50-320

ROUTING AND TRANSMITTAL SLIP

1 TO (Name, office symbol or location) Albert P. Kenneke, PE	INITIALS / DATE	CIRCULATE / COORDINATION
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REMARKS

Here is some background questions and answers on reactor decontamination and decommissioning. We understand this subject is not the topic of the Tuesday meeting of Hendrie with Senator Hart. But some questions on decontamination and decommissioning may come up and we hope this will be of use at that time.

Do NOT use this form as a RECORD of approvals, concurrences, disapprovals, clearances, and similar actions

FROM (Name, office symbol or location)
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DATE 4/6/79

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OPTIONAL FORM 41 (Rev. 7-76) 7540-00-634-4041 5041-101
AUGUST 1967
GSA FPMR (41CFR) 101-11.206

4

118 257

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Decontamination Prior to Repair

Q. Should plant be decommissioned and repaired or scrapped?

A. Decommissioning and repair would represent a small fraction ot its replacement cost. The Northeast Power Pool is going to need that power before a replacement plant could be built.

We see no reason why this plant cannot be made safe the next time. Both NRC and Metropolitan Edison personnel are a lot wiser now.

Q. Can the plant be refurbished?

A. We think "yes" as we are not aware of any significant structural damage to the plant.

Primary coolant loops and reactor vessel internals may require extensive repairs.

Q. Do we have a technological base and experience in this sort of decontamination?

A. Yes, and companies are in this business.

- 35 years at government plants in which just about everything imaginable has occurred and been taken care of.
- 20 years in Navy programs, detailed procedures, much experience.
- La Crosse (BWR) gross failure of fuel cladding - confined to primary system and fuel storage pool.
- Incidents - SLI, EBRI, Redox, Thorex pilot plant, Calder Hall.

Q. When can it start?

A. As soon as most of the short-lived activity has decayed away.
- Probably within about 60 to 90 days.

Q. How long will it take?

A. Probably many months, but not years. Much depends on how much trouble is created by local hot spots in places difficult to get at and time required for equipment replacement.

Q. How much will it cost?

A. Decontamination by itself probably in the order of a few million dollars. Replacement of equipment could raise this figure into the tens of millions.

Q. Where will decommissioning wastes be sent?

A. Chem-Nuclear, Barnwell, S.C.; NECo, Beatty, Nev.; Hanford, Savanna River, Idaho.

Q. What will be the dose to public? To workers?

A. To the public, very little. To workers, tens of thousands of man-rems in total, but individually < 5 rem/year.

118 259

Q. Can we handle the failed fuel?

A. We think "yes".

Some will require canning - this is a well-known technology.

Q. What is disposition of fuel?

A. Store on site in SFSP, not an immediate problem. Some has value for research.

Q. Can failed fuel be shipped?

A. Yes, canned in standard casks.

Decontamination Only

Repair for Reuse	Versus	Decommissioning
Mild reagents		Stronger reagents
Careful treatment		Rough treatment
Down to MPC		Only clean enough to package.
Extensive Testing		Throw away
More Time		Less Time
Higher Dose		Min. Dose
More Waste		Less Waste

118 260

Decontamination

Q. The containment building has been too hot for personnel. If that continues, how can the building be cleaned up?

A. As a preliminary estimate it should be possible to reduce the radioactive contamination to levels so that personnel can enter by the use of one or both of the following:

1. The containment building spray can be used to wash contamination from the walls and collect it in water in the sump.
2. If the spray is not satisfactory a robot using a hydrolaser could be used to wash down the walls. A hydrolaser is a high-pressure, low-volume water washdown system that is commercially available.

Q. There are large volumes of contaminated water. What will be done with it?

A. The contaminated water will be processed to remove the radioactive materials. Processes consisting of filtration, ion exchange and evaporation will be used singly or in combination to accomplish this.

Q. Some of the fuel elements may be broken up. What is done with them?

A. The intact elements are removed to the fuel storage pool after placing them in special cans to avoid contaminating the pool. Broken fuel elements will be enclosed in shrouds as much as possible right in the core. The shrouds containing the broken fuel elements will be removed to the fuel storage pool after placing them in special cans to avoid contaminating the pool. Any small pieces of fuel elements that escape the shrouds will have to be collected in cans with aid of pickup tools and vacuum devices.

Q. Can't the plant be most easily decommissioned by entombment?

A. The technical studies we have conducted show that entombment is only slightly less expensive than the immediate dismantlement mode of decommissioning. Entombment requires that all of the radioactive materials from the whole facility be accumulated in the containment building which is then immobilized with concrete. Since some long-lived radioactive materials are involved a major question involves the long-term surveillance of the entombed structure and its ability to survive for very long periods of time.

118 262

Decommissioning

Q. How much will it cost to decommission the facility if it is needed?

A. We know from detailed technical studies that it will require about $42 million to decommission a large (1175 MWe) pressurized water reactor that has not been involved in an accident. The major differences for the accident case will be higher levels of contamination in the buildings and ruptured fuel elements. As soon as it is possible to estimate the costs associated with these differences they can be added to $42 million to get total estimate of the decommissioning cost.

Q. Is the technology available to decommission a large PWR?

A. Yes, our technical studies show that it is.

Q. Can a large PWR be safely decommissioned?

A. Yes, our technical studies for a 1175 MWe plant estimated a very small public exposure of 22 man-rem, mainly associated with transportation of the radioactive wastes from the site and an occupational exposure of 1300 man-rem spread over four years of the decommissioning operation.

STATEMENTS, QUESTIONS, AND ANSWERS REGARDING PACKAGING AND TRANSPORTATION OF RADIOACTIVE MATERIALS FROM THREE MILE ISLAND

I. PRIMARY COOLANT - Assuming the primary coolant is contaminated with fission products and, possibly, some fuel material fines.

1. Q - Can the primary coolant be transported from the 3MI site to a waste disposal site?

   A - These liquid high level wastes cannot be transported without some processing since there are no packages suitable or approved by NRC, at this time, for this type of material.

2. Q - What processing would be required for the primary coolant?

   A - Processing would involve normal liquid removal techniques such as filtering and collection on ion exchange resins. The processing could involve special handling or special equipment depending on the particular circumstances that may be encountered here.

3. Q - How would these solidified wastes be transported to a waste disposal site?

   A - This is a normal procedure and approved packages and sites are available.

4. Q - Will the fuel elements have to be transported for disposal?

   A - The fuel elements can be canned and stored at the site indefinitely. Some fuel elements, of course, will be transported to laboratories for examination and testing procedures and approved casks are available for transportation. Without special arrangements, some minimum cooling period is required for the fuel elements before they can be shipped.

5. Q - What are the means available for shipping low level liquids which result from clean-up and decontamination procedures?

   A - There are normal and adequate procedures which are now used for shipping low level wastes such as these.

6. Q - Will equipment, fixtures, etc. have to be disposed of?

   A - Some equipment, fixtures, etc. may not be capable of being decontaminated to a level where useable and, therefore, may have to be transported for disposal. There are adequate packaging and transportation means for this disposal, if required.

7. Q - What state restrictions exist for transportation of radioactive materials?

   A - See "State Legislation" bulletin of February 20, 1979.

INFORMATION REPORT ON

State Legislation

OFFICE OF STATE PROGRAMS
U. S. NUCLEAR REGULATORY COMMISSION
(301) 492-7794

Vol. 5, No. 4 February 20, 1979

I. The transportation of radioactive materials has been given wide visibility in the States over the last several years. The following is a partial list of State and local statutes.

STATE

Connecticut - Permit required

Florida - Advance notification

Louisiana - Spent Fuel and High-level Waste Shipments banned

Maryland - Bond and permit required

Massachusetts - No travel permitted on the Massachusetts Turnpike

Minnesota - Prior Notice required

New Jersey - Permit required

North Carolina - Prior Notice for shipments of spent fuel

Oregon - Prior Notice required

Rhode Island - Permit required

Vermont - Prior notification required

LOCAL

New London, Connecticut - Spent Fuel Shipments banned

Miami, Florida - All Radioactive shipments through Port banned

Chicago, Illinois - High Enriched Uranium and plutonium banned from O'Hare airport

For Further Information contact Elizabeth McCarthy

118 265

Local cont.

Wichita, Kansas - Recommends routing around city

Plymouth, Massachusetts - All shipments banned

Wendell, Massachusetts - Certain shipments banned

Carteret, New Jersey - Waste shipments banned

New York City - Spent Fuel Shipments banned

Suffolk County, New York - Prior Notice required

Beachwood, Brooklyn, Euclid, Lakewood, Mayfield Village, Olmstead Falls, Richmond Heights, Shaker Heights and South Euclid, Ohio - Spent Fuel Shipments banned

VI. INTRODUCTION OF NEW LEGISLATION

COLORADO

Waste Disposal Ban -- H-1162. Would prohibit the disposal of radioactive waste or material in Colorado. (Introduced 1/3/79)

CONNECTICUT

Conditions for Nuclear Plant Construction -- H-5096. Would ban construction of nuclear power plants in the State until the Commissioner of Environmental Protection finds that the Federal Government has identified and approved a demonstrable technology or means for the disposal of high-level nuclear waste. (Introduced 1/5/79)

Waste Burial Ban -- H-5097. "No individual, partnership, corporation, association or other legal or commercial entity, or state or local government or political subdivision or instrumentality thereof shall bury any nuclear radioactive waste within this state." (Introduced 1/5/79)

GEORGIA

Bonding Requirements -- H-420. Would authorize the Department of Human Resources to require bonds from all licensees to assure funds in the event of accident, abandonment, insolvency or other inability of a licensee to decommission his facility. (Introduced 1/19/79)

KANSAS

Decommissioning Cost Study -- S-87. Would direct the State Corporation Commission to study the costs of decommissioning a nuclear reactor from the viewpoint of the costs borne by ratepayers. The report would be due to the governor and legislature by 1/1/80. (Introduced 1/11/79)

On-Site Waste Prohibition -- S-97. Would prohibit on-site storage of waste at reactors for a period exceeding 5 years, unless a permit for a time extension has been granted by the Secretary of Health and Environment. The permit would only be issued for one year. (Introduced 1/16/79)

MASSACHUSETTS

Radiation Protection Division -- S-394. Would create a separate division of radiation protection to administer all laws regulating the use of ionizing and nonionizing radiation. (Introduced 1/3/79)

Radiation Treatment to Women -- H-2178. Would require that any individual who administers radiation treatments of any kind to a woman shall inquire whether the woman is pregnant, before administering the treatment and inform the woman of a potential health hazard. (Introduced 1/3/79)

Condition for Power Plant Construction -- H-2342. Would ban the construction of new nuclear plants until a method for permanently storing radioactive waste is developed, tested, proven safe, and fully licensed. The legislature by 2/3 majority determines that the specific conditions had been met. (Introduced 1/3/79)

State Notification of Waste Repository Investigations -- H-2343. Would direct that the Legislature be notified before any exploration, testing, drilling or investigation relating to the siting of a waste repository is conducted. Thirty-day advance notification would have to be given. (Introduced 1/3/79)

Spent Fuel Storage Ban -- H-2345. Would ban construction of storage pools for the temporary storage of spent fuel, except that which is built at the time of the reactors construction. (Introduced 1/3/79)

NEW MEXICO

Radioactive Waste Tax -- H-4. Would require a transportation permit prior to transporting radioactive waste by rail, air or commercial carrier. A tax would be 10% of the gross receipts attributable to services performed in the State. (Introduced 1/17/79)

NORTH DAKOTA

Legislative Approval for Waste Repositories -- S-2168. Would require prior legislative approval before radioactive waste could be deposited in the State. (Introduced 1/4/79)

RHODE ISLAND

Reactor Licensing --H-5102. "Every city or town shall have the power to regulate the keeping of nuclear reactors by granting licenses therefore upon such compensation for the benefit of the municipality as they shall see fit to impose or by refusing to grant them." (Introduced 1/3/79)

Robert G. Ryan, Director
Office of State Programs