



From: Jay C. Dillon, Jr.
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To: Mr. Robert Clark, Chief
Operating Reactors, Branch #3

August 12, 1981

Dear Mr. Clark:

I am a citizen concerned about the present application by Maine Yankee Atomic Power Company to increase the density of spent nuclear fuel rods contained in the holding tank at their reactor in Wiscasset, Maine.

I have made up a list of questions which I need to find answers for, in order to more fully understand the issue of the interim storage of nuclear waste.

On August 11 I attended a pre-hearing conference in Wiscasset where officials of the Atomic Safety and Licensing Board and the Nuclear Regulatory Commission were present. A Mr. Lessy (sp.?) gave me your name and address when I asked for information regarding the technical specifications of the spent fuel pool. Understanding the time limitation of the conference and not wishing to impede the progress of the conference in any way, I gratefully accepted the opportunity to write to your offices for the necessary detailed information.

I have separated the questions into groups and retyped them so that they are more legible and easier to organize answers for.

I am asking that you answer each question fully and in technical detail, including numbers and scientific terminology wherever necessary. If there are any answers which may contain classified information, I would like to know so that I do not waste a lot of time writing to different government agencies.

If I ask any questions which you cannot answer completely, please indicate which ones they are and try to get an address so that I can continue the research. Also, if you are too busy to answer or do the research yourself, please provide me with a bibliography which will be adequate. I have access to a large library here in Maine.

Any assistance from your office will be very much appreciated.

Thankyou,

Jay C. Dillon, Jr.

Jay C. Dillon, Jr.

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Questions for Atomic Safety and Licensing Board, Aug. 11, 1981.
(Information requested for a more adequate understanding of
the spent nuclear fuel storage problems at Maine Yankee.)

TEMPERATURES:

- 1.) What is the design water temperature for water in the spent fuel holding tank at Wiscasset, Me.?
- 2.) Is there any upper limit of water temperature for safe cooling?
- 3.) What is the temperature in the spent fuel tank now (recent)?
- 4.) Is there a historical record of tank temperatures from 1972 to present (please provide if available, with full documentation including numerical values, i.e. if you have a line graph, please provide the numbers also, if available)?
- 5.) What temperatures are projected in the spent fuel holding tank for the years 1981 - 2008, assuming Maine Yankee receives permission to increase spent fuel density?
- 6.) How much heat is being produced now by the spent fuel in the tank (in kilowatts)?
- 7.) Can you provide numbers showing the kilowatt heat production of the spent fuel in the tank, 1972 to present, taking into account the addition of fresh spent fuel loads and the cooling rate of these materials?
- 8.) If available, are the numbers cited in #7 estimated or actually measured?
- 9.) What levels of heat production are projected assuming Maine Yankee achieves its proposed schedule of re-racking and/or compacting spent fuel until the year 2008?
- 10.) Where and how often are pool temperatures monitored (indicate placement of thermometers, if any)?

- 11.) Are the thermometers equipped with alarms?
- 12.) According to the Report to the President by the Interagency Review Group on Nuclear Waste Management, Table 3, D7, March 1979, entitled "Repository Design Assumptions," (regarding underground deposits of nuclear spent fuel), "The areal requirements are strongly dependent on the emplacement densities employed. It should be noted, however, that a basis for choosing a thermal emplacement density has not been established. The integrated thermal output of spent fuel is appreciably higher than that of high-level reprocessing waste due to the large quantity of contained transuranics."

In view of the above, is there any method to determine a 'thermal emplacement density' for spent fuel rods in underwater holding tanks? The table calls for 50 metric tons of spent fuel per acre for underground deposits. How does this relate to the mass-emplacement density in a spent fuel pool?

ROD SPACING:

- 1.) How close were the fuel rods packed in their assemblies in 1972 at Maine Yankee?
- 2.) How close were the fuel assemblies packed in 1972?
- 3.) What is the historical record of re-racking at Maine Yankee, 1972-present?
- 4.) What will the proposed re-racking at Maine Yankee mean in terms of fuel rod separation, fuel assembly separation, and spent fuel density until the year 2008?

TANK SPECIFICATIONS:

- 1.) What tonnage was the tank designed to hold?
- 2.) What stress limits and maximum tonnage per square foot does the tank design incorporate, if any?
- 3.) What reinforcements (rebar, etc.) were added to strengthen the pool concrete?
- 4.) What strength earthquake could be expected to damage the floor or walls of the tank?
- 5.) What studies have been done to predict the possibilities of seismic activity at or near the site?
- 6.) How deep is the water in the tank now (measured from tank floor to water surface)?
- 7.) What are the exact dimensions of the interior of the spent fuel tank?
- 8.) What is the surface area of the water in the spent fuel tank?
- 9.) How many gallons of water were in the tank in 1972, and for each year thereafter; and how many gallons will be in the tank 1981-2008, assuming Maine Yankee performs all proposed re-racking operations?
- 10.) How often has the water in the pool been filtered since 1972, and what types and amounts of radiation have been filtered out?
- 11.) What cooling methods are used in the tank?
- 12.) What kind of monitoring is performed on the tank, if any?

SPENT FUEL:

- 1.) What amounts of 'fissionable materials' does the tank contain presently?
- 2.) What is the historical record 1972-1981, of the fissionable materials contained in the tank, and what amounts are projected for the future assuming Maine Yankee performs the proposed re-racking? (Please provide radioisotope names and curie amounts and half-lives).
- 3.) How much spent fuel is added each year to the tank?
- 4.) What historical record and future projections are available for the piling of spent fuel in the tank, including all fission products, actinides, cladding materials - tonnage and levels of activity?
- 5.) What is the volume in cubic meters of 100 tons of spent fuel, including volume of fuel assemblies and all structural components?
- 6.) Do the fission products within the fuel rods migrate within the tubes (cladding)?
- 7.) What chemical reactions can be expected within the spent fuel rods, if any?
- 8.) How does increasing the density of fuel rods affect the observed levels of activity?
- 9.) What studies have been done to answer #8, if any?
- 10.) How does the radioactivity within and between the fuel assemblies affect the materials constituting them?
- 11.) What monitoring is done for radiation levels underwater?
- 12.) What concentrations of boron are used and how are boron levels measured and monitored?



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