



NUCLEAR SCIENCE & ENGINEERING

Cornell University
Ward Laboratory
Ithaca, NY 14853-7701

607/255-3480 Fax 607/255-9417

Nov. 27th, 1996

Mr. Theodore S. Michaels
Senior Project Manager
Non-Power Reactors and Decommissioning
Project Directorate
U.S. Nuclear Regulatory Commission
MS: 11B20
Washington, DC 20555

Subject: Facility License R-89; Docket 50-97: Request for License Amendment to Withdraw Authorization to Operate Cornell University's Zero Power Reactor.

References: 1) Letter, Howard C. Aderhold (C.U.) to Document Control Desk, (U.S. N.R.C.), dated Nov. 1st, 1996.
2) Facsimile, Theodore Michaels (U.S.N.R.C.) to Howard Aderhold (C.U.), sent Nov. 22nd, 1996.
3) Safety Evaluation Report (NUREG 1010)
4) Ward Laboratory Emergency Plan
5) Ward Laboratory Physical Security Plan

Dear Mr. Michaels:

This letter is in response to your request for additional information in consideration of our telephone conversation of Nov. 21st and your facsimile received on Nov. 22nd. For completeness, the License and Technical Specification amendments requested in Cornell University's original request (Ref. 1), and the additional information being supplied in response to the NRC staff review, have been combined and are enclosed as an attachment to this letter.

The attachment includes: a) a reworded amendment request for license condition B.2, b) additional technical specifications deletions in the Definitions (§1) and Administrative Controls (§6) subsections, and c) several additional requests for the rewording of technical specifications in the Definitions (§1.1), Reactor Safety System and Radiation Monitors (§4.3), Fuel Storage (§5.3), and Reporting Requirements (§6.11) subsections.

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Cornell University appreciates your assistance in considering this request and is hopeful of an expeditious approval. If you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "H. Aderhold".

Mr. Howard Aderhold
Laboratory Director

Attachment - as above

cc: Thomas F. Dragoun; Regional Administrator, N.R.C. Region I.
Norman Scott; V.P. for Research & Advanced Studies, Cornell University.
K.B. Cady; Chairman, Ward Laboratory Safety Committee.

Requested Amendments to License and Technical Specifications

In support of Cornell University's request to have the NRC withdraw authorization to operate the CU Zero Power Reactor, CU hereby requests that license conditions B.1, B.2 and B.3 in it's Zero Power Reactor License R-89 be amended to read as follows:

- B. Subject to the conditions and requirements incorporated herein, the Commission hereby licenses Cornell University:
1. Pursuant to Section 104(c) of the Act and 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," to possess, but not operate the Zero Power Reactor in accordance with the procedures and limitations described in the application and this license;
 2. Pursuant to the Act and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," to possess up to 40.0 kilograms of uranium 235 contained in uranium enriched in the isotope uranium 235 and up to 16.0 grams of plutonium contained in a plutonium-beryllium source;
 3. Pursuant to the Act and 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to possess, but not to separate such byproduct material as may have been produced by past operation of the reactor.

Further, CU hereby requests that license condition C.1 be deleted in its entirety and license condition C.2 be amended to read as follows:

C.2 Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 3, are hereby incorporated into the license. The licensee shall possess the facility in accordance with the Technical Specifications as amended.

In support of the above request, CU hereby commits to cease operation of its Zero Power Reactor immediately upon obtaining the requested license amendment.

Prior to this amendment change, CU will remove all fuel from the reactor core so as to render the reactor incapable of achieving criticality. The three control rod clusters with lower fuel follower sections will also be removed. The fuel elements removed from the core will be stored in a subcritical and safe geometry in the facility's secure fuel storage areas. All fuel will be stored outside of the reactor grid plate and tank in a configuration such that K_{eff} is no greater than 0.8 for all possible conditions of moderation and reflection. No fuel will be stored in, or otherwise placed into, the reactor grid plate or tank. The plutonium-beryllium startup source will be removed from its mounting in the reactor tank and placed in safe storage along with the fuel. The above activities may be achieved under the stipulations of the current operating license and technical specifications. CU will continue to safely store the Zero Power Reactor fuel until such time as arrangements can be made for shipping it offsite for ultimate disposition.

In view of the above request to withdraw CU's authorization to operate its Zero Power Reactor (R-89), there are several technical specifications which CU wishes to amend, by deleting. These technical specifications are listed below:

1. Definitions -

- 1.1 Reportable Occurrences §(1),(2),(3),(5)
- 1.2 Channel Calibration
- 1.3 Channel Check
- 1.4 Channel Test
- 1.5 Control Rod Cluster
- 1.6 Corrosive Materials
- 1.7 Engineered Safety Features
- 1.8 Experiment
- 1.9 Experiment, Secured
- 1.10 Experiment, Unsecured
- 1.11 Explosive Material
- 1.12 Measuring Channel
- 1.15 Operator
- 1.16 Reactivity, Excess
- 1.17 Reactivity Worth
- 1.18 Reactor Operation
- 1.19 Reactor Safety System
- 1.20 Responsible Person
- 1.21 Safety Channel

1.22 Second Person

2. Safety Limits and Limiting Safety System Settings -

2.1 Safety Limits

2.2 Limiting Safety System Settings

3. Limiting Conditions for Operation -

3.1 General

3.2 Reactivity Worth of Experiments

3.3 Reactivity Worth of Control Rods

3.4 Reactivity Insertion Rates

3.5 Personnel

3.6 Measuring and Safety Channels

3.7 Isolation of Reactor Cell

4. Surveillance Requirements -

4.1 Visual Inspection of Core

4.2 Control Rods

4.3 Reactor Safety System and Radiation Monitors §(a),(b),(c),(d),(e)

4.4 Water Quality

6. Administrative Controls -

6.1 Organization and Responsibilities of Personnel §(a),(f)

6.2 Review and Audit §(b)-(3)&(6)

6.3 Procedures §(a)&(b)

6.4 Review of Proposals for Experiments

6.6 Operator Requalification

6.8 Action to be taken in the event a safety limit is exceeded

6.9 Action to be Taken in the Event of a Reportable Occurrence §(a)

6.11 Reporting Requirements §(a)(2), (b)(2), (c), (d), (e)(2),(3),(4)

Inasmuch as CU will not be authorized to operate the Zero Power Reactor and that the reactor will be rendered incapable of achieving criticality, it will be unequivocally unnecessary and/or impossible to meet these technical specification requirements.

Further, there are several technical specifications which CU wishes to amend by rewording. These technical specifications, as modified, are listed below:

1. Definitions

1.1 Reportable Occurrences

- i) Item (6); delete last part of sentence, "... in connection with the operation of the reactor."
- ii) Renumber subsections numbered (4), (6) & (7) as (1), (2), & (3) respectively.

4.3 Reactor Safety System and Radiation Monitors

- i) Applicability: Omit and replace with, "This specification applies to the surveillance requirements for the ZPR cell and control room radiation monitors."
- ii) Bases: Omit first two sentences of paragraph leaving "Verification of alarm set points for the radiation monitors insures that adequate warnings of potential radiation exposure are provided."
- iii) Specifications: Item (f): Omit and replace with, "The alarm set points for the Zero Power Reactor cell and control room radiation monitors shall be verified on a semi-annual basis."

5.1 Reactor Fuel - paragraph #3: Omit - "... when loaded into the reactor tank...".

5.2 Reactor Cell - Omit last sentence reading, "When water rises above a level below the bottom of the fuel, the reactor cell is automatically sealed."

5.3 Fuel Storage - Amend the second sentence to read, "The only exception to this is when fuel material is in transit between the locked rooms or when limited amounts are outside of the locked rooms for maintenance purposes." Further, amend the last paragraph to read, "All fuel will be stored outside of the reactor grid plate and tank in a configuration such that K_{eff} is no greater than 0.8 for all possible conditions of moderation and reflection. No fuel will be stored in, or otherwise placed into, the reactor grid plate or tank."

6.1 Organization and Responsibilities of Personnel Item (c): Omit "... (including but not limited to the Zero Power Reactor)..."

6.2 Review and Audit Item (a): Omit and replace with, "There will be a Ward Laboratory Safety Committee which shall review the ZPR reactor status

within the Laboratory."

6.11 Reporting Requirements Item (e)(1): Omit and replace with, "A brief narrative summary of (1) changes in facility design related to reactor safety occurring during the reporting period, and (2) results of surveillance tests and inspections."

The Technical Specifications as amended will ensure the appropriate oversight of the facility during the possession only phase and through decommissioning. The technical specifications will still require that:

- 1) All fuel will be stored in accordance with existing technical specification requirements for safe and secure fuel storage.
- 2) All fuel movements required to achieve the safe and secure storage will be conducted following existing fuel handling and storage practices and procedures.
- 3) The physical security of the stored fuel will be assured by continuing to implement the measures specified in CU's NRC approved Physical Security Plan, which remains in effect.
- 4) The Emergency Plan and Emergency Procedures will remain in effect.
- 5) All existing pertinent safety related technical specifications applicable and relevant to the reactor in a permanently shutdown/possession only mode and/or to safe handling and storage of fuel will remain in effect. The requirements of these technical specifications will continue to be met until the fuel is shipped off site for ultimate disposition.

Clearly, with the reactor being incapable of achieving criticality, the fuel being stored in approved secure locations, and in view of all of the above described measures to ensure safety and security, there are no safety considerations affected by this request.