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

CHAIRMAN

December 3, 1990

The Honorable Michael S. Dukakis
Governor of Massachusetts
Boston, Massachusetts 02133

Dear Governor Dukakis:

I am responding to your letter of October 7, 1990, forwarding a copy of the Southeastern Massachusetts Health Study. The Nuclear Regulatory Commission (NRC) staff has reviewed the study and independently estimated off-site radiation doses associated with radionuclide emissions from the Pilgrim Nuclear Power Plant. Given the Commission's mission of protecting the public health and safety, the NRC is always interested in scientific research and investigations that enhance the present state of knowledge about health and environmental effects of ionizing radiation.

You also requested NRC to consider three specific suggestions based on the study. First, you recommended that the NRC take steps to require off-site radiological monitoring at every nuclear power plant in the country. The NRC and its predecessor, the Atomic Energy Commission, have required that an off-site radiological monitoring program be conducted by the licensee at each nuclear power plant since the first commercial plant went into operation approximately 30 years ago. Although the number of samples, sample frequency, and sample analyses has changed somewhat over the years, the program has always included measurements of radioactive materials in air, water, milk, fish, and food crops in addition to measurements of direct (ambient gamma) radiation. Licensees are required to report annually the results of such monitoring to the NRC.

In addition to the program conducted by the nuclear power plants, the NRC has contracts with 34 States (including Massachusetts) to independently collect and analyze samples from the environs of nuclear power plants. Each contracting State submits to the NRC an annual report that presents the results of sample analyses and measurements as well as a comparison with data collected by the licensee.

Another facet of the NRC's independent monitoring activities entails collecting plant effluent samples and analyzing them on site, using mobile radiochemical measurement laboratories that are based in each of the NRC's five regional offices. The NRC staff then compares its independent results with those of the licensee. Any areas of disagreement are promptly resolved, and, if necessary, modifications are made to the licensee's measurement program. In addition, the NRC staff has placed a network of thermoluminescent dosimeters (TLDs) around each nuclear power plant to measure direct radiation levels. Currently,

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approximately 50 TLDs are collected and measured each calendar quarter at all of the 73 nuclear power plant sites, including the Pilgrim plant. The results are published in a quarterly report entitled "NRC TLD Direct Radiation Monitoring Network, Progress Report for [calendar quarter/year]," NUREG-0837. In view of the programs just described, the Commission does not see a need for new NRC monitoring programs for nuclear power plant emissions.

Second, you requested the NRC to consider the emission standard for nuclear power plants. As mentioned in your letter, the current Environmental Protection Agency (EPA) whole-body dose standard is 25 mrem per year. This EPA standard appears in 40 CFR Part 190 and applies to the combined effect of all exposure pathways, including airborne and waterborne releases and direct radiation from uranium fuel cycle facilities on the maximally exposed member of the public. The NRC has incorporated this EPA standard in its own regulations (10 CFR Part 20), thus making it a requirement directly implemented and enforced by the NRC for NRC licensees.

The proposed standard of 10 mrem per year, which you mentioned in your letter, appears to coincide with the 10-mrem-per-year effective dose equivalent standard (40 CFR Part 61, Subpart I) promulgated by EPA pursuant to the Clean Air Act (CAA), but currently being held in abeyance until March 10, 1991. This EPA standard also applies to the maximally exposed member of the public; however, because it is a CAA standard, the 10-mrem-per-year standard applies only to exposure from airborne emissions.

In addition to the EPA 25 mrem per year standard, the NRC imposes separate requirements for airborne and waterborne releases. These requirements are structured to maintain doses associated with all effluent releases to levels that are as low as reasonably achievable (ALARA). These requirements, which were promulgated 15 years ago for light water reactors (as 10 CFR Part 50, Appendix I) and implemented at each plant during the following 10-year period, contain design objectives for off-site doses to the maximally exposed member of the public living near a nuclear power plant. These design objectives are 3 mrem per year from waterborne releases and 5 mrem per year whole-body dose from airborne releases for a single unit nuclear power plant. Thus, the Commission does not see a need for further standards for nuclear power plant emissions.

Third, you requested that the NRC consider replicating the methodology of the Massachusetts study at other selected sites around the country. As you may be aware, a recent National Cancer Institute (NCI) epidemiological study "found no suggestion that nuclear facilities may be linked causually with excess deaths from leukemia or from other cancers...." This study included 52 nuclear power plants (including Pilgrim) and examined county statistics for 2.7 million

individuals who died of cancer. The findings of the NCI study are consistent with the findings of several similar epidemiological studies in foreign countries and with the latest conclusions of expert bodies, such as the National Research Council's Committee on the Biological Effects of Ionizing Radiation.

Furthermore, as a result of restrictive NRC limits on releases of radioactive materials to the environment, calculated doses to members of the public from routine operations of nuclear power plants since 1975 have been maintained at very low levels. These doses are so small -- particularly when compared with background radiation exposure levels and variations in background radiation -- that they are unlikely to have measurable effects on the incidence of leukemia or other forms of cancer. In addition, although the NCI's Ad Hoc Advisory Committee concluded that epidemiological studies of cancer occurrence around individual nuclear facilities may be informative, the Committee also stated that case control studies of cancer incidence around such facilities "are not without methodologic limitations, and, in addition, make very heavy demands upon both time and resources."

Given all of the information available to us at this time, including the Southeastern Massachusetts Health Study, and given that case control studies like the Massachusetts study place heavy demands on resources that might be used to better advantage in other areas of safety research, we do not plan to use the Massachusetts Department of Public Health's methodology at other nuclear power plant sites. The NRC is, however, taking other steps to further research on the health and environmental effects of ionizing radiation. For example, as a consequence of the imminent revision of the NRC's regulations on radiation protection (10 CFR Part 20), data on the radiation exposures to nuclear power plant workers will be reported by licensees in a format which will be useful for future epidemiological studies. I want to assure you that the NRC will continue to scrutinize all the data available to us and require our licensees to take any appropriate action that may be necessary to protect the public health and safety.

Sincerely,

Kenneth M. Carr

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