UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-

December 1, 2017

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Supplement for request for changes to NBSR Technical Specifications to allow low power testing.

Ref: Docket 50-184, TR-5 Facility License

Sirs/Madams:

On November 20, 2017, NCNR sent a request for subsequent changes regarding our license amendment request of March 2, 2017. After discussions with NRC staff, we are requesting additional changes to technical specifications 3.3.1 and 3.3.2. Attached is a copy of the Technical Specification pages to be changed, with change bars.

Please contact Dr. Thomas Newton at (301) 975-6260 if you have any questions.

Respectfully,

Robert M. Dimeo, Director
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I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 1, 2017

By: Robert M. Dimeo

cc: Xiaosong Yin, BRR/DPR/PRLB

Designated as original per XY

NIST

Basis

The nuclear and process channels of Table 3.2.2 initiate protective action to Ensure that the safety limit is not exceeded. With these channels operable, the safety system has redundancy.

3.3 Coolant System

3.3.1 Primary and Secondary

Applicability: Primary fluid systems

Objective: To prevent degradation of primary systems' materials.

Specifications

The reactor shall not be operated unless:

(1) The reactor vessel coolant level is no more than 25 inches below the overflow standpipe.

Exception: To perform periodic surveillance of the effectiveness of the moderator dump or approach to critical testing for a previously unmeasured core loading, it is necessary to operate the reactor as permitted in the specifications of Section 2.2(4) and without restriction on reactor vessel level above the top of the 6" overflow pipe (refueling level)

(2) The D_2 concentration in the Helium Sweep System shall not exceed 4% by volume.

(3) All materials, including those of the reactor vessel, in contact with the primary coolant shall be compatible with the D_2O environment.

Basis

(1) The limiting value for reactor vessel coolant level is somewhat arbitrary because the core is in no danger so long as it is covered with water. However, a drop of vessel level indicates a malfunction of the reactor cooling system and possible approach to uncovering the core. Thus, a measurable value well above the minimum level is chosen in order to provide a generous margin of approximately 7 feet (2.13 m) above the fuel elements. To permit periodic testing, such as surveillance of the effectiveness of the moderator dump or approach to critical for a previously unmeasured core loading, it is necessary to operate the reactor without restriction on reactor vessel level. This is permissible under conditions when forced reactor cooling flow is not required, such as is permitted in the specifications of Section 2.2(4).

(2) Deuterium gas will collect in the helium cover gas system because of radiolytic disassociation of D_2O. Damage to the primary system could occur if this gas were to reach an explosive concentration (about 7.8% by volume at 77°F (25°C) in helium if mixed with air). To ensure a substantial margin below the lowest potentially explosive value, a 4% limit is imposed.

(3) Materials of construction, being primarily low activation alloys and stainless steel, are chemically compatible with the primary coolant. The stainless steel pumps are heavy walled members and are in areas of low stress, so they should not be susceptible to chemical attack or stress corrosion failures. A failure of the gaskets or valve bellows would not result in catastrophic failure of the primary system. Other materials should be compatible so as not to cause a loss of material and system integrity.

3.3.2 Emergency Core Cooling

Applicability: Emergency Core Cooling System Objective:

To ensure an emergency supply of coolant.

Specifications

The reactor shall not be operated unless:

(1) The D_2O emergency core cooling system is operable, except when operating under specification 2.2(4)

(2) A source of makeup water to the D_2O emergency cooling tank is available.

Basis

(1) In the event of a loss of core coolant, the emergency core cooling system provides adequate protection against melting of the reactor core and associated release of fission products.

Full operability is not available, nor is it needed, when operating as permitted by the specifications of Sections 2.2(4) and 3.3.1(1). However, the 3000 gallon D_2O emergency cooling tank and a source of makeup water would be available.

(2) The emergency core cooling system employs one sump pump to return spilled coolant to the overhead storage tank. Because only one sump pump is used, it must be operational whenever the reactor is operational. There is sufficient D_2O available to provide approximately 2.5 hours of cooling on a once-through basis. In the event that the sump pump fails and the D_2O supply in the overhead storage tank is exhausted, domestic water or a suitable alternative would be used to furnish water for once-through cooling. The water makeup capacity must be in excess of 25 gpm, which was found adequate in cooling calculations to prevent fuel damage.