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

CHAIRMAN

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February 4, 1980

The Honorable John Heinz
United States Senate
Washington, D. C. 20510

Dear Senator Heinz:

This is in response to your November 26, 1979 letter to Dr. Hendrie concerning the decontamination and disposal of Three Mile Island's radioactive waste.

The release or venting to the atmosphere of krypton contained in the TMI-2 reactor building is currently not permitted. On November 13, 1979, the licensee transmitted to the NRC an analysis of the safety and environmental consequences of the removal of radioactive krypton from the reactor building. In this analysis, the licensee considered various alternatives and concluded that the venting operation could be done with no significant hazard to site personnel or the general public. On this basis, the licensee proposed atmospheric venting as the means for removing contaminated gases from the reactor building. The NRC is currently preparing an Environmental Assessment of the krypton disposal alternatives and, upon completion of this Assessment, will request comments from the public for consideration. The options considered by the licensee, as well as an additional option being considered by the NRC staff, are described in Enclosure 1.

This Environmental Assessment may be used as part of a near-term decision regarding the disposition of the krypton; in any event, it will be fully incorporated into the programmatic environmental impact statement which is being prepared to include the total cleanup and decontamination operation.

As for the disposal of the water which has been decontaminated by the EPICOR-II system, releasing such water into the Susquehanna River is also prohibited at this time. Although the licensee is currently considering a number of options for the disposal of the water, described in Enclosure 2, the licensee has not yet submitted a proposal on a recommended method for disposal of the contaminated water. However, we expect a proposal to be submitted in early 1980. The NRC will then prepare an Environmental Assessment of the alternatives for disposal of this water in order to ensure that the alternative selected for the disposal of decontaminated water is one with which we agree. The Assessment will be made available for public comment.

Decontamination of the water held in the auxiliary building by the EPICOR-II system is continuing. While the throughput of the system has been lower than initially expected, the decontaminated water has a lower level of residual radioactivity than predicted. The resultant exposures to workers and the off-site population has been lower than those predicted in our Environmental Assessment of the system.

Finally, with respect to your request to hold public hearings in the Middletown area, public meetings will be held in the Harrisburg-Middletown area during the preparation of the Programmatic Environmental Impact Satement. The first such meeting was held on January 29, 1980. In addition, as outlined in our August 25, 1979 response to your July 20, 1979 letter, the Environmental Assessment described above will be released for public comments and the comments will be considered in any decision regarding these activities.

Since October 2, 1979, NRC senior staff members responsible for the TMI recovery program have participated in periodic briefings on the cleanup activities at Three Mile Island. These briefings are sponsored by the Pennsylvania Department of Environmental Resources to advise public officials, the press and the public on various phases of the cleanup operation. We have opened an office in the Middletown area to make staff members more readily available to the public and to provide a place for public inspection of documents related to the cleanup.

We believe by these efforts we will keep the public informed and provide the public the opportunity to comment on significant aspects of the cleanup program.

I hope this provides you with the information you desire.

Sincerely,

John F. Ahearne

Enclosures:
1. Reactor Building Contaminated Atmosphere (Gases)
2. Water Disposal

Reactor Building Contaminated Atmosphere (Gases)

On November 13, 1979, the licensee submitted its proposal for the disposal of the contaminated atmosphere in the reactor buiding in a report titled, "Three Mile Island Reactor Building Purge-Program Safety Analysis and Environmental Report." The licensee examined four options for removal and disposal of the contaminated gases, made up primarily of radioactive krypton within the reactor building: (1) atmospheric purge, (2) charcoal absorption and storage, (3) gas compression and storage and, (4) cryogenic processing and storage. In addition to these options, the NRC staff examined freon absorption and storage.

(1) Atmospheric Venting

The licensee proposed that atmospheric venting be the means used for removing the contaminated gases from the reactor building. Atmospheric venting consists of releasing the contaminated gases from the reactor building through the plant vent stack (located 160 feet above grade) at times when the wind and other meteorological conditions are most favorable for atmospheric dispersion. The licensee concluded that the venting can be done with no significant hazards to site personnel or to the general population. One advantage of venting is that it is less expensive and faster than the other alternatives considered.

(2) Charcoal Adsorption and Storage

This method consists of passing the contaminated gases from the reactor building through beds of charcoal where the radioactive krypton would remain adsorbed to the charcoal. Once decontaminated, the air would be vented to the atmosphere. The charcoal with the absorbed krypton would be stored indefinitely. To decontaminate the large quantity of air in the reactor building would require 34,000 tons of charcoal stored in 450 tanks approximately 12 feet in diameter and 50 feet long. More details on the system, including the estimated cost and construction schedule, are shown in Table 1.

(3) Gas Storage and Compression

This method consists of compressing the contaminated gas from the reactor building and storing the compressed gas in piping. At a pressure of 340 psig, about 150,000 feet of 36-inch pipe would be required to store the contaminated gases. Storing the contaminated gases at this pressure for long periods of time increases the likelihood of uncontrolled releases.

(4) Cryogenic System

The contaminated air would be removed from the reactor building, passed through a recombiner to remove the oxygen, and then passed through a cryogenic system cooled by liquid nitrogen. Most of the radioactive gases, mainly krypton, would be liquified and retained in the cryogenic system. The purified gases would then be discharged from the plant via the reactor building vent. Periodically, the liquified krypton would be vaporized and stored as a gas. The gas would have to be stored for a long period of time. The cryogenic systems, if they operated as designed, will remove about 99.9% of the krypton gas. Therefore, a small amount of radioactive krypton will be vented with the purified gas. In addition, concentrated krypton will accumulate within the system during operation and be stored. Any uncontrolled release of this radioactivity due to failures could result in higher offsite doses than the controlled venting. Additional details for this system and an estimated cost construction schedule appear in Table 1.

(5) Freon Absorption

In this system, the contaminated air from the reactor building is brought into contact with freon in a packed column where the freon absorbs and removes the radioactive krypton from the air.

The purified air is vented from the column through the reactor building vent. The krypton is then stripped from the freon in the same column and stored. As in the cryogenic system, a small amount of radioactive krypton would be vented with the purified gases. The krypton will require long-term storage.

As with the cryogenic system, some of the radioactive krypton will be released with the purified gases. The potential also exists for higher doses to offsite populations in the event of uncontrolled releases caused by failures. Additional details for the system and its estimates, cost and construction schedule are shown in Table 1.

TABLE 1

COMPARISION OF ALTERNATIVES FOR DECONTAMINATION OF THE GASSES IN TMI-2 REACTOR BUILDING

	Charcoal	Compression	Cryogenic	Freon
Status of Technology	Known	Known	Known	Pilot scale only
System Complexity	Simple Static System, no pressure	Simple, but under pressure	Complex	Complex
*Cost of Installation	$120-160 million	$50-75 million	$10-15 million	$4-10 million
*Time to Install	30-40 months	25-35 months	20-30 months	18-36 months

*Preliminary cost and schedule estimates

Water Disposal

The licensee has not submitted a proposal for disposal of the decontaminated water. We expect a proposal to be submitted early in 1980. As soon as we receive the proposal, we will prepare the Environmental Assessment of the approach proposed.

A number of options are being considered by the licensee. The most direct and cheapest route is to release water to the Susquehanna River after processing reduces the radioactivity concentrations to those below the limits specified in 10 CFR 20 and the dose objective in 10 CFR 50, Appendix I. Examples of alternative approaches to river discharge are:

(1) Store onsite as liquid in large storage tanks. Approximately 3 to 8 million gallons of water would have to be stored for the life of the plant. The cost would be higher than river disposal and would not resolve the problem of ultimate disposal of the decontaminated water.

(2) Allow the decontaminated water to evaporate from a holding area. This method would avoid liquid releases but would result in the airborne release of tritium. This is a low-cost approach but it

is still more expensive than the release to the Susquehanna. However, among the problems associated with this approach are overflow due to storms and the disposition of nuclides left behind after the water has evaporated.

(3) Solidify as concrete and either store onsite or ship offsite for retention. This is an expensive option that involves forming large quantities of concrete. For example, the size of a concrete slab that would be formed would be 6 inches thick by 235 feet on a side. Approximately 900 shipments would be required to move the concrete offsite for disposal.