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Herb
Angela

Los Alamos
Los Alamos National Laboratory
Los Alamos, New Mexico 87545

DATE: August 29, 1984
IN REPLY REFER TO: Q-6-798 (R649)
MAIL STOP: K557
TELEPHONE: (505) 667-7020
FTS 843-7020

Safety Assessment

Mr. C. O. Thomas, Chief
Standardization & Special
Projects Branch
Division of Licensing
Mail Stop 340-Phil
US Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir:

Enclosed are preliminary questions resulting from our review of the proposed license renewal documentation for the Manhattan College Zero Power Reactor (MCZPR), License No. R-94.

We found that the MCZPR Technical Specifications were adequate for our review, but they deviated somewhat from the format of ANSI 15.1.

These are rough working papers and are meant solely for your use in the further consideration of this proposed license renewal. If you have any questions about this document, please call me at the above number or, in my absence, call C. A. Linder on FTS 843-9206.

Sincerely,

C O Linder for
J. E. Hyder

JEH/jl

Enc. as cited

Cy: H. N. Berkow, NRC/NRR
M. G. Stevenson/W. L. Kirk, Q-DO, w/o enc., MS E561
L. H. Sullivan/J. R. Ireland, Q-DO/RS, MS K552
R. A. Haarman/W. S. Gregory, Q-6, MS K557
C. A. Linder, Q-6, MS K557
CRM-4 (2), MS A150
Q-6 File

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PRELIMINARY QUESTIONS FOR MCZPR TER

1. Describe the current core lattice configuration and provide a diagram showing it.

2. For the partial fuel elements, are nonfuel-bearing dummy plates used to replace certain fuel-bearing plates?

3. Can the control rods be moved to different positions within the core lattice?

4. Can the control rods be ganged?

5. Provide a more detailed description of the control rod drive system and the coupling to the control rods.

6. How high above second floor level is the top of the reactor tank?

7. Provide a diagram of the fuel element hold-down rods. How are these removed or inserted during fuel handling operations?

8. What is the effective delayed neutron fraction (β_{eff})?

9. There needs to be a Technical Specification on the reactivity worths of experiments.

10. Can experiments that decrease the total excess reactivity be placed in the core?

11. Are ^{235}U foils or fission chambers the only "experiments" allowed in the core?

12. Describe your experimental program in more detail.

13. What is the total rod worth? What are the individual rod worths?

14. What is the maximum excess reactivity?

15. What materials compose the safety control rod that is kept on the platform? What is its reactivity worth? What do you call this rod?

16. Are there plans to add refrigeration equipment to the demineralizer loop heat exchanger to cool the pool water below ambient temperature?

17. What are the operating limits for the pool water resistivity?

18. What is the flow rate through the demineralizer?

19. Does the pool water make-up system have a separate demineralizer?

20. Describe the experimental facilities.

21. Describe the administrative organization of the radiation protection program, including the authority and responsibility of each position identified.

22. Describe the responsibilities of the Radiation Safety Office staff at the reactor facility. Identify the radiation safety related tasks that are performed routinely by the reactor staff.

23. Describe any radiation protection training for the non-Health Physics staff. If possible, provide a topic outline of the courses and indicate the normal duration of each course or lecture.

24. Summarize your general radiation safety procedures. Identify the minimum frequency of surveys, action points (levels), and appropriate responses.

25. Describe your program to ensure that personnel radiation exposures and releases of radioactive material are maintained at a level that is "as low as reasonably achievable" (ALARA). Identify steps taken to implement the ALARA principle.

26. For all fixed-position radiation and effluent monitors, specify the generic types of detectors and their efficiencies and operable ranges.

27. For the fixed-position radiation and effluent monitors, describe the methods and frequency of instrument calibration and routine operational checks.

28. Identify the generic type, number, and operable range of each of the portable Health Physics instruments routinely available at the critical facility. Specify the methods and frequency of calibration.

29. Describe your personnel monitoring program. Describe calibration procedures for any in-house portions of this personnel monitoring program. Describe any Quality Assurance studies for the commercially supplied portions.

30. Identify any administrative personnel exposure limits and anticipated actions if these levels are exceeded. Also, identify the operational constraints that are placed on personnel entering potential radiation/high radiation or contaminated areas.

31. Provide a summary of the critical facility's annual personnel exposures [the number of persons receiving a total annual exposure within the designated exposure ranges, similar to the report described in 10 CFR 20.407 (b)] for the last 5 yr of operations.

32. List all parameters that are alarmed in the control room and specify the alarm trip settings.

33. Describe your environmental monitoring program and summarize the results for the past 5 yr.

34. Describe the liquid radwaste management program. Specify the locations and sizes of hold-up/storage tanks; summarize the sampling procedures and analytical techniques.

35. Describe the solid radwaste management program, including segregation and handling practices.

36. Summarize the quantities of liquid and solid radioactive waste resulting from reactor operations for the last 5 yr (total activity of each physical form at time of release or shipment for each year).

37. What is the void coefficient in units of $\Delta k/k$ per the per cent void?

38. What is the effective prompt neutron lifetime?

39. What is the clean, cold, critical mass?

40. What is the maximum thermal neutron flux?

41. What is the nominal water channel width between fuel plates in a fuel element?

42. What are the dimensions of the fuel plates?

43. What is the travel and withdrawal speed of each control rod?

44. What is the weight-per cent of ^{235}U in each fuel element?