

TESTIMONY OF WILLIAM F. KANE  
BEFORE THE  
SPECIAL JOINT COMMITTEE ON THE INVESTIGATION AND STUDY OF THE PILGRIM STATION  
NUCLEAR GENERATION FACILITY AT PLYMOUTH, MASSACHUSETTS  
APRIL 27, 1987

GOOD MORNING. MY NAME IS WILLIAM F. KANE AND I'M THE DIRECTOR, DIVISION OF REACTOR PROJECTS AT THE NRC'S REGION I OFFICE. I WISH TO THANK THE SPECIAL JOINT COMMITTEE ON THE INVESTIGATION AND STUDY OF THE PILGRIM STATION FOR GIVING ME THE OPPORTUNITY TO PRESENT THE NRC'S VIEW OF THE BOSTON EDISON COMPANY'S (BECO) PROGRESS, SINCE THE SHUTDOWN ON APRIL 12, 1986, ON CORRECTING IDENTIFIED DEFICIENCIES AND IMPROVING PERFORMANCE AT PILGRIM. I HAVE KEPT MY PREPARED STATEMENT BRIEF IN ORDER TO ALLOW MORE TIME FOR ANSWERING SPECIFIC QUESTIONS THE COMMITTEE MAY HAVE.

PRIOR TO THE APRIL 1986 SHUTDOWN, THE NRC DETERMINED THROUGH ITS INSPECTION ACTIVITIES AND THROUGH THE SALP PROCESS THAT BECO'S PERFORMANCE IN CERTAIN PROGRAM AREAS WAS WEAK. IN SPITE OF CORRECTIVE ACTIONS TAKEN BY THE UTILITY SINCE 1982, BECO CONTINUED ITS WEAK PERFORMANCE. IN OUR VIEW, THE PRINCIPAL CAUSES OF THESE CONTINUING PROBLEMS INCLUDED: 1) INCOMPLETE STAFFING, IN PARTICULAR, OPERATOR AND KEY MID-LEVEL SUPERVISORY PERSONNEL; 2) A PREVAILING VIEW IN THE ORGANIZATION THAT THE IMPROVEMENTS MADE TO DATE HAD CORRECTED THE PROBLEMS; 3) RELUCTANCE, BY MANAGEMENT, TO ACKNOWLEDGE SOME PROBLEMS IDENTIFIED BY THE NRC; AND 4) DEPENDENCE ON THIRD PARTIES TO IDENTIFY PROBLEMS RATHER THAN IMPLEMENTING AN EFFECTIVE PROGRAM FOR SELF-IDENTIFICATION OF WEAKNESSES. CONSEQUENTLY, FOLLOWING THE PLANT TRIPS WHICH SHUT THE PLANT DOWN IN APRIL, THE

NRC REGION I ADMINISTRATOR EXPANDED THE PREREQUISITES FOR RESTART TO INCLUDE RESOLUTION OF ORGANIZATIONAL AND STAFFING DEFICIENCIES AND HARDWARE ISSUES AT THE PLANT. FURTHER, PERIODIC MEETINGS BETWEEN SENIOR NRC AND BECO MANAGEMENT WERE ESTABLISHED TO MONITOR BECO'S CORRECTIVE ACTION PROGRAMS.

DURING THE SHUTDOWN, BECO HAS MADE SEVERAL ORGANIZATIONAL CHANGES AND STAFFING AND HARDWARE CHANGES AND COMMITMENTS IN AN ATTEMPT TO CORRECT THE LONGSTANDING ISSUES. IN GENERAL, THE NRC VIEWS THESE CHANGES AS POSITIVE WITH THE POTENTIAL TO RESULT IN PERFORMANCE IMPROVEMENT. SOME OF THE MORE SIGNIFICANT CHANGES ARE:

- ASSIGNMENT OF A NEW SENIOR VICE PRESIDENT RESPONSIBLE FOR BECO'S NUCLEAR PROGRAM.
  
- AN ONSITE REORGANIZATION TO ELIMINATE A DUAL REPORTING CHAIN WHICH HAD OBSCURED THE CHAIN OF COMMAND AND WEAKENED ACCOUNTABILITY.
  
- HIRING A NEW OPERATIONS SECTION MANAGER, A CHIEF RADIOLOGICAL ENGINEER, AND FILLING THE MAINTENANCE SUPERVISOR VACANCIES.
  
- APPROVING INCREASES IN THE NUMBER OF LICENSED OPERATOR STAFF AND ACTIVELY RECRUITING CANDIDATES FROM OUTSIDE THE COMPANY.

- STAFFING INCREASES IN THE SECURITY AND FIRE PROTECTION PROGRAM AREAS.
- FORMING A NEW ONSITE SYSTEM SPECIALIST GROUP TO PROVIDE ENGINEERING SUPPORT AND AUGMENTING THE ONSITE QUALITY ASSURANCE AUDITOR GROUP.
- INITIATION OF A MAINTENANCE BACKLOG CLEARING PROGRAM AND WORK PLANNING PROCESS.
- INCREASING CORPORATE NUCLEAR ENGINEERING DEPARTMENT PRESENCE ONSITE.
- INCREASING THE EMERGENCY PREPAREDNESS STAFF AND COMPLETING THE NEW EMERGENCY OPERATIONS FACILITY.
- EXTENDING OVERTIME CONTROLS TO ALL EMPLOYEES.
- INITIATION OF A MAJOR EFFORT TO CLEAN UP THE CONTAMINATED AREAS OF THE PLANT.
- INITIATION OF THE SAFETY ENHANCEMENT MODIFICATIONS TO IMPROVE THE CONDITION AND SAFETY OPERATION OF THE PLANT.
- COMPLETION OF THE PLANT SPECIFIC SIMULATOR AND INITIATION OF TRAINING ON IT.

HOWEVER, WHILE SOME IMPROVEMENT HAS BEEN MADE, THE NRC FOUND PROGRESS HAS BEEN SLOW DURING THIS OUTAGE ON RESOLVING IDENTIFIED PROBLEMS. MANY OF THE CHANGES NOTED ABOVE HAVE NOT BEEN FULLY IMPLEMENTED OR IN-PLACE LONG ENOUGH TO DETERMINE THEIR EFFECTIVENESS OR DURABILITY. NONETHELESS, THEY DO INDICATE A CHANGE OF ATTITUDE BY BECO. THE DEFENSIVENESS AND RELUCTANCE TO RECOGNIZE PROBLEMS ARE BY AND LARGE GONE FROM BECO'S APPROACH. IT IS CLEAR THAT BECO SENIOR CORPORATE MANAGEMENT IS COMMITTED TO ESTABLISHING EFFECTIVE LEADERSHIP OF ITS NUCLEAR PROGRAM AND HAS TAKEN STEPS TO PROVIDE ADEQUATE STAFFING AND IMPROVE ACCOUNTABILITY. ALSO, THE INCREASE IN THE SITE SUPPORT FUNCTIONS PROVIDES BECO THE OPPORTUNITY TO IDENTIFY PROBLEMS AND REDUCE DEPENDENCE ON THIRD PARTIES. THE DECISION THAT EXTENDED THE OUTAGE TO CORRECT MANAGEMENT AND HARDWARE PROBLEMS INDICATES THAT BECO RECOGNIZES THERE ARE PROBLEMS AND HAS TAKEN STEPS TO IDENTIFY THE SCOPE OF THE PROBLEMS AND ACTIONS TO RESOLVE THEM.

AS THE COMMITTEE IS AWARE, THE NRC RECENTLY ISSUED THE PILGRIM SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE (SALP) FOR THE 15 MONTH PERIOD NOVEMBER 1, 1985 THROUGH JANUARY 31, 1987. THE REPORT IDENTIFIES THE SPECIFIC IMPROVEMENTS BECO HAS MADE. MOST NOTABLE WERE: A SIGNIFICANT REDUCTION IN THE NUMBER AND EXTENT OF CONTAMINATED AREAS IN THE PLANT; COMPLETION OF A NEW EMERGENCY OPERATIONS FACILITY; AND IMPROVEMENTS IN THE LICENSED OPERATOR TRAINING AND REQUALIFICATION PROGRAMS. HOWEVER, THE REPORT ALSO IDENTIFIES RECURRING PROGRAMMATIC WEAKNESSES IN SEVERAL FUNCTIONAL AREAS INCLUDING: RADIOLOGICAL CONTROLS; SURVEILLANCE; FIRE PROTECTION; SECURITY; AND ASSURANCE

OF QUALITY. THE NRC BELIEVES THE LOW SALP GRADES REFLECT THE MAGNITUDE OF THE PROBLEMS AND CONFIRMS BECO'S PRUDENCE IN EXTENDING THE OUTAGE TO RESOLVE THEM. THE NRC ALSO BELIEVES THAT THE CHANGES MADE DURING THE SALP PERIOD AND TWO OTHER CHANGES, THE ASSIGNMENT OF THE NEW SENIOR VICE PRESIDENT-NUCLEAR OPERATIONS AND THE ELIMINATION OF THE DUAL HEADED ONSITE ORGANIZATION, MADE AFTER THE SALP PERIOD ARE ESPECIALLY SIGNIFICANT AND WILL PROVIDE A SOLID FOUNDATION FOR FUTURE IMPROVEMENT.

CURRENTLY, BECO REQUIRES NRC APPROVAL PRIOR TO RESTARTING PILGRIM. BECO IS AWARE THAT THE NRC IS LOOKING FOR PROGRESS IN CORRECTING THE IDENTIFIED PROBLEMS PRIOR TO OBTAINING THAT APPROVAL. BECO IS REQUIRED TO SUBMIT A FORMAL READINESS FOR RESTART ASSESSMENT AND A RESTART SCHEDULE FOR NRC REVIEW AND APPROVAL. THE NRC ALSO INTENDS TO CONDUCT AN INDEPENDENT IN-DEPTH READINESS ASSESSMENT TEAM INSPECTION PRIOR TO APPROVING RESTART TO ENSURE THAT THE PROBLEMS HAVE BEEN SATISFACTORILY RESOLVED AND THE PLANT IS READY FOR SAFE OPERATION. IN ADDITION, PILGRIM, AS A HIGH PRIORITY SITE, HAS AND WILL CONTINUE TO RECEIVE A CONSIDERABLE AMOUNT OF THE REGION I INSPECTION RESOURCES. THIS INCLUDES PERMANENTLY ASSIGNING THREE RESIDENT INSPECTORS TO THE SITE, SUPPLEMENTED WITH PERIODIC INSPECTIONS BY EXPERIENCED RESIDENT INSPECTORS FROM OTHER SITES, AND PROGRAMMATIC REVIEWS OF ALL SALP FUNCTIONAL AREAS BY REGION BASED SPECIALIST INSPECTORS.

IN SUMMARY, THE NRC BELIEVES BECO IS TAKING MANY STEPS TO RESOLVE THE LONGSTANDING PROBLEMS AT PILGRIM. HOWEVER, TO DATE, PROGRESS HAS BEEN SLOW. THE NRC INTENDS TO CONTINUE TO CLOSELY MONITOR BECO IMPROVEMENT PROGRAMS TO ENSURE THAT THE ACTIONS TAKEN DO RESULT IN REAL PROGRESS AND THAT THE IMPROVEMENTS MADE WILL BE PERMANENT. AGAIN, I WANT TO THANK THE COMMITTEE FOR GIVING ME THE OPPORTUNITY TO PRESENT THE NRC'S VIEW OF BECO'S PROGRESS THUS FAR DURING THE OUTAGE, AND I AM PREPARED TO ANSWER ANY QUESTIONS THE COMMITTEE MAY HAVE.

THE COMMONWEALTH OF MASSACHUSETTS

REPORT  
OF THE  
SPECIAL COMMITTEE  
ESTABLISHED FOR THE PURPOSE  
OF MAKING AN INVESTIGATION AND STUDY

RELATIVE TO

THE PILGRIM NUCLEAR GENERATING  
FACILITY AT PLYMOUTH

UNDER THE PROVISIONS  
OF SENATE ORDER 2044  
ADOPTED IN THE YEAR 1986

JULY 1987

E/11

## RECOMMENDATIONS

- I) Creation of the Division of Nuclear Facilities Safety.
- II) Endorsement of Comprehensive Load Management and Conservation Programs.
- III) Prioritize Massachusetts Based Electrical Generating Facilities.
- IV) Department of Public Utilities to Establish a Five-Year Supply Plan without reliance on the Pilgrim Plant.
- V) Committee Review of the Nuclear Regulatory Commission (NRC) Systematic Assessment of Licensee Performance Report (SALP) and Recommended Measures to Correct Serious Functional Deficiencies at the Pilgrim Nuclear Generating Facility at Plymouth.
- VI) Improved Emergency Preparedness Plan.



RECOMMENDATION I

## RECOMMENDATION I

### CREATION OF A DIVISION OF NUCLEAR FACILITY SAFETY

After many hours of deliberation over topics such as emergency preparedness and planning, monitoring of radiation and other aspects of nuclear safety, the committee has concluded that many areas regarding public safety need immediate attention and improvement. After reviewing and hearing the testimony of the Department of Public Health (DPH) and the Department of Public Safety, the committee concluded that lack of funding, along with shortfalls in strict compliance with many sections of Chapter 796 of the acts of 1979, have led to a less than appropriate handling of radiation monitoring and emergency preparedness. The committee, therefore, recommends that the Commonwealth adopt and implement the formation of a Division of Nuclear Facility Safety to oversee nuclear generated power production in the Commonwealth.

The Division of Nuclear Facility Safety shall provide the following provisions and services:

The Division of Nuclear Facility Safety shall be a division of the Department of Public Safety and shall be responsible for monitoring the operation and modification of the two nuclear power plants within the Commonwealth. In addition, it shall be responsible for developing emergency response plans in conjunction with Massachusetts Civil Defense for responding to accidents involving nuclear power plant facilities. Major activities shall include: installation, operation and maintenance of a system for remote monitoring of radioactive discharges from the nuclear power plants, in conjunction and under the supervision of the Department of Public Health; development and review of the Massachusetts Radiological Accident Emergency Preparedness Plan (MRAEPP); oversight of training of state and local civil defense personnel responsible for implementation of the MRAEPP. Enforcement of rules and regulations prescribing standards for in service testing of pressurized systems at nuclear power plants which the Department of Public Safety oversees.

- 1) The Massachusetts Radiological Accident Emergency Preparedness Plan.

The Massachusetts Radiological Accident Emergency Preparedness Plan shall establish a program for statewide, integral management procedures in the event of an accident which may occur at a nuclear power reactor site. 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 the Commonwealth. The plan shall include site specific planning to cover the urgency of protecting 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 shall pre-assign 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 Massachusetts Division of Nuclear Facility Safety and the Massachusetts Civil Defense Agency shall share the primary responsibility for developing the plan with integral component agencies such as the state police and the Emergency Planning Zone (EPZ) communities' local officials. The utilities' security and safety personnel must also play a major role in planning. Specifically, the Division of Nuclear Facility Safety shall be responsible for the technical functions of this effort, and the Civil Defense Agency shall be responsible for the operational aspects. The plan shall be reviewed every year for accuracy and proper appropriation to assure a fully functional quality plan. The appropriate components shall be distributed to the proper state, county and municipal agencies and organizations in the Commonwealth for implementation.

The Division of Nuclear Facility Safety shall plan to expand the EPZ to 50 miles from each reactor with the understanding that greater planning and preparedness efforts are necessary closer to the reactor and that evacuation will not likely be recommended for all areas within a 50 mile radius. These plans should be tailored to meet each community's specific needs.

The Division of Nuclear Facility Safety shall clarify evacuation plans for regional schools which have students from at least one, but not all, towns in the school system which are part of an EPZ. Division and Civil Defense officials working with school administrators and parents' groups must develop workable student and teacher evacuation plans and establish criteria for determining when, if ever, it would be appropriate to send children home first to evacuate with their families.

The Division of Nuclear Facility Safety shall establish emergency evacuation time estimates and traffic control plans based on evacuations of people within the EPZ to reception centers at least 30 miles from the reactor and should anticipate secondary or shadow evacuations.

The Division of Nuclear Facility Safety shall commission a site-specific probabilistic risk analysis of severe accident probabilities at Pilgrim and the consequences of radioactive releases and the probable health effects at various distances from the plant.

Major operations specified in the Plan and agency responsibilities are outlined in Recommendation VI.

2) Monitoring.

The committee recommends that the Division of Nuclear Facility Safety and the Department of Public Health adopt and develop a Remote Monitoring System (RMS) which shall incorporate three major components: gross gamma detectors radially positioned around each nuclear power station; an automated, isotopic gaseous effluent monitor system which samples from major engineering release points; and a reactor parameter data communication link to each facilities on-site computer. In addition there shall be provided liquid effluent monitors, which will be located at each plant's liquid discharge points. All of these RMS components shall be connected through a dedicated data communications link to provide instantaneous readings to the Division of Nuclear Facility Safety Headquarters. Technical staff shall review the data and perform analyses of plant conditions.

a) ENVIRONMENTAL RADIATION MONITORING SYSTEM: The Division of Nuclear Facility Safety shall develop a dual ring system of environmental radiation monitors utilizing gross gamma detectors and automated isotopic detectors which shall be installed and maintained around each reactor site that would measure a change in radiation levels resulting from a radioactive release at the reactor site. This system shall serve a multitude of purposes. It shall define the existence of a radioactive release sufficiently large enough to impact upon the environment, as well as detect a release through an unmonitored release path. In addition, the system shall provide a backup capability should the effluent monitoring system be inoperable, and shall also help reveal the presence of atmospheric conditions (windshear) which could result in plume dispersal not following anticipated direction of travel.

The Environmental Radiation Monitoring System shall be developed to provide the following features: (1) up to 16 monitors per site (1 detector for each 22.5 degree segment) at a distance of approximately 2 miles from the reactor site; (2) minimum detection level of 1 microRoentgen per hour (natural background levels are approximately 7 to 10 microRoentgens per hour); (3) maximum detection limit is at least 10 Roentgens per hour (one million times normal background levels); (4) automatic transmission of radiation readings to the Nuclear Facility Safety Division headquarters computer system every 8 minutes; and (5) transmission of alarm signals to the Nuclear Facility Safety Division headquarters in the event of high radiation levels or failure of environmental monitoring system components.

b) REACTOR PARAMETER DATA LINK: The Massachusetts Division of Nuclear Facility Safety shall install a direct data communication link between the Division headquarters computer and each nuclear reactor's control room computer for the monitoring of the Commonwealth's two nuclear power reactors and their safety systems. This data link shall be developed for early notification of events that could lead to nuclear accidents. This system is an essential element in providing continuous plant safety assessment, early detection of abnormal conditions, and evaluation of nuclear plant transients.

The system signals to be received at the Division's headquarters shall be the same signals available to the nuclear plant personnel on-site. The Division shall select particular parameters to be transmitted to them from an index containing all available plant system information. Parameters selected by the Department provide detailed information on the operation characteristics of all essential plant safety systems.

Some major features that are available that may be included in this system are: (1) 1,000 to 1,300 parameters (signals) per reactor accessible for transmission every two minutes; (2) technical parameters including reactor power levels, reactor water levels, steam generator water levels, containment temperatures, engineered safety system availability, and essential pump flow rates; and (3) system software for displaying either current or historical signals.

c) THE RADIOACTIVE GASEOUS EFFLUENT MONITORING SYSTEM: The Division of Nuclear Facility Safety and the Department of Public Health shall be directed to utilize and implement a custom designed automated system to monitor gases routinely released by nuclear power plants. The Radioactive Gaseous Monitoring System is designed to identify and quantify the radioactive components of the gaseous discharges from each stack and other gaseous release points to the environment and transmit the information immediately to the Division so that appropriate emergency action can be directed in the event of a nuclear accident.

The Radioactive Gaseous Effluent Monitoring System is a state of the art, computerized system which continuously transmits data from the nuclear power plant to the Division's headquarter computer.

This system includes the following features: (1) dedicated computer at the power plant sites for operation and analysis; (2) minimum detection level of 10 to 13 microCuries/cubic centimeter; (3) maximum accident detection limit of 10 microCuries/cubic centimeter; (4) collection and analyses of radiation in three forms: iodines, particulates, and noble gases; (5) automatic background level checks; (6) automatic check on source verifications; (7) remote computer access to determine operational status and data; (8) signal alarms in the event of high radiation levels or failure of a system function; (9) detection of specific isotopes based on radiation energy; and (10) accelerated operation rates designed to maximize data collection during an accident.

d) EMISSION STANDARDS: It is essential that Massachusetts Public Health Officials review and determine the maximum permissible levels of airborne radioactive emissions from nuclear power plants that do not threaten the public health and safety. By adopting state emission standards as authorized by the Clean Air Act amendments of 1977, the Commonwealth will ensure that safe standards are in place and strictly enforced. Until such standards are set by the Department of Public Health, the federal

RECOMMENDATION I I

standards should be adopted as state standards so that the state officials immediately have the power to inspect onsite and off-site monitoring equipment and have independent enforcement authority over emissions. The state shall assess all licensees for the cost of setting up a monitoring system for the Commonwealth.

Perhaps the most important safety function of a monitoring system is to assist emergency response officials in determining the extent of a serious accident and the amount and direction of radiation releases. We recommend installation of a comprehensive and sophisticated new monitoring system similar to the one that is already installed and functioning in Illinois to provide substantially more public protection.

3) Possible Adverse Health Effects From Pilgrim  
Radioactive Emissions

a) Radiation exposure can cause cancer, birth defects and chromosomal damage. The Department of Public Health has determined that there has been a significant increase in leukemia cases in the area surrounding Pilgrim, although the department is still studying what the cause of those leukemias may be.

b) The Special Committee recommends that four health studies be conducted:

1) A follow-up study on the leukemia cases in the Plymouth area to determine what environmental or occupational exposures may have caused those leukemias.

2) A study to test the theory that coastal winds may concentrate the radioactive emissions from the Pilgrim plant in such a way as to cause adverse health consequences in coastal areas.

3) A regional study of adverse health impacts, including leukemia incidences, birth defects and infant mortality, downwind from other nuclear reactors in New England.

4) A health study of all past and present Pilgrim employees to determine the adverse effects, if any, of exposure to radiation from Pilgrim.

4) The cost of the Division of Nuclear Facility Safety and the Department of Public Health's monitoring system should not be borne by all taxpayers but by the utility ratepayers through an assessment of the nuclear plant licensees..

## RECOMMENDATION II

### ENDORSEMENT OF COMPREHENSIVE LOAD MANAGEMENT AND CONSERVATION PROGRAMS

The special committee investigating the Pilgrim Nuclear Generating Facility reviewed testimony involving energy supply, load management and conservation measures during several hearings. The committee concluded that in order to meet current and future power supply demands all utilities in the Commonwealth must implement stringent load management and conservation programming. The committee stresses that authority should be given to the Department of Public Utilities to oversee the implementation of aggressive load management and conservation programs for any electric utility relying on the continual operation of the Pilgrim Generating Facility.

#### LOAD MANAGEMENT:

The committee endorses the concepts contained in the Final Report of the Boston Edison Review Panel as they relate to increased load management programs by Boston Edison Company. The committee recommends that the Department of Public Utilities (DPU) be required to encourage and assist Boston Edison in implementing the specific load management programs. The DPU shall also be required to encourage and assist Commonwealth Electric Company in implementing appropriate cost-effective load management programs that offer the company similar energy-saving results.

Boston Edison Company should identify and fund effective "load management" measures, such as radio-controlled water heaters and nighttime water chilling systems, which reduce peak energy use and are cheaper than the cost of producing electricity from new power plants. In addition, the utility should provide incentives for commercial and industrial sector customers to form "load-shedding cooperatives," where a group of participants agrees to share minimal energy use reductions during peak demand emergencies.

#### CONSERVATION:

The special committee endorses the concepts contained in the Final Report of the Boston Edison Review Panel as they relate to increased, cost-effective conservation programs by Boston Edison Company. The DPU should be required to encourage and assist Boston Edison in implementing the specific conservation programs. The DPU shall also be required to encourage and assist Commonwealth Electric Company in implementing appropriate, cost-effective conservation



programs that offer the company similar energy-saving results. The DPU should direct all utilities to make significant investments in energy conservation and energy efficiency programs, known as "demand-side management" programs, to reduce the energy demand of all utilities' customers. The DPU should set target investment levels and participate in the design of demand-side management programs. Such programs should include, but not be limited to the following, where shown to be cost effective:

- 1) The special committee recommends all utilities should employ design teams to go into buildings that use large quantities of electricity to identify the full package of demand-side management measures and practices that are cheaper than the utilities commensurate cost of producing electricity from new power plants over the useful life of the conservation measures. The utility should then fund the purchase and installation of identified cost-effective measures.
- 2) All electric utility companies should offer their customers incentives for a wide range of efficiency measures. This incentive program should go far beyond the limited scope of current and prior utility rebate programs for refrigerators and efficient lights.
- 3) All electric utility companies should also provide incentives for electrical energy efficiency in new construction including hook-up fee and penalties.
- 4) All electric utility companies should convene an auction for energy efficiency improvements similar to the bidding process that is currently being used to promote the development of small power and cogeneration facilities.
- 5) The committee recommends that the DPU should be allowed to provide all utilities with a profit, or "rate of return" on the investment the company makes in demand-side management programs. This rate of return, to be recovered from the company's ratepayers, could be at least as high and or up to two percentage points higher than the rate the utilities are authorized to receive for capital investments in new power plants.

RECOMMENDATION III

### RECOMMENDATION III

#### PRIORITIZE MASSACHUSETTS BASED ELECTRICAL GENERATING FACILITIES

I. The Committee recommends that the Energy Facilities Siting Council and the Department of Public Utilities give priority consideration to the construction of non-nuclear electric generating plants located within the Commonwealth when reviewing the plans of any electric utility for the construction of a new generating plant.

The Massachusetts General Laws and regulations promulgated by regulatory agencies require utility companies to provide ratepayers with electricity at the lowest possible economic cost and with the least possible environmental impact. In planning to meet the electrical energy needs of ratepayers, the Department of Public Utilities, the Energy Facilities Siting Council, and the utilities should consider and evaluate the following factors:

- 1) The full "life cycle" economic costs of each energy resource option. These include costs for construction, financing, operation and maintenance, and decommissioning. With respect to energy efficiency and load management programs, costs for materials and installation and program administration should be considered.
- 2) The full environmental costs of each energy resource option. Environmental impacts associated with the siting of facilities, degradation of outdoor and indoor air quality, potentially adverse impacts on water quality, and risks to public health should all be fully considered when deciding which energy option to pursue.
- 3) The number of jobs created by the use of each energy resource option. The number of long and short-term jobs that are directly and indirectly created as a result of developing various energy resource options should be considered and compared. Other state and local economic development costs and benefits, such as support of indigenous industry and inflows or outflows of capital resulting from development of each energy resource option should also be considered.

4) The reliability of the energy resource option. Massachusetts needs affordable and reliable energy resources to help sustain a healthy economy. Energy resource options that decentralize and diversify the region's fuel mix, and which reduce reliance on non-indigenous fuels, should be prioritized.

All potential resource options--including energy efficiency improvements and practices, load management measures and practices, small power production, co-generation, and small and large oil, natural gas and clean coal technologies should be evaluated and compared using the above criteria.

The Committee believes that priority should be given to Massachusetts based plants. The Committee is concerned about the increased dependence on plants located outside Massachusetts for our electric generating needs. It believes that this trend increases the likelihood of supply disruptions, thereby complicating unduly our ability to forecast long range supply. This trend of reliance on plants outside Massachusetts is also detrimental to our economy, since it creates jobs in other states that would otherwise benefit Massachusetts workers.

RECOMMENDATION IV

RECOMMENDATION IV

DEPARTMENT OF PUBLIC UTILITIES TO ESTABLISH A FIVE-YEAR SUPPLY  
PLAN WITHOUT RELIANCE ON THE PILGRIM PLANT

The Committee has found that the Pilgrim Nuclear Generating Facility at Plymouth, Massachusetts has suffered from serious and continuous mismanagement. Although significant efforts are being made by its owners to rectify the management problems, considerable uncertainty remains over the reliability of the plant to contribute to the electric supply needs of the Commonwealth.

The Committee therefore recommends that the Department of Public Utilities (DPU) establish a five-year plan for ensuring adequate supply without consideration of the electrical production of Pilgrim plant. Due to the uncertain future of Pilgrim, the DPU should establish a supply plan for the Commonwealth that does not require any dependence on the Pilgrim plant. Such plan shall include a forecast of future supply and demand which delineates each source of power and its location. January 1, 1988 is the due date for the implementation of the initial five-year plan.

The Committee recommends that in determining whether to restart the Pilgrim Nuclear Power Plant, the availability of sufficient cost effective and safe alternate energy resources shall be taken into consideration.

RECOMMENDATION V

## RECOMMENDATION V

### COMMITTEE REVIEW OF THE NUCLEAR REGULATORY COMMISSION (NRC) SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE REPORT (SALP) AND RECOMMENDED MEASURES TO CORRECT SERIOUS FUNCTIONAL DEFICIENCIES AT THE PILGRIM NUCLEAR GENERATING FACILITY AT PLYMOUTH

The Pilgrim nuclear power plant has a well documented, and well publicized, history of problems. This history has called into question both the level of safety when Pilgrim is operating and Boston Edison's ability to run the plant. With an issue as emotional as nuclear power the loss of public confidence must be addressed in addition to the actual safety problems.

Massachusetts, particularly residents of Southeastern Massachusetts, have every right to demand that Pilgrim be one of the best run plants in the country rather than one of the worst. Clearly the initiative for this belongs to Boston Edison. Pilgrim has been "off-line" for more than a year. During that time the utility has undertaken significant initiatives to improve its performance. In some cases they have taken a lead in the nuclear industry to address certain problems. More work remains to be done, however, and how effective the company is in its work will have to be judged when it is completed.

This is neither a "pro-nuclear" nor an "anti-nuclear" report. The committee feels that where there are problems, they must be addressed, prior to restart, and that the plant should not operate until all major deficiencies are corrected. Individual members will have their own views on nuclear power but everyone agreed that the overriding issue here was not to resolve the nuclear debate but to address the problems of one particular plant.

The committee heard testimony on specific operations and plant problems from Boston Edison, the Nuclear Regulatory Commission, and representatives from citizen groups. In addition, the committee has had access to Public Safety Secretary Charles Barry's report to the Governor on the plant and volumes of NRC reports.

To try and identify every single problem and the appropriate solutions would be beyond the committee's capability and jurisdiction. The sheer number of technical matters, the lack of expert staff, and the debate within scientific and regulatory circles over some issues made it unrealistic for us to devise the specific solutions to many particular problems. Likewise, it makes little sense to list every specific problem since it would make more difficult our aim to focus public attention on the most substantive problems.



The committee does feel, though, that it is useful for the Legislature to summarize the patterns of problems and our perceptions of the work which needs to be done. This, we hope, will not only focus greater attention on the major problems but also give the Legislature and the public some standard by which we can measure Edison's progress.

The NRC, on many occasions, has claimed it will force Edison to prove significant improvements before restart is allowed. As part of their process they will develop a detailed check list of matters requiring solutions. The committee urges the NRC to include our concerns as part of that process. If addressed, we feel plant safety will be enhanced and public confidence raised.

The Nuclear Regulatory Commission recently issued the Pilgrim Systematic Assessment of Licensee Performance (SALP) for the 15 month period of November 1, 1985 through January 31, 1987. SALP is a comprehensive assessment of the plant analyzed into twelve functional areas. The report identifies recurring programmatic weaknesses in five functional areas including: radiological controls; surveillance; fire protection; security and assurance of quality.

These five functional areas received low SALP grades of 3. The NRC rates on a 1, 2, and 3 basis and defines a 3, the lowest rating, as follows:

"Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considered nuclear safety, but weaknesses are evident; licensee resources appear to be strained or not effectively used so that minimally satisfactory performance with respect to operational safety is being achieved."

The following is an outline of the problems in each of the five functional areas as reported by the NRC, followed by the committee's recommendations.

- (1) RADIOLOGICAL CONTROL - This assessment covers radiation protection, effluent monitoring and controls, radwaste shipping and environmental monitoring. SALP found that the licensee made numerous improvements in the overall quality of the radiological controls program. However, implementation of the program continues to be weak. When problems with program implementation or adequacy are identified, corrective actions are sometimes not adequate or not implemented resulting in the need for further NRC involvement. In the area of effluent monitoring and control, the licensee implemented the

new effluent technical specifications in a generally acceptable manner, however, failure to take action on significant long standing deficiencies in the environmental Thermoluminescent Dosimeters (TLD) program detracted from the good effort."

COMMITTEE RECOMMENDATIONS:

- a)--Aggressively supervise the radiological control program.
- b)--Establish and implement measures to verify program implementation and implement corrective actions for deficiencies.
- c)--Interactions with personnel outside the radiological group should be significantly strengthened.
- d)--Continued clean up of plant and reduction of contaminated areas.
- e)--Strengthen the role and company jurisdiction of radiation control department over the other departments.
- f)--Exposure histories of past and present employees and contracted workers be compiled, continually updated, and reported to DPH and Nuclear Facility Safety Division.
- g)--Improve programs for replacement of thermoluminescent dosimeters.
- h)--Improve training of employees in radiological environmental technical specifications.
- i)--Improve control and accounting of special nuclear material under one gram.
- j)--Improved access control to high radiation areas.
- k)--Improved inspection of vehicles leaving site for any contamination.

- (2) SURVEILLANCE: " Individual surveillance tests were well conducted and controlled. The response to recurring local leak rate test failures was also positive. However, the licensee has been slow to recognize and correct weaknesses in the control of the program tests. This lack of progress is reflected in the large number of surveillance-related licensee event reports and NRC violations issued during the current period. The control of the program is fragmented and not always effective and appears to depend more on historical past practice than in a well founded, systematic approach. This is a major weakness that must be corrected. The licensee's measuring and test equipment control program also need improvement."

COMMITTEE RECOMMENDATIONS:

- a)--Significant site and corporate management attention is needed to correct deficiencies in this area.

b)--Place a single qualified individual in overall charge of the surveillance program.

- (3) FIRE PROTECTION: "The licensee has been slow to strengthen the fire protection program. Problems included inadequate surveillance procedures, degraded fire barriers, inoperable fire protection system equipment, and poor quality fire brigade training. Although action has been taken to address these concerns the program has suffered from a chronic lack of attention and should be closely monitored."

COMMITTEE RECOMMENDATIONS:

- a)--Significantly reduce the amount of inoperable fire protection equipment in the station.
- b)--System for assessing priority needs and timely correction of any deficiencies in fire barriers and protection equipment.
- c)--Improved supervision and training of fire watchers.
- d)--Provision for independent water and power supplies.
- e)--Completion of all Appendix R improvements.
- f)--System to control combustible material on-site.

- (4) SECURITY AND SAFEGUARDS: "The previous SALP report identified serious NRC concerns regarding the licensee's awareness of, and attention to, NRC physical security objectives and the need for additional management attention to, and support of, the security program to insure that the program was properly implemented. The previous SALP report also identified NRC's belief that the licensee had initiated actions to resolve those concerns and that the security program was receiving increased management attention. However, shortly after the beginning of this assessment period, it became apparent to the NRC that, due to the number and complexity of the identified problems and some other problems which were then surfaced, far more extensive management attention and resources would be required. As evidenced during this assessment period, the need for additional attention and resources by the licensee continued until late in this assessment period. As a result, little physical progress toward improving the program was accomplished by the licensee during the period."

COMMITTEE RECOMMENDATIONS:

- a)--High level corporate and site management attention to the recently established priority level for the security program upgrade should continue in order to implement commitments and develop an effective program.
- b)--NRC/Boston Edison review of relationship of contracted security force over Boston Edison and other contracted employees. Does Security have adequate power to control plant personnel and question employee activities?
- c)--Develop and implement effective program to eliminate any presence or use of alcohol and drugs.
- d)--Elimination of any violations or weaknesses in security barriers.

- (5) ASSURANCE OF QUALITY: "Although the licensee has exhibited good performance in certain activities such as outage control and engineering and has displayed initiative in its safety enhancement program, significant deficiencies still were found to exist in radiological controls, surveillance, fire protection and security. Some of these deficiencies have existed throughout the period and have been identified in previous SALP reviews, and by the licensee's own quality assurance organization. The ambiguity of the site organizational structure and the instability in the corporate and site management team have resulted in the licensee's inability to address and resolve these long-standing problems without repeated prompting and overview by NRC. Senior corporate management was slow in confronting the problems and in implementing corrective actions. Late in this assessment period and immediately following it, the licensee took steps to address its organizational weaknesses. However, the effectiveness of these efforts in improving the licensee's performance remains a matter of continuing NRC interest and concern."

COMMITTEE RECOMMENDATIONS:

- a)--Continue senior management attention to identify problems to ensure that they are promptly and effectively resolved.
- b)--Improve tests and surveillance of equipment program.
- c)--Greater authority of quality control staff over other departments to resolve any conflicts between procedures and personnel in different operation groups.

- d)--Improve training and supervision over contract workers.
- e)--Improvements in visual surveillance system to properly identify and describe deficiencies.
- f)--Improve training, testing and requalification of personnel.

(6) PLANT/EQUIPMENT

COMMITTEE RECOMMENDATIONS:

- a)--Maintenance requests back log be eliminated.
- b)--Complete review of maintenance and testing schedules with all incomplete testing being finished and any deficiencies corrected.
- c)--Identification and repair of Main Stream Isolation Valve and RHR pumps which caused initial spurious scram which closed the plant.
- d)--NRC investigation and public explanation of recent reports of deficiencies in certain General Electric reactors, including Pilgrim. The public should be informed of the possible problems and any action taken by General Electric or Boston Edison which has corrected these deficiencies. All uncorrected problems should be corrected.
- e)--The NRC and General Electric should also make available to the public the General Electric report.

- (7) GENERAL MANAGEMENT CONCERNS: The following are recommendations which address general management areas which the committee feels need review.

COMMITTEE RECOMMENDATIONS:

- a)--Staff vacancies in key areas should be filled to adequate levels.
- b)--Demonstration that the new programs, divisions and personnel can actually perform as planned.
- c)--Resolution of inter-group conflicts and clearer lines of authority for safety, ALARA (As low as reasonably achievable), and fire protection personnel over other divisions.
- d)--Review and planning of transition from outage and maintenance mode to on-line operation so that they are prepared if restart is approved.

- (8) REACTOR CONTAINMENT: In its most recent SALP report the NRC noted the following: "Plant hardware changes were also impressive, particularly the planned Mark I containment enhancements. The modifications go considerably beyond NRC recommendations and show a

concern for nuclear safety." Nevertheless, serious concerns have been raised, both inside and outside of the NRC, about the Mark I containment and its possible failure in the event of a major accident. The Committee has sent a letter to Boston Edison seeking more information on exactly what work is planned to enhance the containment system. In addition, the committee strongly urges that prior to restart the NRC, the state, and Boston Edison shall hold a public hearing on:

- a) The possible defects or weaknesses of the Mark I containment;
  - b) the work planned by Boston Edison to improve it;
  - c) the schedule for that work;
  - d) NRC studies and others done on the integrity or possible failure of the containment in the event of a major accident. The containment is such a crucial safety feature in nuclear plants that all work to strengthen any weaknesses must be completed prior to restart.
  - e) An evaluation of any additional safety features such as filtered venting of the containment, molten core barriers, underground residual heat removal system, and a secondary steel containment.
- (9) STANDBY GAS TREATMENT SYSTEM: Prior to refueling the problems identified with the Standby Gas Treatment System should be corrected.
- (10) DECOMMISSIONING PLAN: It is unclear what happens to the plant and storage of radioactive waste when the plant is permanently closed. The questions of the cost involved decommissioning, the impact on Plymouth taxes, waste storage, security, and dismantling or "sealing" of the reactor building are of great concern to area residents. The NRC, the state and Boston Edison should develop decommissioning plans, well before a scheduled closing, to answer these and other questions.

The Committee after intensive review of the NRC SALP report recommends the Boston Edison Company immediately take positive action on all of the above recommendations. Boston Edison should improve all of the categories which received grades of category 3 on the most recent SALP report. The two primary causes for the NRC's category 3 findings were slowness in making improvements and lack of management attention. These problems should be resolved so that none of the functional areas maintains a category 3 grade. It is imperative that all improvements are completed before action is taken to restart the Pilgrim Nuclear Power generating facility at Plymouth.

RECOMMENDATION VI

## RECOMMENDATION VI

### IMPROVED EMERGENCY PREPAREDNESS PLANNING

Emergency preparedness is the last layer of protection for public health and safety in the event of an accident at a nuclear plant. Until recently, emergency planning seems to have been perceived more as a regulatory requirement than a form of protection which might be called into use. As public concern over nuclear plants has increased over the past year, so has emergency planning come under greater scrutiny.

This scrutiny has found the obvious current emergency planning is inadequate. The primary responsibility to correct these inadequacies rests with the state. Working with federal officials, local officials, and the utility the state must take immediate action to develop plans that are more realistic and dependable.

The federal government has reserved to itself most powers dealing with nuclear power plants. The state, however, is left with almost total responsibility in protecting the public should an accident ever happen. While this may be jurisdictionally awkward there is no substitute for state and local planning. Local and state officials are the most qualified to prepare and implement emergency plans.

It is unacceptable to this committee for a private utility or federal agency to try and fulfill or usurp state and local responsibility. The committee feels that prior to restart emergency plans must first be reviewed and approved by town officials, in the Emergency Planning Zone (EPZ) communities, and by the state. Nuclear Regulatory Commission (NRC), Federal Emergency Management Agency (FEMA), Boston Edison, the State, and towns should work on a schedule to coordinate the review and decision on whether to approve, prior to restart.

There is growing debate over how far states can use the planning approval requirement as a means of preventing a new plant from being licensed or of closing a licensed plant, if a state does not believe an emergency response plan can adequately protect the public health and safety. It appears that the NRC, Congress, and undoubtedly the courts will be reviewing this issue as more states withhold approvals.

The state should pursue two courses. State and local governments should develop the strongest possible emergency plans. The public's health and safety demands nothing less. If, after those plans are developed, the Governor feels they are still inadequate then he may withhold approval.



The committee heard testimony from the Department of Public Safety about the need to plan beyond a set limit of ten miles. The Department stressed, though, that with deficiencies in current ten mile planning any work beyond the ten mile zone should not deflect any attention from the communities within the zone. Communities closest to the plant require a higher level of planning than communities farther away. The Department also testified that while Civil Defense is the primary agency for dealing with emergencies other divisions are involved such as the National Guard, Public Safety, and Public Health. The Department noted that coordination between state agencies for nuclear emergency planning needs to be improved.

Local Civil Defense officials from several towns in the EPZ testified before the committee. Their concerns included:

- A) Lack of a reception/decontamination area;
- B) A need for greater technical and material assistance from the state and utility;
- C) Criticism that the plans lacked specific written agreements with parties which might be involved with an emergency, such as bus companies and hospitals;
- D) A need to plan for regional school systems in which students come from one but not all towns within the EPZ; and
- E) The need for more inter-community planning in order to have a coordinated regional plan.

The town of Plymouth has created its own local advisory committee on nuclear matters. That committee has thoroughly reviewed the town's emergency response plan. Their report has been made available to the committee and demonstrates the kind of detailed planning necessary for a strong response plan. It also demonstrates the indispensable role of local governments in developing plans. Many of their recommendations would be helpful to other towns. Their report is included (see Appendix 9).

While primary responsibility for planning rests with state and local officials there is necessary assistance which should come from the utility. This includes technical advice as well as material support accepted by the state, a county, or a town. The committee feels that this assistance should be paid for through utility assessments which will be passed on to utility ratepayers rather than all taxpayers.

Specific improvements to the emergency plans need to come from the utility, towns and state. The committee recommends the following improvements:

#### BOSTON EDISON PLANNING ASSISTANCE:

- (1) Boston Edison Company should provide updated and accurate Evacuation Time Estimates under a wide variety of accident scenarios. This will enable state and local officials to better plan traffic management in the event of an emergency.
- (2) Identification, notification and workable evacuation plans for mobility impaired and individuals who will have difficulty being notified of an emergency or in being familiar with the emergency response procedure. Such individuals include the physically disabled, those depending on public transportation, the hard of hearing and those who speak limited English. Greater attention of these individuals will help ensure that no one is excluded from the planning.

#### BOSTON EDISON EQUIPMENT:

- (1) Boston Edison should improve Public Alert Systems including testing. Sirens should be tested more frequently with improved monitoring and identification of individual siren deficiencies. Siren systems should be audible in the entire EPZ, and loud enough to be heard in buildings with closed windows. In addition, this system should be supplemented with an adequate number of loudspeaker equipped vehicles.
- (2) Review and supply of needed equipment for shelters and reception areas for evacuations. During summer months local population swells, increasing the need for sheltering areas for non-resident visitors.
- (3) Provide greater information in the event of an emergency. During an incident, people may not have written information on hand about procedures to be followed. This is particularly true for non-residents. Printed material with procedures for an emergency should be pre-printed for quick distribution in group shelters, relocation areas, hospitals, public transportation, and through school children during an emergency.
- (4) Boston Edison should update the Nuclear Energy Pamphlet to impress upon the public the importance of following official instructions. Necessary information should include maps, location of public shelters, locations of public transportation facilities, Emergency Broadcast System affiliates, traffic routes, reception areas and personal safety precautions.

#### EMERGENCY PLANNING ZONE (EPZ):

- (1) Clarify that when any part of a town lies within an EPZ, the entire town shall be part of the EPZ. Planning and resources for these towns will have to be upgraded.
- (2) Clarify planning for regional schools which have students from at least one, but not all, towns in the school system which are part of an EPZ.
- (3) Clarify authority of Public Safety to plan for a radiological emergency beyond a 10 mile EPZ. (See Recommendation I--Division of Nuclear Facility Safety)
- (4) Evacuation time estimates and traffic control plans should be based on evacuations of people within the EPZ to centers well beyond the 10 mile zone and should anticipate secondary or shadow evacuations.

#### STATE PLANNING:

- (1) Increase state assistance to local planners. This should include technical assistance as well as financial assistance for local use. The goal should be coordinated regional planning as well as strengthened local plans.
- (2) Inventory and where necessary create adequate local shelters to protect non-resident visitors in the event of emergencies which may not require evacuation.
- (3) Identify area medical services, hospitals and medical personnel available for use outside of the EPZs. Also evaluate any additional services and supplies which may be necessary to serve EPZ population in the event of an emergency, including emergency treatment facilities and training of medical personnel.
- (4) The state and towns should participate in appropriate emergency drills.
- (5) Specific planning shall be developed for emergency notification, evacuation planning, and traffic control planning should be imposed in areas outside of an EPZ which pose unique problems, e.g.: Cape Cod and the Islands.
- (6) Inventory of available buses, ambulances and handicapped/elderly vans, to assist in an evacuation. Develop an inventory of service

- stations and towing operations to be available along evacuation routes.
- (7) Supervise planning by towns, ensure a coordinated, regional plan, and ensure cooperation between the utilities and area towns.
  - (8) Identify and designate adequate reception and decontamination centers and ensure the availability of adequate supplies and equipment..
  - (9) Ensure appropriate annual review and publication of plans working with the utilities, towns and Federal Emergency Management Agency (FEMA).
  - (10) Evaluate and where necessary correct effectiveness of notification and communication system between state and local officials.
  - (11) Identification, notification and workable evacuation plans for people in all institutional facilities -- such as hospitals, nursing homes, schools and prisons -- inside the EPZ.
  - (12) Contractual agreements for the above services where appropriate should be made to avoid any erroneous assumptions of transportation in the event of an evacuation.

#### LOCAL PLANNING:

- (1) Each town in an EPZ should consider establishing an Radiological Emergency Response Plan Committee to review matters pertaining to emergency response planning.
- (2) Local plans need more thorough documentation and letters of agreement between involved parties to ensure clear lines of responsibilities in the event of an emergency.
- (3) Local officials should inventory local planning needs, equipment and resources which can be provided by the Division of Nuclear Facility Safety or the utilities.
- (4) In addition to plan for their own communities, local officials should work closely with neighboring communities to ensure workable regional planning.
- (5) Each town in an EPZ should establish plans for informing non-residents of procedures to be followed in the event of an emergency.

The state and utility have been ineffectual and too informal in developing adequate emergency response plans. The committee, therefore, finds:

A) The Pilgrim Nuclear Power Plant should not restart until, and unless, an emergency preparedness plan, including evacuation, has been approved by the Selectmen in the EPZ communities and by the Governor;

B) Federal, state, and local officials and the utility should coordinate actions in order to reach a decision on whether to approve emergency response plans prior to restart.

C) The cost of emergency planning should not be borne by all taxpayers but financed through utility assessments.