STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

RHODE ISLAND ATOMIC ENERGY COMMISSION
Rhode Island Nuclear Science Center
16 Reactor Road
Narragansett, RI 02882-1165

November 20, 2003

Docket No. 50-193

Mr. Marvin Mendonca, Senior Project Manager
Non-Power Reactors, Decommissioning and
Environmental Project Directorate
Division of Reactor Projects - III/IV/V
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Mendonca:

This letter concerns revision of the Rhode Island Atomic Energy Commission License R-95. The following three changes to the Technical Specifications are requested:

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(1) To change the following surveillance specification items concerning the inspection of the core components from annually to a five year cycle.

Surveillance specifications	4.9.a. Beryllium Reflectors (page 38)
	4.9.b. LEU Fuel Elements (page 39)

Basis for this change: The Technical Specifications require an annual test and check of the above surveillances of core components (54 elements [fuel and reflector]). The annual inspection of irradiated fuel elements consists of visually inspecting the elements for cracking and/or swelling. Inspections of fuel element are conducted with the element hanging about ten feet below the pool water level to reduce dose rates to personnel. Due to the construction of a fuel element, these inspections are of minimal value as one can only see the two outside surfaces of the outside fuel plates on anyone fuel element. Each fuel element has 42 fuel plate surfaces that cannot be visually inspected with any confidence in the results.

The annual inspection interval of these tests and checks create too many chances to damage and/or drop an element with almost no chance of sighting any swollen or cracked element. To minimize these chances, the core components should be visually inspected and functionally fit into the core grid box on a continuing basis – approximately eleven elements (three fuel & eight reflectors) per year, ideally, during

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normal core configuration changes and experiments. This frequency will result in the test and checks of all the elements of the core are completed within a five-year period.

The Technical Specification (4.3.a.3) currently requires that the primary coolant water be analyzed weekly to detect a ruptured element. This technical specification requirement provides for the most sensitive method to discover a failed element.

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(2) To change the following Reactor Safety System specification:

a. Add paragraph 3.2.5. – 'At least one radiation monitor on the experimental level of the reactor building and one monitor over the reactor pool are operable and capable of warning personnel of high radiation levels.'
b. Remove listing of area monitors and the continuous air monitor from table 3.2.
c. Add note to table 3.2 – 'Grab sampling may be substituted for monitoring operations for up to eight hours in the event of a monitor failure.'
d. Add text to the bases: page 16.

Basis for this change: The current Technical Specification requires a minimum of two radiation monitors to warn personnel of abnormal radiation levels. However, the current Technical Specification is ambiguous and fails to provide a practical alternative in the event of monitor failure. The change ensures that monitors are provided to cover the two main experimental areas within the reactor area. Failure of either monitor necessitates grab sampling coverage until the monitor can be fixed or the risk is terminated by normal reactor shutdown.

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(3) To change page 42, paragraph 6.1.2

from: 'An operator or senior operator licensed pursuant to 10CFR55 shall be present in the control room unless the reactor is <u>secured</u> as defined in these specifications. The minimum operating crew shall be two individuals.'

to: 'An operator or senior operator licensed pursuant to 10CFR55 shall be present in the control room unless the reactor is <u>shutdown</u> as defined in these specifications. The minimum operating crew shall be two individuals.'

Basis for this change: To allow the reactor operator to leave the control room in order to conduct routine pre-checks of systems and experiments at the pool level without having to turn the control console master switch to the off position.

Enclosed is an original and changed pages, (changes identified with mark in right margin), of the Technical Specifications. This change is submitted as amendment # 29.

If there are any questions regarding these changes to the Technical Specifications, you can reach me at (401) 789-9391.

Sincerely,

Terry Tehan, Ph.D
RI Atomic Energy Commission, Director

cc: Craig Bassett, U.S. NRC, Region 2

Specification 3.1.10 assures that the full volume of the pool water is available to provide cooling of the core during normal operation and in the event of a loss of coolant accident.

3.2 Reactor Safety System

Applicability:

These specifications apply to the reactor safety system and other safety related instrumentation.

Objective:

To specify the lowest acceptable level of performance or the minimum number of acceptable components for the reactor safety system and other safety related instrumentation.

Specification:

The reactor shall not be made critical unless:

1. The reactor safety systems and safety related instrumentation are operable in accordance with Tables 3.1 and 3.2 including the minimum number of channels and the indicated maximum or minimum setpoint;

2. All shim safety blades are operable in accordance with Technical Specification 4.1.1 and 4.1.2.

3. The time from initiation of a scram condition until the control element is fully inserted shall not exceed 1 second in accordance with Technical Specification 4.2.5 and 4.2.6.

4. The reactivity insertion rates of individual control and regulating blades will not exceed 0.02 %ΔK/K per second.

Bases:

Neutron flux level scrams provide redundant automatic protective action to prevent exceeding the safety limit on reactor power. The period scram limits the rate of rise of the reactor power to periods which are manually controllable without reaching excessive power levels or fuel temperatures.

The loss of flow scram assures that an automatic loss of flow scram will occur in the event of a loss of flow when the reactor is operating at power levels above 0.1 MW.

The reactivity insertion rate limit was determined in the SAR, Section XI and predicts a safe fuel clad temperature.

TABLE 3.2

Required Safety Related Instrumentation

	Instrumentation	Setpoint	Minimum Number Required	Function	Reactor Operating Mode In Which Reqd.
1.	Reactor Coolant Inlet Temperature	≤ 111°F	1	Alarm	FC ≥ 0.1MW
2.	Reactor Coolant Outlet Temperature	≤ 119°F	1	Alarm	FC ≥ 0.1MW
3.	Log Count Rate	< 3 cps	1	Rod with-drawal interlock	Both Modes
4.	Servo Control Interlock	≥ 30 sec (fullout)	1	Auto Control Interlock	Both Modes
Facility Radiation (a) Monitoring System					
5.	Building Air Gaseous Exhaust (Stack)	2.5 x normal particulate 2 x normal	1	Alarm	Both Modes
6.	Reactor Bridge	2 x normal	*	Alarm	Both Modes
7.	Fuel Safe	2 x normal or 5mR/hr, which ever is higher	*	Alarm	Both Modes

Review of the experiments using the appropriate LCO's and the Administrative Controls assures that the insertion of experiments will not negate the consideration implicit in the Safety Limits.

4.9 Reactor Core Components

Applicability:

This specification applies to the surveillance requirements for reactor core components affecting reactor power.

a. Beryllium Reflectors

Applicability:

This specification applies to the surveillance of beryllium lifetime for the standard and plug type beryllium reflectors.

Objective:

To prevent physical damage to the beryllium reflectors in the core from accumulated neutron flux exposure.

Specification:

The maximum accumulated neutron flux shall be 1×10^{22} neutrons/cm^2. The exposure shall be determined annually in accordance with the operating procedures. Inspections and core fit shall be conducted annually.

Bases:

The RINSC SAR (Part A Section VIII) has addressed this limit as a conservative limit. (Annual inspections and core box fit as well as calculated total exposure serve as a method to monitor the beryllium lifetime.)

b. LEU Fuel Elements

Applicability:

This specification applies to surveillance of LEU fuel elements.

Objective:

To prevent operation with damaged fuel elements and verify the physical condition of the fuel element.

Specification:

The fuel elements shall be visually examined and functionally fit into the core grid box annually.

Bases:

Fuel elements are initially inspected for manufactured specifications and then inserted into the grid box in accordance with QA/QC program requirements for functional fit. Core reloading is performed in accordance with operating procedures. Routine fuel movements are logged and visual inspections are conducted during fuel movements. Pool sampling also is used to detect a ruptured element (Tech. Spec. 4.3.3). The fission density limit for this reactor cannot be exceeded (reference SAR, Part A, Section VI). Burnup calculations are made quarterly (4.9.1).

6.0 ADMINISTRATIVE CONTROLS

6.1 Organization and Management

1. The Rhode Island Atomic Energy Commission (RIAEC) shall have the responsibility for the safe operation of the reactor. The organization of RIAEC is shown in Figure 6-1. The RIAEC shall appoint a Director and a Nuclear and Radiation Safety Committee (NRSC) consisting of a minimum of seven members, as follows:

   a. The Director, RIAEC

   b. The Assistant Director for Reactor Operations

   c. The Radiation Safety Officer

   d. A qualified representative from the faculty of Brown University

   e. A qualified representative from the faculty of Providence College

   f. Two qualified representatives from the faculty of the University of Rhode Island

   A qualified alternate may serve in lieu of one of the above. The Director, Assistant Director and Radiation Safety Officer are not eligible for chairmanship of the Committee.

2. An operator or senior operator licensed pursuant to 10CFR55 shall be present in the control room unless the reactor is secured as defined in these specifications. The minimum operating crew shall be two individuals.

3. A licensed senior operator shall be on duty or readily available on call whenever the reactor is in operation.

Specification 3.1.10 assures that the full volume of the pool water is available to provide cooling of the core during normal operation and in the event of a loss of coolant accident.

3.2 Reactor Safety System

Applicability:

These specifications apply to the reactor safety system and other safety related instrumentation.

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To specify the lowest acceptable level of performance or the minimum number of acceptable components for the reactor safety system and other safety related instrumentation.

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1. The reactor safety systems and safety related instrumentation are operable in accordance with Tables 3.1 and 3.2 including the minimum number of channels and the indicated maximum or minimum setpoint;
2. All shim safety blades are operable in accordance with Technical Specification 4.1.1 and 4.1.2;
3. The time from initiation of a scram condition until the control element is fully inserted shall not exceed 1 second in accordance with Technical Specification 4.2.5 and 4.2.6;
4. The reactivity insertion rates of individual control and regulating blades will not exceed 0.02 %ΔK/K per second;
5. At least one radiation monitor on the experimental level of the reactor building and one radiation monitor over the reactor pool are operable and capable of warning personnel of high radiation levels.

Bases:

Neutron flux level scrams provide redundant automatic protective action to prevent exceeding the safety limit on reactor power. The period scram limits the rate of rise of the reactor power to periods which are manually controllable without reaching excessive power levels or fuel temperatures.

The loss of flow scram assures that an automatic loss of flow scram will occur in the event of a loss of flow when the reactor is operating at power levels above 0.1 MW.

The reactivity insertion rate limit was determined in the SAR, Section XI and predicts a safe fuel clad temperature.

When the reactor is operating, a stack monitor provides continuous gaseous and particulate measurement of the stack effluent with a read-out in the control room. Its primary function is to warn operators of abnormal airborne releases from the facility. This LCO ensures that particulate and noble gas releases are continuously monitored during operation.

A radiation monitor located on the reactor bridge continuously monitors radiation levels directly above the reactor core. Its primary function is to warn operators of abnormal radiation levels directly above the pool. The monitor detects rising radiation levels caused by decreased pool water level, build-up of radioactivity within the pool water, incipient fuel failure, loss of delay for Nitrogen-16 decay, problems with in-core experiments and similar problems. Radiation monitors are located throughout the reactor facility to continuously monitor radiation levels. Their primary function is to warn personnel of abnormal radiation levels at a particular location. The monitors detect possible failures in shielding leading to neutron and/or gamma streaming occupied areas. This LCO ensures that radiation levels above the pool and throughout the reactor building are continuously monitored during reactor operation.

TABLE 3.2

Required Safety Related Instrumentation

	Instrumentation	Setpoint	Minimum Number Required	Function	Reactor Operating Mode In Which Reqd.
1.	Reactor Coolant Inlet Temperature	≤ 111°F	1	Alarm	FC ≥ 0.1MW
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3.	Log Count Rate	< 3 cps	1	Rod withdrawal interlock	Both Modes
4.	Servo Control Interlock	≥ 30 sec (fullout)	1	Auto Control Interlock	Both Modes
5.	Ln Period	< 7 seconds	1	Alarm/rundown	Both Modes
6.	Building Air Gaseous Exhaust (Stack)	2.5 x normal particulate 2 x normal	1*	Alarm	Both Modes

* Grab sampling may be substituted for monitoring operations for up to eight hours in the event of monitor failure.

Review of the experiments using the appropriate LCO's and the Administrative Controls assures that the insertion of experiments will not negate the consideration implicit in the Safety Limits.

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Bases:

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b. LEU Fuel Elements

Applicability:

This specification applies to surveillance of LEU fuel elements.

Objective:

To prevent operation with damaged fuel elements and verify the physical condition of the fuel element.

Specification:

The fuel elements shall be visually examined and functionally fit into the core grid box on a rotating basis not to exceed five years.

Bases:

Fuel elements are initially inspected for manufactured specifications and then inserted into the grid box in accordance with QA/QC program requirements for functional fit. Core reloading is performed in accordance with operating procedures. Routine fuel movements are logged and visual inspections are conducted during fuel movements. Pool sampling also is used to detect a ruptured element (Tech. Spec. 4.3.3). The fission density limit for this reactor cannot be exceeded (reference SAR, Part A, Section VI). Burnup calculations are made quarterly (4.9.1).

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