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

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SEP 4 1980

Docket No. 50-271

The Honorable Silvio O. Conte
United States House of Representatives
Washington, D. C. 20515

Dear Congressman Conte:

Reference is made to your letter of May 22, 1980 to Carlton Kammerer requesting responses to questions from a constituent regarding the Vermont Yankee Nuclear Plant. Our responses to your constituent's questions are enclosed.

We regret the delay in this response. Several organizational groups contributed to these answers. Heavy workloads and summer vacations caused some delay in completing the task.

Sincerely,

[redacted]

William J. Dircks
Acting Executive Director
for Operations

Enclosures:
1. Responses to questions
2. 10 CFR Part 20

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Question 1

Is Vermont Yankee radiating into the environment at any level?

Response

All operating nuclear power plants release very small amounts of radioactivity to the air and water surrounding the immediate vicinity of the plant. Federal regulations (10 CFR Part 20) require that all releases of radioactivity be less than the amounts considered safe to be present in drinking water or the air we breathe. In addition, the U. S. Nuclear Regulatory Commission (NRC) and the U. S. Environmental Protection Agency (EPA) require that releases of radioactivity be maintained as low as reasonably achievable as spelled out in Appendix I to 10 CFR Part 50 and 40 CFR Part 190. The objective of these latter regulations is to limit releases of radioactivity to a small fraction of those permitted under law and well below those levels considered harmful to public health and safety. Each operating nuclear power plant is required to report, semiannually, all radioactive releases from the plant. Each plant is also required to conduct an extensive monitoring program in the environs; this monitoring program is independently checked by Federal and, generally State agencies. Since the facility was initially licensed in 1972, the licensee has installed additional shielding around the turbine. This additional shielding reduces direct radiation "shine" from the turbine. The monitoring program includes samples of air and water in the surrounding area, fish, milk, locally grown foodstuffs (e.g., vegetables), etc. In a recent evaluation by the NRC, the releases of radioactivity from the Vermont Yankee plant were found to be less than even the design objective. The actual radiation received by the population in the vicinity of the plant from these releases of radioactivity is too small to be measured. Calculated radiation doses to a hypothetical maximally exposed individual - that is, an individual assumed to live year-round at the plant site boundary and whose diet is assumed to consist predominantly of fish from Vernon Pond, local milk and locally grown vegetables - were within the normal variations in background radiation in Vermont and Massachusetts. Calculated doses to the general population in the vicinity of the Vermont Yankee plant are typically less than 1% of the doses this same population receives from naturally occurring radiation (i.e., cosmic rays, radioactive materials in the earth, building materials, food, etc.)

Question 2

What is the standard safety level of radiation and how has it been determined?

Response

The standards which control the release of any radioactive material from a nuclear power plant are the NRC's requirements set forth in the Code of Federal Regulations, 10 CFR Part 20, a copy of which is enclosed. These regulations were established in accordance with the recommendations of the Federal Radiation Council which was formed in 1959 to provide a Federal policy on human radiation exposure. All operating nuclear

power plants are required to limit the amount of radioactivity released from the plant within the standards in 10 CFR Part 20. The intent of 10 CFR Part 20 was to ensure that any individual, other than those intentionally working with radioactive materials, would not be exposed to more than 1/2 Rem per year from all potential sources, excluding natural background radiation and radiation received as a result of medical diagnosis and therapy. For all nuclear power plants, the releases of radioactivity during normal operation are so small that the annual exposure received by individuals living in the vicinity is below detectable levels. Estimated maximum exposures have always been less than 5% of the standards in 10 CFR Part 20.

In May 1975, the NRC amended the regulations in 10 CFR Part 20 to require that all nuclear power plants maintain radiation exposures and releases of radioactive materials in effluents as low as is reasonably achievable. The guidance on design objectives is set forth in Appendix I to 10 CFR Part 50. The design objective is to limit the release of radioactive material from a nuclear power plant so that an individual would not receive a radiation exposure from the release of more than 5 millirems per year to the whole body or more than 15 millirems to any organ. The 5 millirems per year is 1% of the limits in 10 CFR Part 20. These values are design objective doses and are not limits based on health and safety considerations.

Effective December 1, 1979, EPA regulation 40 CFR Part 190, entitled "Environmental Radiation Protection Standards for Nuclear Power Operations", requires that no individual in the United States receive in excess of 25 millirem per year from all radioactive releases associated with the uranium fuel cycle. This 25 millirem per year is 5% of the basic standard in 10 CFR Part 20.

Radiation exposures in the United States from naturally occurring radiation (cosmic rays, natural radiation from soil, food, air and water) ranges from about 80 millirem per year (e.g., Atlantic City, New Jersey) to about 180 millirem per year (e.g., Denver, Colorado). Variations within regions of individual states are commonly on the order of several millirem per year. Because of the wide variation in naturally occurring radiation, it is generally agreed by authoritative groups of scientists that as long as radiation doses from human activities do not significantly exceed the variations in the naturally occurring radiation doses, it is probable that the risk of an undesirable effect (e.g., cancer) will be insignificant relative to those which occur from other causes. (See for example "The Effects on Populations of Exposure to Low Levels of Ionizing Radiation", Committee on the Biological Effects of Ionizing Radiations, National Academy of Sciences 1980 (BEIR III)).

Question 3

Have there been any studies of the air, soil, water and food chain supply near the plant for contamination?

Response

Vermont Yankee, as well as every nuclear power plant, is required to conduct an extensive atmospheric and terrestrial monitoring program to detect any significant radioactivity that might be attributable to the plant. Vermont Yankee routinely collects and analyzes samples of river water, ground water, well water, [illegible] meat, poultry, eggs, milk, fruit, vegetables, and silage crops. In addition, Vermont Yankee takes continuous air samples in many locations. The monitoring program and results are audited and checked by NRC, EPA, and the States of Vermont, Massachusetts and New Hampshire.

Question 4

In the event of an accident, what plans are there for evacuation?

Response

The Vermont Yankee Plant has emergency plans which have been approved by the NRC. Periodic tests of these plans have been conducted, including simulated evacuation. In accordance with new Federal requirements, revised Emergency Plans, which address a range of protective actions to initiate evacuation, are under development by Massachusetts, Vermont and New Hampshire state and local governments for the area within 10 miles of the Vermont Yankee plant. In accordance with the December 7, 1979 Presidential directive, the Federal Emergency Management Agency (FEMA) has lead responsibility for offsite emergency planning around nuclear facilities. In this capacity, FEMA will conduct an adequacy review of the govermental emergency plans for the area around the Vermont Yankee plant and will submit their findings to the President.

Question 5

Most disconcerting is the fact that scientists seem to disagree over the significance of similar data and safety standards. What exactly is the crux of the argument?

Response

Since questions 1 through 4 relate to radiation in the environment, it is assumed you were referring in the above question to disagreement as to the biological effect of low levels of radiation. Much of the controversy stems from the extrapolation of radiation effects observed at high doses and high dose rates (e.g., Japanese A-bomb survivors) to potential effects at very low doses, which may not have been observed. The effects of very high levels of radiation (e.g., 400,000 millirems) on the body are readily evident within days of exposure. The effect, if any, of low level radiation (e.g., 400 millirem), are not detectable, at least within several years of exposure. Although effects at low doses and low dose rates of radiation may have not been observed, some scientists have adopted what is commonly referred to as the linear dose response hypothesis. This assumes there is a linear (straight line) effect between radiation doses and damage to human cells. It is conservatively assumed that cellular repair mechanisms, which have evolved in the constant presence of background radiation, are as ineffectual at low doses and low dose rates as they are at high doses and high dose rates. There is a great deal of experimental animal and human cell culture data that tends to indicate otherwise. The linear dose response hypothesis is not an established fact, but merely a means to make prudent decisions regarding activities which may affect the public health. The fact is that the vast majority of scientists in the world agree that the current models used for estimating radiation risks probably overestimate the actual risks. Most of the real controversy is related to the question of how much the models overestimate the real risks. Unfortunately, it may never be possible to resolve the controversy since all studies of radiation exposures must include considerations of natural background radiation (averages about 100 millirems per year) and exposure to medical and dental x-rays about 100 millirems per year.