February 5, 2002

Dr. David B. Ashley, Director
Engineering Experiment Station
Ohio State University
167 Hitchcock Hall
Columbus, OH 43210

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION

Dear Dr. Ashley:

We are continuing our review of your application for renewal of Facility Operating License No. R-75 for the Ohio State University Research Reactor (OSURR) which you submitted on December 1999. During our review of your application for renewal request, questions have arisen for which we require additional information and clarification. Please provide responses or a schedule to respond to the enclosed request for additional information within 30 days of the date of this letter. In accordance with 10 CFR 50.30(b), your response must be executed in a signed original under oath or affirmation. Following receipt of the additional information, we will continue our evaluation of your amendment request.

Should you have any questions regarding this review, please contact Mr. Patrick Isaac, at (301) 415-1019.

Sincerely,

/RA/

Marvin Mendonca, Senior Project Manager
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-150

Enclosure: As stated

cc w/enclosure: Please see next page

cc:

Ohio Department of Health
ATTN: Radiological Health
Program Director
P.O. Box 118
Columbus, OH 43216

Ohio Environmental Protection Agency
Division of Planning
Environmental Assessment Section
P.O. Box 1049
Columbus, OH 43216

Mr. Richard D. Myser
Reactor Operations Manager
Engineering Experiment Station
Ohio State University
142 Hitchcock Hall
Columbus, OH 43210

Dr. William Vernetson
Director of Nuclear Facilities
Department of Nuclear
Engineering Science
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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REQUEST FOR ADDITIONAL INFORMATION
OHIO STATE UNIVERSITY RESEARCH REACTOR
DOCKET NO. 50-150

1. Please list the shared facilities or equipment, if any, and discuss the impact on the operation and safety of the facility. (Reference: NUREG 1537, Part I, Section 1.4)

2. Provide a list of or confirm that there are no other reactors with principal similarities with OSURR now that it has low-enriched uranium silicide-aluminum dispersion fuel. (Reference: NUREG 1537, Part I, Section 1.5)

3. Briefly discuss reactor operations, experimental programs, and mission of the reactor in reference to the license renewal period. Refer to current and proposed operational plans. (Reference: NUREG 1537, Part I, Section 1.6)

4. What is located in the area up to 8 km (4.8 miles) radius from the reactor site? What are the demographics in the area up to 8 km (4.8 miles) radius from the reactor site? Are there any hazardous industries located in the area up to 8 km (4.8 miles) radius from the reactor site? Are there any major rail lines located in the area up to 8 km (4.8 miles) radius from the reactor site? Please assess the affect on the safety of the reactor facility if any.

5. What is the location of nearest major airport? How close are the flight paths to the reactor site? Please assess the affect on the safety of the reactor facility if any. (Reference: NUREG 1537, Part I, Section 2.2)

6. Discuss postulated accidents at identified facilities in the area up to 8 km (4.8 miles) radius from the reactor site that may affect the safety of the reactor facility. (Reference: NUREG 1537, Part I, Section 2.2)

7. Are the 65,000 students, staff and faculty included in the population figures in the table of Section 2.2.1 of the SAR?

8. What is the site history for severe weather such as tornados and high winds? What is the frequency and severity of such weather? Is there any possibility of surface flooding that would affect the OSURR site?

9. Discuss the possibility of sky shine from the reactor with a loss of coolant. (Reference: SAR Section 2.3.3)

10. Discharge from the tertiary loop is to a floor drain on the main floor of the reactor building. What is the pathway of water after entering the reactor building floor drains? Are the drains monitored for radiological releases? Discuss the need for such monitoring. (Reference: SAR Sections 3.2.2.2 and 6.2.4.2)

11. Are there any private or otherwise owned wells in the vicinity of OSURR site that may be affected by reactor operations? If so, discuss the need to monitor for radioactivity.

ENCLOSURE

12. Are there any systems or practices used to minimize the activation of the pool wall? What affect does radiation have on the pool wall and liner integrity? What surveillance is done to assess damage of the pool wall and liner? Discuss aging effects of the fiberglass-reinforced epoxy paint in the reactor pool and the bulk shielding pool. (Reference: SAR Section 3.1.1.1)

13. This quote is taken from SAR Section 3.1.1.2: "Blister tests conducted in the RERTR program on high burnup fuel have provided data which can be used to show that no fission product releases will occur from the fuel in the OSURR core even under maximum credible accident conditions that do not involve direct mechanical damage to the fuel plates." Please provide the reference for this conclusion?

14. Discuss the Wigner effect with the graphite in column, the graphite filled central irradiation facility (CIF), the graphite isotope irradiation elements (GIIE), beam plugs, and the solid graphiteflectors. Also discuss the possibility of gas buildup in the thermal columns, CIF, GIIEs, beam plugs, and the solid graphite reflectors. (Reference: SAR Sections 3.1.1.3, 3.1.2.1, 3.1.3.1, 3.8.1, 3.8.4, and 3.8.6)

15. If coolant temperatures can be as high as 145 ^{o}F what is the expected maximum cladding surface temperature with heat transfer? In SAR Sections 4.8.1 and 4.8.2 the average fuel plate and channel is used to calculate the coolant outlet temperature and cladding surface temperature. What is the expected maximum coolant outlet temperature and cladding surface temperature for the hottest channel? Verify these valves are acceptable through reference or analyses. (Reference: SAR Sections 4.8.1 and 4.8.2)

16. What is the estimate of the temperature rise across the hot channel? (Reference: SAR Section 4.9.2)

17. Discuss the difference in the estimated and the measured void coefficient. How will this difference affect the safety analyses of this reactor? (Reference: SAR Section 4.5)

18. In SAR Section 3.2.2.1 the following statement is made: "The pump is protected from running dry in that if the water level drops low enough to expose the pump head, the reactor will have already tripped, blocking operation of the primary pump." Does the pump automatically trip if there is a reactor trip? Discuss how this protection is provided.

19. Are there I&C comparisons that are current? Please point out any particular similarities and/or differences with the comparable systems. (Reference: SAR Section 3.3.1)

20. Discuss the aging effects of the control system. If vacuum tube technology is used, discuss the challenges to maintaining such a system that may affect the ability to operate safely for the duration of the renewed license? (Reference: SAR Section 3.3.7)

21. In SAR Section 3.3.16 the following statement is made. "A 'Fast Scram' occurs when reactor power reaches 150% of full power." This would be 750 kW. Discuss why this is different from the TS 2.2.(2).

22. In SAR Section 7.3.7 the following statement is made. “Administrative controls are established to allow NRL personnel discretion in approving and carrying out experiments and operations in a safe manner.” How are the requirements of 10 CFR 50.59 met?

23. Are there facilities available to store the radioactive effluent if necessary? (Reference: SAR Section 6.2.3)

24. Please discuss the difference between confinement and containment. Does not the use of a facility designed for confinement as containment cause uncontrolled releases at ground level? Please quantify the dose to the unrestricted areas. Compare ground release (release from a leaky building with the ventilation secured) with the controlled release from the 30 ft high release point when the ventilation is operable. Please justify such operational actions as advocated in Section 6.3.6.4 with calculations or operational data. What is the decision tree used by the staff to decide the action to take? (See question 33 also)

25. Does the Director of the Radiation Safety Section (RSS) have authority separate and similar to the Manager of Operations such that “he or she may terminate any operation at any time if it is deemed to be or likely to adversely affect the health or safety of the public?”

26. The SAR states that fuel element handling tools are kept stored and locked during reactor operation, and OSURR operational procedures require that the reactor be shut down with the control rods fully inserted into the core during all fuel element movements. Please justify why this should not be a limiting condition of operation (LCO) in the TS? Please justify why this TS should not also establish the configuration of the confinement system (building and ventilation configuration) during fuel movement.

27. Please discuss a reactivity accident with the initial conditions of low-power.

28. TS 3.2.1 specifies that the control rod drop time is 600 msec. The control rod drop time used for the analysis of design basis accident appears to be 530 msec (Table 8.3). Please discuss how the 70 msec difference will affect the results of the analysis.

29. In TS 1.3 “Scram Time” is defined. Does control rod drop time have the same definition?

30. In the bases for TS 3.2.1, the referenced SAR Section 4.3.3 does not exist. What is the correct reference?

31. The basis for TS 3.2.2 states that the specification is based on a continuous reactivity insertion event. Is this referring to an analysis of a reactivity ramp accident? Please provide a description of that event and the analysis which leads to the maximum reactivity insertion rate specification of 0.02% Dk/k per second.

32. In TS 3.2.3 the terms slow scram and fast scram are used. Please include a definition of these two terms in Section 1.3 of the TSs.

33. In TSs 3.4 and 3.5 there appears to be a confusion between confinement and containment systems. Please review these TSs and clarify the wording such that it is clear which system you have and wish to maintain and use in your analyses and emergency response. This same confusion appears to exist in the SAR especially in the last two paragraphs of Section 8.4.4.5. If the ventilation is intended to be secured during an event the building leakage rate should be determined and used to calculate the unrestricted airborne and direct (from the building) dose with a ground release during a damaged fuel plate type accident. (See question 24 also)

34. In TS 3.4, is the analysis referenced in the “revised SAR of September 1987" also in the SAR submitted with the license renewal application?

35. Please discuss and justify the fact that the specification of TS 3.7.1(4) is greater than TS 3.2.2.

36. Please provide justification for not having a TS placing limits on fueled experiments.

37. TS 6.2.4(7) refers to the TS Section 6.6.4. This section is not part of the TSs. What is the proper reference?

38. In TS 6.3.1 it is indicated that procedures are not meant to preclude the use of “independent judgement.” Please discuss what is meant by “independent judgement” in association to approved and reviewed procedures and the limits that are placed on this “independent judgement.”

39. Please provide justification for not including electrical interaction with reactor instrumentation as a valid consideration in experimental evaluation in TS 6.4.2(3).