:

This letter is to confirm the general agreement reached as the result of our meetings with Dr. Berkowitz and his staff regarding the surveillance of the nuclear power plants operating in New Jersey. During those meetings we agreed that there was a need to have a more formal way of coordinating NRC and State activities related to plant operations and that the Department of Environmental Protection's Bureau of Nuclear Engineering (BNE) will be the interface with the NRC on a day-to-day basis.

The areas addressed by this letter are:

1. State attendance at NRC meetings with licensees relative to licensee performance, including: enforcement conferences, plant inspections and licensing actions.
2. NRC and BNE exchanges of information regarding plant conditions or events that have the potential for or are of safety significance.

We agree that New Jersey officials may attend, as observers, NRC enforcement conferences and NRC meetings with licensees, including Systematic Assessment of Licensee Performance (SALP) reviews, with respect to nuclear power plants operating in New Jersey (PSE&G, GPUN). We shall give timely notification to the BNE of such meetings, including the issues expected to be addressed. Although I do not expect such cases to arise frequently, we must reserve the right to close any enforcement conference that deals with highly sensitive safeguards material or information that is the subject of an ongoing investigation by the NRC Office of Investigation (OI), where the premature disclosure of information could jeopardize effective regulatory action. In such cases, I would brief you or your staff after the enforcement conference and would expect the State to maintain the confidentiality of the briefing.

With regard to NRC inspections at nuclear power plants in New Jersey, we agree that the BNE staff may accompany NRC inspectors to observe inspections. To the extent practicable, NRC will advise the State sufficiently in advance of our inspections such that State inspectors can make arrangements to attend. In order to assure that those inspections are effective and meet our mutual need I suggest the following guidelines:

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1. The State of New Jersey will make arrangements with the licensee to have New Jersey participants in NRC inspections trained and badged at each nuclear plant for unescorted access in accordance with utility requirements.
2. The State will give NRC adequate prior notification when planning to accompany NRC inspectors on inspections.
3. Prior to the release of NRC inspection reports, the State will exercise discretion in disclosing to the public its observations during inspections. When the conclusions or observations made by the New Jersey participants are substantially different from those of the NRC inspectors, New Jersey will make their observations available in writing to the NRC and the licensee. It is understood that these communications will become publicly available along with the NRC inspection reports.

With regard to communications, we agree to the following:

1. The NRC shall transmit technical information to BNE relative to plants within New Jersey concerning operations, design, external events, etc.; for issues that either have the potential for or are of safety significance,
2. The NRC shall transmit all Preliminary Notifications related to nuclear plant operations for New Jersey facilities to the BNE routinely.
3. The BNE shall communicate to the NRC any concern or question regarding plant conditions or events, and any State information about nuclear power plants.

Please let me know if these agreements are satisfactory to you.

Sincerely,

Original Signed By
WILLIAM T. RUSSELL
William T. Russell
Regional Administrator

APPENDIX FIVE

C



MICHAEL S. DUKAKIS
GOVERNOR

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT

CIVIL DEFENSE AGENCY AND OFFICE OF EMERGENCY PREPAREDNESS
400 WORCESTER ROAD
P.O. BOX 1498
FRAMINGHAM, MASS. 01701-0317



ROBERT J. BOULAY
DIRECTOR

September 18, 1987

Mr. Ralph Bird
Senior Vice President
Boston Edison Company
800 Boylston Street
Boston, Massachusetts

Dear Mr. Bird:

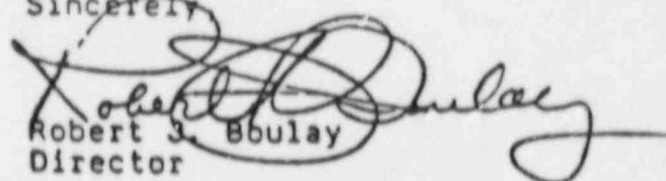
My staff has reviewed the August, 1987 "Study to Identify Potential Shelters in EPZ Coastal Region of the Pilgrim Nuclear Power Station," which was prepared for you by Stone and Webster.

We find that this study is deficient in several respects and that additional work is required to provide information to local officials which is sufficient to support development of implementable shelter utilization plans. I have attached a copy of a memorandum prepared by my staff which details our specific concerns regarding this study.

If you have any questions or observations regarding our evaluation, please contact Buzz Hausner of my staff.

Thank you for your cooperation in this matter.

Sincerely,


Robert J. Boulay
Director

cc: Assistant Secretary, Peter W. Agens, Jr.
Deputy Director, John L. Lovering
Mr. Buzz Hausner



MAEL S. DUKAKIS
GOVERNOR

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE DEPARTMENT

CIVIL DEFENSE AGENCY AND OFFICE OF EMERGENCY PREPAREDNESS
600 WORCESTER ROAD
P.O. BOX 1496
TRAMINGHAM, MASS 01701-0517



ROBERT J. BOULAY
DIRECTOR

TO: DIRECTOR BOULAY
FROM: BUZZ KAUSNER
IN RE: SHELTER SURVEY OF PILGRIM EPZ PREPARED BY BOSTON EDISON COMPANY
DATE: SEPTEMBER 11, 1987

We have made a preliminary review of the shelter survey of the Pilgrim EPZ which was prepared by the Boston Edison Company and its consultants. While this document compiles some very useful data, we feel that more work must be done to estimate the effectiveness of shelter as a protective action.

Our principal concern is that we must be able to put data in the hands of local officials which are sufficient for the development of shelter utilization plans for all areas of all five communities within the Pilgrim EPZ. With this in mind, we have the following comments.

- The survey only covers an area approximately one mile wide along the coast. The shelter capabilities of the entire EPZ must be surveyed and reported.
- The survey does not separate out those structures which could "most reasonably" be used as shelters from those where shelter is less appropriate.

For instance, it would help to have a separate list of public buildings and facilities for each town, including an estimation of the actual useable shelter space and protective factors for shelter under government authority.

- Many of the shelters listed, such as jewelry stores and pharmacies are clearly not suitable for public shelter. In a severe emergency, every available resource will of course be put to use. However, to develop an implementable shelter utilization plan, local officials must be able to match estimated needs with the most appropriate resources available.

- Regarding protection of the beach population, the survey identifies shelters within a mile of the coast but does not indicate the distances that beach goers would have to travel to find shelter. In addition, the survey must demonstrate that adequate proximate shelter is available for the total population at the individual beaches.

For instance, Duxbury beach is about seven miles long and the survey should indicate the distance people at Saquish Head are required to travel to reach adequate shelter. Further, an implementable shelter utilization plan must demonstrate that the nearest shelter would not be full to capacity before the people at the most remote points of the beaches arrived.

- The survey must identify adequate shelter which is handicapped accessible.
- The survey does not distinguish between available space and usable space. For instance, residents of Plymouth have indicated to us that some basements listed in the survey are no more than crawl spaces. Crawl spaces cannot be considered for public shelter. Further, in most buildings, a good deal of floor area will be occupied by machinery, counters, office furniture, et cetera. The survey must identify accurately the actual useable shelter space available in each structure.
- Stone and Webster uses a FEMA nuclear attack value of ten square feet per person to estimate the potential population which can be sheltered. Local Civil Defense Officials may wish to allocate more space -- up to twenty square feet per person -- in their utilization plans. The value used in the survey overestimates the potential capacity of various buildings. We doubt that 17,000 people can be sheltered at Duxbury High School, or that 89,700 can be sheltered at the 5 Cordage Park Buildings.
- The survey must demonstrate that public shelters are free from asbestos and other environmental hazards.
- The report estimates residential "sheltering capability" in individual communities as between 53% and 81%. These figures indicate that a significant number of residents do not have adequate domestic shelter and emphasize the need for a full study of public shelter capacities throughout the entire EPZ.

Further, even if it can be established that the vast majority of residences offer adequate shelter, local officials must be prepared to offer public shelter of a known protective capability to residents who demand assistance.

- This report makes no definitive statement of what constitutes adequate shelter to protect people from the effects of a radiological release from Pilgrim Station. This is necessary to determine what facilities are most appropriate for a local shelter utilization plan and to determine the public shelter needs of each community.

In summary, we would say that this survey is a useful beginning but that much more work is required before we can assess our ability to develop implementable shelter utilization plans consistent with the public safety concerns in Secretary Barry's report to the Governor.

cc: Assistant Secretary Peter W. Agnes, Jr.
Deputy Director John L. Lovering

APPENDIX SIX



The Commonwealth of Massachusetts

Department of Public Safety
State Police, Troop "D", Headquarters
Middleboro, Massachusetts
September 10, 1987

To: Captain Charles F. Henderson, Commanding Troop "D"
From: Lieutenant Edward H. Begin #908

Subject: Review of and Recommendations for Man Power and Equipment Needs relative to Evacuation Time Estimates and Traffic Management Plan Update Final Draft prepared by KLD Assoc., Inc. for Boston Edison Co., Emergency Operations Facility, Plymouth, Mass. dated August 18, 1987.

1. On August 19, 1987, I attended a meeting at Secretary Charles V. Barry's office relative to the proposed traffic management plan update re an evacuation within the Emergency Planning Zone (EPZ) at the Pilgrim Nuclear Power Station (PNPS) located in the town of Plymouth. At that time, a copy of the final draft for review prepared by KLD Associates, Inc. for Boston Edison Company was presented to me for review and recommendations relative to:
 - A. Location of traffic control posts,
 - B. Evacuation routes,
 - C. Personnel resources and
 - D. General review.
2. Based on personal knowledge of traffic patterns within the area to be affected and traffic intensity data provided by sources mentioned in the plan submitted by KLD, which I assume to be correct, the following recommendations are being submitted for your approval.
3. The traffic control posts (TCP) and access control posts (ACP) submitted by KLD appear to be essential in order to complete full evacuation. However, I do have reservations relative to ACP BR-1 and BR-2. (See attached Table L-1, L-51 and L-52) This location, with its close proximity to Boston, would create massive gridlock in the area thus preventing any emergency response from agencies coming from or through that area. It would also deny access to residents of the EPZ who wish to return home for their families.
4. This ACP could be used more effectively if information could be transmitted to motorists traveling in the area. The information could be provided by the radio media and also electronic message signs erected near ACP BR 1 and 2. An additional four to six police officers on motorcycles would be required in that area in addition to the four recommended by KLD to handle the traffic problems in the area in addition to the above additional requirements. A medium sized mobile communications van manned by at least three officers would be utilized at ACP BR 1 and 2 to better handle traffic and other related problems in the area. This van should have the capability to communicate with all State Police agencies as well as local police. It

September 30, 1987

4. Continued

should also have the capability to utilize the telephone communication system via a cellular mobile unit contained within the van. A large 10 KW hour mobile generator would be needed to handle all power requirements at that ACP. This equipment would be stored and maintained at State Police Norwell to better facilitate implementation.

5. Another area of question is ACP BO.1. This area, due to its close proximity to PNPS and large volume of traffic, requires a large mobile communication vehicle capable of communicating directly with all State and local agencies involved in the evacuation and in addition PNPS itself. It should also have three cellular mobile telephones to handle the additional communication needs that would arise from such an incident. This vehicle would be set up at a prearranged area at the Sagamore Rotary which would have been prepared with a power module which could accommodate the electrical and communication hookups necessary to power the communication vehicle. A large mobile generator would also be needed in the event of a power outage. Additional manpower requirements to properly operate the communication vehicle would be needed.

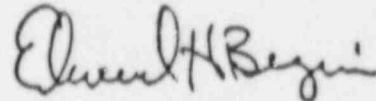
6. It is also necessary to equip each officer assigned to duty at the various ACP and TCP's with hand held radios. This equipment should be comparable and compatible with equipment currently in use within the Division of State Police.

7. I further recommend that telephone equipment be installed in specific vehicles in use by personnel within the Division so that communication could be provided without further straining the radio communication system which would be taxed to the maximum in the event of any evacuation at PNPS. This equipment should be available to the 1) Deputy Superintendent, 2) Commanding Officer of Field Operations, 3) Bureau Commander of Eastern Fields, 4) Troop Commander and 5) entire command staff at Troop "D". Protective clothing and breathing apparatus should be supplied to officers assigned within the five mile radius of PNPS EP2. Personal radiological monitoring devices should be issued to all personnel assigned and training should be provided periodically in its proper usage. All ACPs and TCPs should be equipped with a power module mentioned earlier so that if necessary, emergency lighting and telephone communication could be brought into service if the need became evident. Telephone communication is obvious because of information which should not be monitored by private citizens and news media.

8. I also recommend that a contingency of State Police officers be trained and maintained on a twenty-four hour basis to respond to the various ACP's and TCP's in the event of an emergency at PNPS. This could be accomplished by expanding the "55" Team now deployed in Troop "D". An additional seven troopers and two NCO's would bring the total strength to twenty-five men. This contingency of officers in addition to available personnel would be able to respond to the various ACP's and TCP's within one hour of notification of an ALERT condition at PNPS.

September 30, 1987

9. It must be noted that the personnel requirements can only be met at the ACP's and TCP's located on major limited access highways, Route 6, Route 3, Route 495, Route 128, Route 25, and their immediate approaches. This is due to the availability of manpower at short notice and also the need for minimum manning requirements - one desk officer and two patrols at the five troop mainland substations and at least one commissioned officer, one patrol supervisor and one civilian State Police dispatcher at the troop headquarters. These minimum requirements are absolutely necessary due to excess activity which would be generated as a result of any evacuation order.
10. If the emergency lasted for an extended period (days), additional manpower would be solicited from other areas (District Attorney's offices, neighboring Troop "A" and other sources) so that assistance could be provided to local agencies at the remaining ACP's.
11. The equipment and manpower needs described above are in addition to recommendations offered by KLD and are minimum requirements. It may be that additional manpower and equipment may be necessary in the event of an emergency. I do believe however that the State Police can provide the services necessary at the described locations if the equipment and manpower requests are made available.
12. In addition to the aforementioned personnel and equipment requirements, an adequate supply of printed handouts explaining evacuation routes, reason for evacuation and other pertinent data should be available for distribution at ACP's and TCP's. This would expedite any need for instructions to evacuees thus allowing a smoother flow of traffic at these points.



EDWARD H. BEGIN #908
Lieut., Mass. State Police
DHQ, Middleboro

EHB:dv

Encs.

APPENDIX 1

Brief Explanation of Manpower Availability within Troop "D"

Total Manpower availability of Troop "D" A/O 9-21-87 104

This figure describes the total strength including six officers assigned to the island stations at Nantucket and Martha's Vineyard. 6

Six officers are currently on extended sick leave. Three are currently assigned temporary duty within the Bureau of Investigative Services. One officer is unavailable for duty due to a suspension. This leaves a total working strength of 148 officers currently available for assignment on the mainland. 10

Typical working troop strength, not counting the personnel mentioned above, varies during each 8 hour period from 55 uniformed officers working during the day Monday thru Friday to between 17 and 25 uniformed officers working on the remaining two shifts Monday thru Friday and weekends.

Minimum manning requirements are one desk officer and two patrols at each of five mainland stations. In addition to the above, one commissioned officer and an NCO is assigned duty at the troop headquarters. One civilian State Police Dispatcher is also assigned on a 24 hour basis at the troop headquarters. 17

Typical day strength Monday thru Friday	55 + or - 5
Typical Eve strength Sunday thru Saturday	25 +4 - 8
Typical Mid strength Sunday thru Saturday	20 +5 - 3
Typical weekend Day strength	25 +5 - 8

The remaining personnel are on time off (days off, Vacation, holidays owed, sick leave, personal days) but are available for re-call on an overtime basis.

Manpower requirements in the event of an evacuation at PNPS LF2.

KLD Inc.	28
State Police	45

Personnel available for service less minimum manpower requirements.

Typical day Monday thru Friday	38
Typical eve Sun. thru Sat.	8(+4)
Typical mid Sun. thru Sat.	3(+5)

By supplementing the existing Troop "D" 55 team with an additional 7 troopers and 2 NCO's bringing the total compliment to 27 officers. This group of officers would be trained and equipped to respond within one hour of notification of an emergency at PNPS. The remaining 18 officers needed would be drawn from existing manpower and so trained and equipped.

APPENDIX 2

Equipment Requirements

1. Fifty portable radios which would supplement existing equipment currently in use within the division at Troop "D".
2. Four 10 KW generators to be used at access control points described. (ACP- BR-1, BR-2, BU-1, SA-1)
3. Nine mobile cellular telephones to be utilized as described.
4. Two mobile communications vans, one large, one medium to be equipped as described. (BR-1&2 BU-1)
5. One hundred sixty four dosimeter/one per man.
6. Six air packs to be used by personnel assigned within the 5 mile radius of FNFS. (TCP P-4, P-7, P-8, P-15)
7. Six suits of protective clothing to be used by personnel assigned within 5 mile radius of FNFS. (Same as 6)
8. Sufficient power modules* to provide a source of power and telephone communications to be erected at described sites.

* A power module would be a permanently erected, all weather source of electrical power sufficient to handle any lighting requirements at that site. It would also be equipped with telephone jacks so that communication by telephone could be easily implemented.

APPENDIX SEVEN

November 19, 1987

Mr. Buzz Hausner
Civil Defense Agency
Executive Department
The Commonwealth of Massachusetts
400 Worcester Road
P.O. Box 1496
Framingham, Massachusetts 01701-0317

Dear Mr. Hausner:

As requested in your letter of September 28, 1987, I have reviewed the testimonies of Avishai Ceder and Thomas J. Adler regarding the Seabrook Station evacuation time estimates (ETEs) to see if they have any bearing on your consideration of the Pilgrim Station ETEs.

Dr. Ceder focuses specifically on the behavioral assumptions and parameters of the I-DYNEV traffic simulation model, and concludes that the model can not provide realistic ETEs within a reasonable degree ($\pm 10\%$) of accuracy. Furthermore, he believes that the model is likely to produce ETEs which err on the low side. Dr. Adler concentrates on the input data to the simulation model, and concludes that the ETEs were underestimated, especially for the summer scenarios, and that the complete set of ETEs should be redone.

Each cite a number of reasons for believing that the ETEs were underestimated. First, there are Seabrook-specific ones. One of them relates to the estimation of evacuation traffic from the beach area. Dr. Adler testifies that the ETEs for summer-weekend scenarios should reflect the times required to evacuate beaches which are at 100% of capacity, not at 2/3 capacity (as was done by KLD Associates, having observed 2/3 capacity to be typical of actual use). This and other Seabrook-specific issues will not be commented on here.

Second, there are also a number of technical assumptions which may not be agreed upon among all people in the profession. One of these assumptions is the saturation discharge headway for intersections. Dr. Ceder recommended 2.7 seconds/vehicle, based on an observation of 80 vehicles (R. J. Salter, Highway Traffic Analysis and Design, Addison Wesley, 1974), while KLD used 2.4

seconds/vehicle, taking the high end of the range from a low of 2.1 to a high of 2.4 documented in the Highway Capacity Manual (Transportation Research Board, 1985). No attempt will be made here to resolve differing views about these technical assumptions.

However, there are some major issues raised in the testimony which have direct bearing on your consideration of the Pilgrim ETEs, and which are addressed here.

Simulation of Normal Behavior

The Seabrook ETEs are the result of simulation of normal travel behavior. Effects of potential abnormal or unstable travel behavior in highly congested and stressful situations were not taken into account.

Dr. Ceder points out that only one driver needs to behave in an unstable manner to create a significant disturbance for a long line of vehicles (e.g., a single impatient vehicle occupying part of an intersection and thereby reducing intersection capacity significantly for the cross-flowing traffic).

Dr. Ceder also points out that more traffic accidents are likely to occur during an evacuation, because the traffic safety circumstances during the evacuation process are, in his view, analogous to the circumstances which commonly exist during roadway construction/maintenance work, and that traffic incidents such as vehicle breakdowns due to overheated engines, empty gas tanks, or mechanical failures are very likely to occur during the evacuation. Dr. Ceder concludes that these traffic accidents and traffic incidents will cause additional delays for the evacuating traffic.

Dr. Adler goes one step further and raises the question of whether people will stay with or abandon their cars if circumstances make auto travel considerably slower than walking.

It is likely that at least some of the events described above would occur during an evacuation. However, there are no empirical data to quantify the probability of their occurrence and the severity of their impacts. Therefore, a "what-if" analysis is appropriate. It is suggested that KLD Associates develop Pilgrim ETEs for a range of reductions in roadway capacity for a selected scenario.

Trips from Work to Home

The return-home-from-work trips by employees who reside in the Evacuation Planning Zone (EPZ) were not included in the trip assignment/simulation models for the ETEs. The effects of these trips were implicitly considered by assuming that the capacity of two-way road section will be reduced to a level corresponding to a 90%/10% split of evacuating vs. returning traffic. Dr. Adler

suggests that these work-to-home trips should be explicitly modeled. As you may recall, this topic is discussed in my September 8, 1987, memorandum to Dr. Michael D. Meyer of the MDPW. It is recommended that a sensitivity analysis be performed by including these trips in the trip assignment/simulation process for one of Scenarios 3 through 7, to determine the effect of these trips on the ETEs.

Apparent Errors

Dr. Adler points out two apparent errors in the modeling process. One error is in the calculation of the capacity of freeway ramps under congested flow conditions (service volume at level of service F). While the documentation says that the volume at level of service F is assumed to be 85% of the volume at level of service E, the actual volume used is approximately 94% of the volume at level of service E. It is suggested that a sensitivity analysis be performed by running the model with corrected capacities for a scenario, and that the ETEs for all scenarios be manually adjusted according to the findings of that sensitivity analysis.

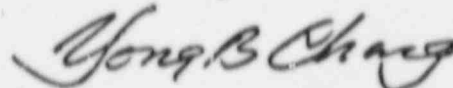
A second error relates to the interpolation method. The I-DYNEV model produces the number of vehicles that have passed through a given area (e.g., the edge of the EPZ) at half-hour intervals. An adjustment procedure is necessary to determine when, during the last 30-minute interval, the area actually cleared. KLD Associates performed the interpolation for all exiting roads combined instead of interpolating individual roads separately and choosing the maximum value. As a result, the ETE computations are biased on the low side by as much as 25 minutes. The Pilgrim ETEs should be corrected. The correction work does not require running the model.

Concluding Remarks

The recommendations made here are focused on (a) correcting apparent errors, (b) refining the modeling process where the model may have been over-simplified, and (c) performing limited what-if analyses for uncertainties during the evacuation.

It is suggested that any time and effort available beyond what is spent on the above recommendations would be best utilized in refining the Pilgrim traffic-management plan.

Sincerely,



Yong B. Chang
Technical Director

YBC:pak

cc: Dr. Michael D. Meyer, MDPW
Matthew Currie, MDPW