Kennedy's Conn.

APR 23 1987

on Tues. 7th
for Murley & Russell
Plymouth

MEMORANDUM FOR: Thomas T. Martin, Director
Division of Radiation Safety and Safeguards

FROM: Ronald R. Bellamy, Chief
Emergency Preparedness and Radiological Protection Branch, DRSS

SUBJECT: PILGRIM PUBLIC INTEREST ITEMS

There have recently been a number of articles in newspapers published in the area around the Pilgrim Station that suggest there is a pattern of increased cancers in the area, and that Pilgrim effluent releases might be the cause. I have enclosed a series of questions and answers to address these issues that indicate what the effluent releases have been from Pilgrim, and the minimal impact these releases had on the public.

Ronald R. Bellamy

Ronald R. Bellamy, Chief
Emergency Preparedness and
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Enclosure: Questions and Answers

cc w/encls:
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I/50

Question:

Is it likely that coastal wind patterns could keep radiation circulating in the same area, and slowly building up over time, instead of dissipating

Answer:

No. Atmospheric processes are largely governed by statistical mechanics and thermodynamics. Particularly when there is a finite amount of radioactive material released, the coastal wind patterns will quickly disperse, and continue to disperse, these contaminants. The second law of thermodynamics prohibits non-condensable airborne gases from concentrating once they have been dispersed. This is the same as a dye that is put into a tank of water and mixed; once the dye is dispersed it cannot be reconcentrated by mixing or agitating the water. The only reconcentration mechanism in a tank of water or in the atmosphere is deposition (settling out). Deposition in the atmosphere only takes place with particulate material, and the majority of the radioactive material released from Pilgrim has not been particulate material but gases which do not deposit. Some small amount of radioactive particulates have been released, however, the deposition behavior of these radionuclides has been taken into consideration in estimating doses to the public in the Final Environmental Statement for Pilgrim Station. All of these doses are within the NRC regulatory limits of Appendix I to 10 CFR 50, 10 CFR 100, and EPA guidelines.

Question:

Some studies have shown that certain communities surrounding Pilgrim have cancer rates two to three times the average U.S. rates. Could this be due to Pilgrim?

Answer:

Scientific data indicate no. NRC regulations establish waste system design requirements on whole-body annual doses over natural background at the site perimeter due to airborne releases to be less than 10 mrem per year. The latest data on radiation induced cancer risk for chronic exposure suggests that the risk of dying from radiation exposure is one part in ten million for every mrem of whole-body exposure received. If the nuclear plant operates for 40 years, the maximum possible exposure an individual could receive from the gaseous effluents would be in the range of 400 mrem. This amounts to a maximum lifetime increase in cancer risk of 400 parts in ten million, or .00004. The average lifetime risk of dying of cancer in the U.S. is about 0.17 (i.e. 17% of the U.S. population dies from cancer). These data suggest a maximum increase in lifetime risk in death from cancer due to a 400 mrem exposure to be .00004/.17 = .0002 or .02%. This number is much smaller than the increase that was observed in the surrounding communities of 100% to 200%, suggesting that the increase is not due to the effluents from Pilgrim station.

Question:

From the standpoint of human health effects, how significant were the releases that were made during the period from late 1974 through most of 1975?

Answer:

Not very significant. In terms of airborne noble gas effluents, the highest releases occurred in 1974, and the second highest in 1977, 546,000 Ci and 413,000 Ci respectively. The average annual release during the entire operational life of the plant was 104,000 Ci (see table). This results in a cumulative dose to the whole-body less than 40 mrem (1972-86), based on actual effluent release reports results. As noted in the answer to the previous questions, this level of exposure will have a negligible effect on increasing cancer risk. In addition, releases from Pilgrim have been within the regulatory limits and Technical Specifications.

Question:

Did the spent resin release that occurred on June 11, 1982, result in high radiation levels offsite?

Answer:

No. The resin beads were not dispersed offsite. While they were contaminated, the resin beads remained onsite, and the contamination appeared to remain fixed to the beads as no detectable contamination was measured in sewers, storm drains, or direct exposure on TLDs. Also, no intakes of radioactivity occurred by radiation workers involved in the cleanup activities. Actual measurements to verify that no radioactivity was released offsite were performed independently by both the licensee and the NRC.

	Pilgrim Airborne Noble Gases (Ci)	Pilgrim Liquid Effluents (Ci)
1972	18,000	1.5
1973	230,000	0.9
1974	546,000	4.2
1975	46,000	8.01
1976	183,000	2.33
1977	413,000	3.41
1978	32,700	1.77
1979	13,900	0.51
1980	26,200	2.73
1981	5,300	1.94
1982	19,400	0.872
1983	20,100	0.935
1984	20.2*	4.75*
1985	3,266	1.13
1986	131**	0.13**

* Recirculation Pipe Replacement
** Shutdown: NRC ~~order~~ CAL

WASTE STORAGE

Pilgrim has a dedicated waste storage facility onsite that satisfies NRC criteria in terms of environmental protection (weather, temperature, rain) and security. It is only occupied to a small percentage by radwaste today. There are three concerns that the licensee is presently reviewing: (1) it is an older facility and is not state-of-the-art in terms of traffic, design or handling; (2) it is not large and during times of heavy use could become cramped; (3) it is located outside the protected area which causes problems in terms of movement of radwaste.

Pilgrim Off-site Releases

Operation of the PNPS facility is governed by operating license Technical Specifications that are based on the dose-design objectives of Appendix I to 10 CFR 50. Because these design-objective values were chosen to permit flexibility of operation while still ensuring that plant operations result in offsite doses that are as low as is reasonably achievable (ALARA), the actual radiological impact of plant operation may result in doses close to or occasionally greater than the dose-design objectives. Even if this situation exists, the individual doses for the member of the public subject to maximum exposure will still be very small when compared to natural background doses (100 mrems/year) or the dose limits (500 mrems/year - total body) specified in 10 CFR 20 as consistent with considerations of the health and safety of the public. As a result, the radiological impact on members of the public from routine operation of the facility is negligible.

Operating standards of 40 CFR 190, the Environmental Protection Agency's Environmental Radiation Protection Standards for Nuclear Power Operations, specify that the annual dose equivalent must not exceed 25 mrems to the whole body, 75 mrems to the thyroid, and 25 mrems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials (radon and its daughters excepted) to the general environment from all uranium-fuel-cycle operations and radiation from these operations that can be expected to affect a given individual. The PNPS facility has operated within these standards.

Pilgrim Station
Radioactive Effluent Data 1979-1986

Year	Capacity Factor	Noble Gases	Airborne Tritium	Non Tritiated Liquids	Liquid Tritium	Solid Waste Vol., m^3	Waste Activity, Ci
1979	82.5	13,875Ci	156Ci	0.51Ci	13.4Ci	3,026	22,000
1980	51.7	26,062Ci	44Ci	2.74Ci	40.0Ci	2,937	1,600
1981	58.7	4,488Ci	77Ci	1.95Ci	34.0Ci	1,064	938
1982	56.0	19,413Ci	19Ci	0.78Ci	5.9Ci	2,286	959
1983	80.3	19,991Ci	60Ci	0.94Ci	15.6Ci	665	1,481
1984	0.1*	18.4Ci	1.8Ci	4.75Ci	14.8Ci	1,794	1,199
1985	84.4	3,259Ci	7.2Ci	1.13Ci	12.5Ci	996	494
1986	17.5**	126Ci	4.5Ci	0.13Ci	8.1Ci	443	385

* Recirculating Pipe Replacement
** Shutdown - NRC order

Based on 15 BWRs of comparable vintage (for 1983):

Average Noble gases	14,619Ci 2f9-85726Ci
Average Airborne Tritium	50.2Ci; 2.9-258Ci
Average Non Tritiated liquid	1.25Ci; 0-12.4Ci
Average Tritium in liquid	11.3Ci; 0-94.7Ci
Average Solid Waste Volume	806m^3; 357-2680m^3
Average Solid Waste Activity	13,000Ci; 561-57501Ci

BWR Exposures

yeor	AVG	Total Nine mile 1	Pilgrim
1973	340	567	126
1974	507	824	415
1975	701	681	748
1976	549	425	2648
1977	828	1363	3142
1978	604	314	1327
1979	733	1497	1015
1980	1136	541	3621
1981	980	1542	1836
1982	940	1264	1535
1983	1056	860	1162
1984	1003	590	4002
1985	774	265	893
1986	653	1250	874
1987		210	950
1988			~ 2060

AVG BWR	Nine mile 1	Pilgrim
1973-1985 = 783 person-rem	858	1739
AVG BWR		
1980-1985 = 981 person-rem	910	2183 ~~1355~~

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QUESTIONS AND ANSWERS IN PREPARATION FOR JANUARY 7, 1988 PILGRIM HEARING

Question: Will NRC require that all of the FEMA identified deficiencies be corrected prior to restart?

Answer: In the report of their self-initiated review, FEMA identified six areas in which the Massachusetts and local emergency plans were deficient. Because the plant was already shutdown for other reasons, these deficiencies were not being evaluated to determine if each one would have to be completely corrected prior to restart. Based upon the timing of submittal of revised plans to FEMA for review, and FEMA's report to NRC, we will not know until shortly prior to restart, which items are still uncorrected, and what significance to place on them.

Question: Will an exercise be required to satisfactorily resolve those deficiencies prior to restart?

Answer: FEMA has indicated that some of the deficiencies would be amenable to correction by review of plans and procedure changes, but that others would require demonstration in a drill (not necessarily an exercise). Although a full-participation exercise must be conducted by the end of June, 1988 (as a condition of the exemption granted for not conducting an exercise in 1987, this exercise has not been determined to be necessary prior to restart.

Question: What is the NRC position on the Commonwealth's plan to enlarge the EPZ?

Answer: The present EPZ has been reviewed by FEMA and the NRC and found to be acceptable. We are not aware of the details of the planned enlargement, however the following things must be considered prior to enlarging the EPZ:

We are not aware of any technical justification for enlarging the EPZ.

We would need to be assured that the enlargement of the EPZ would not drain resources in such a manner as to lessen the level of protection for those in the current EPZ.

FEMA and the NRC would not be bound to evaluate any deficiencies which were found to exist in the expanded portion of the EPZ.

In general, we have no objection to providing more detailed planning for the areas outside the existing EPZ, but due to the greatly reduced risk, see no need of the same level of planning as required for the population within the current EPZ.

Question: What do you mean by "addressed prior to restart" when you refer to the FEMA identified deficiencies?

Answer: - We mean that sufficient progress has been made to correct the deficiencies to the extent that we believe that there is an adequate level of protection of public health and safety.

Question: What would the NRC do if the state did not prepare a plan?

Answer: We have not addressed that issue so the answer is that we don't know how we would respond.

Question: Do the plans have to be approved prior to restart?

Answer: If by "approved" you mean the formal approval defined in FEMA's regulation 44CFR350, the answer is no. The plans must be in a form that we would have reasonable assurance that they could be implemented in a manner which would provide adequate protection for the health and safety of the public. The regulations allow for continued plant operation as long as their is a finding of reasonable assurance that public health and safety can be protected. That assurance can be gained through plan review and exercises prior to the formal approval of the state's emergency plan.

Question: Why is the Pilgrim restart process continuing with the FEMA-identified deficiencies unresolved?

Answer: The restart process principally involves the BECo's correction of identified deficiencies to the NRC's satisfaction. Pilgrim is presently shutdown with plant activities being conducted in accordance with the

conditions of their license as modified by our Confirmatory Action Letter. It would not be prudent management for them to not prepare for restart. Further, none of the FEMA identified deficiencies appears to be of such complexity that it cannot be corrected. In fact FEMA outlined what would be necessary for each item to be corrected in their report. Based on that it is reasonable to assume that the deficiencies will be satisfactorily resolved.

Question: Does the NRC have sufficient technical resources to perform the same level of emergency plan review as FEMA?

Answer: Yes. The FEMA review involves a collegial body called the Regional Assistance Committee (RAC) which consists of representatives from several federal agencies including DOT, EPA, FDA, HHS, Dept. of Agriculture, NOAA, and NRC. Most of the skills are available "in-house", however we could also call upon assistance from the other agencies or qualified contractors as FEMA does.

Issue: What are the regulatory requirements regarding the operation (or restart) of nuclear power plants with identified deficiencies in offsite emergency preparedness?

Response: The Commission's regulations require the submission and implementation of licensee, state and local governmental emergency plans which meet the standards in 10 CFR §50.47(b) and Appendix E to 10 CFR Part 50. As described in the Memorandum of Understanding between FEMA and NRC (50 Fed. Reg. 15485, April 18, 1985), FEMA has lead responsibility for assessing offsite radiological emergency response plans and preparedness. The NRC assesses onsite emergency planning and reviews FEMA's assessment of offsite plans for the purpose of making findings on the overall state of emergency preparedness. The NRC must find reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

The Commission recognizes that there can be deficiencies in the emergency planning and preparedness associated with a nuclear facility. However, there must be substantial compliance with the regulations, i.e., compliance sufficient to find that there is reasonable assurance that adequate protective measures can and will be taken in a radiological emergency. Indeed, even in those instances where the Commission can no longer make its reasonable assurance finding, emergency preparedness deficiencies may not require facility shutdown. See 10 CFR §50.54(s)(2)(ii). In practice, radiological emergency response plans are rarely if ever perfect and complete. This is the reason for the continuing FEMA and NRC oversight of this area. Deficiencies will be found and assessed for significance. While all deficiencies are expected to be corrected, not all will change a finding of reasonable assurance by the NRC.

For an operating plant, such as Pilgrim, the regulations provide considerable enforcement flexibility to the NRC. Unlike safety deficiencies, identification of an emergency planning deficiency does not require immediate shutdown of a facility. Where a significant deficiency in emergency planning is revealed, a 120-day period is initiated in which the deficiency must be addressed. Even after this

"120-day clock" has run, the regulations provide that the NRC has the enforcement discretion to allow the plant to continue operation even in the face of such a deficiency. This regulation and the broad flexibility which it accords to the NRC has been judicially approved. (County of Rockland v, NRC)

The Commission's emergency planning rules require "reasonable assurance" of "adequate protective measures." 10 CFR §50.47(a). This requirement recognizes that there cannot be the same degree of precision in emergency planning as is demanded by the NRC for plant design and construction. Commission regulations provide that if the Commission finds that an emergency planning deficiency exists, the facility operator has 120 days to correct the deficiency before the Commission need determine "whether the reactor should be shut down until such deficiencies are remedied or whether other enforcement action is appropriate."

Whereas significant deficiencies in a safety system at an operating reactor would cause it to be shut down at once, the identification of significant deficiencies in emergency planning results in the initiation of a four-month period within which the deficiencies are addressed, not in an automatic shutdown of the facility.

Prior to contemplating enforcement action the NRC normally would, consistent with its regulations, provide the licensee a four-month opportunity to demonstrate that the deficiencies are not significant for the plant in question, that adequate interim compensatory measures have been or will be taken, or that there are other compelling reasons for allowing operation to continue.

The United States Court of Appeals for the Second Circuit in County of Rockland v. NRC, held that a nuclear power plant emergency planning deficiency does not require the NRC to take enforcement action to shut down that plant. The Court in County of Rockland specifically recognized the four-month grace period set forth in the NRC's emergency planning regulations and further noted that even at the end of that period the NRC still retained the authority to decline to take any

enforcement action. The County of Rockland court found "nothing in the language or legislative history of the [Atomic Energy Act] or [Energy Reorganization Act], nor in the regulations promulgated by the Commission," that required NRC enforcement action even in the event an emergency planning deficiency were found by the agency.

Thus, even assuming that the NRC is wrong in its conclusion that there is no deficiency in the emergency plans sufficient to prevent a finding or reasonable assurance of adequate protective measures, NRC regulations provide an additional four months for study of the problem at Davis-Besse before the agency must confront the need to take enforcement action.

[The following material is from the final rule on emergency planning issued on 12/3/87].

In 10 CFR §50.54(s)(2)(iii), the Commission provided that if it "finds that the state of emergency preparedness does not provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency...and if the deficiencies...are not corrected within four months of that finding, the Commission will determine whether the reactor shall be shut down until such deficiencies are remedied or whether other enforcement action is appropriate." In other words, a plant ordinarily may operate for at least four months with deficiencies in emergency planning before the NRC is required even to decide whether remedial action should be taken. At the time that the Commission created the so-called "120-day clock" for deficiencies in emergency planning, it was settled Commission law (and remains so today) that the NRC must issue an order directing a licensee to show cause why its license should not be modified, revoked or suspended whenever it concludes that "substantial health or safety issues ha[ve] been raised" about the activities authorized by the license. Consolidated Edision Company of New York (Indian Point).

In the context of that standard, the 120-day clock provision of emergency planning deficiencies amounts to a Commission finding that, at least for the first 120 days, even a major deficiency in emergency planning does not automatically raise a "substantial health or safety issue" with regard to plant operation. By contrast, a major safety deficiency relating to emergency core cooling system--would warrant immediate shutdown.

In sum, despite language indicating that emergency planning was "essential," the Commission in 1980 created a regulatory structure in which emergency planning was treated somewhat differently, in terms of the corrective actions to be taken which deficiencies are identified, from the engineered safety features ("hardware") that would be relied on in an emergency