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January 24, 2006
Docket # 50-027

Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555-0001

In September 2006, the existing temperature indication system installed at the Washington State University Nuclear Radiation Center was replaced with a modern equivalent. As approved by our Reactor Safeguards Committee in December of 2005, the system is a drastic improvement in the operability and performance of the temperature indication system.

Attached is the review of the 50.59 criteria of the system change. As installed, there is no reduction in the safety or performance of the reactor and associated systems.

This notification is submitted per 10CFR50.54 and 10CFR50.59.D.2

After the new temperature system was installed and fully tested, the reactor was returned to power. All systems and associated parameters continue to indicate normal and perform as expected.

If you have any comments or questions, please feel free to contact me at 509-335-0172.

Sincerely,

Dr. Donald Wall

Director, WSUNRC

Cc: Marvin Mendonca, Project Manager

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A. SHORT DESCRIPTION OF PROPOSED CHANGE

The proposed change to the facility involves removing the current core temperature monitoring system and replacing it with a new Omega temperature indication and control system.

B. EVALUATION TO DETERMINE IF THE PROPOSED MODIFICATION INVOLVES A TECHNICAL SPECIFICATION CHANGE OR MEETS 10 CFR 50.59 CRITERIA.

1. *THE PROPOSED CHANGE DOES NOT INVOLVE A CHANGE TO THE TECHNICAL SPECIFICATIONS*

The requirements for reactor monitoring channels and safety settings are listed in section 3.6.2 of the technical specifications. The requirements and proposed changes are listed below in Table 1. The requirements for reactor safety systems are listed in section 3.6.3 of the technical specifications. These requirements and the proposed changes are listed in Table 2. Since the change does not involve reducing these numbers to below the technical specification limits, the change meets this criteria.

Table1. Measuring Channels

Measuring Channel	Tech. Spec. Requirement	Current Number	Proposed Change
Steady State Mode			
Fuel temperature ¹	1	2	No Change
Linear power level	1	2	No Change
Log power level	1	1	No Change
Pulse Mode			
Fuel temperature	1	2	No Change
Integrated pulse power	1	2	No Change

1. This installation will remove the existing fuel temperature indication system and replace them with modern Omega thermocouple indications and controls. The in-core thermocouples will remain in place and will connect to the new indications. All technical specifications are met.

Table 2. Reactor Safety Channels

Safety Channel	Function	Tech. Spec. Requirements	Current Number	Proposed Change
Steady State Mode				
Fuel temperature	SCRAM at 500°C	1	2	No Change
Power level	SCRAM at 125%	1	2	No Change
Manual SCRAM	Manual SCRAM	1	1	No Change
Wide Range	Low count rate inhibit	1	1	No Change
High Voltage Monitor	SCRAM on loss of High Voltage	1	All channels	No Change
Pool level	Alarm at 16'	1	1	No Change
Transient rod control	Prevent air application unless fully inserted	1	1	No Change
Pulse Mode				
Fuel temperature	SCRAM at 500°C	1	2	No Change
Manual SCRAM	Manual SCRAM	1	1	No Change
Wide range	High Power Pulse inhibit	1	1	No Change
High voltage monitor	SCRAM on loss of high voltage	1	All channels	No Change
Pulse mode switch	Prevent standard rod withdrawal in pulse mode	1	1	No Change
Preset timer	Transient rod SCRAM within 15s after pulse	1	1	No Change
Pool level	Alarm at 16'	1	1	No Change

2. *THE PROPOSED CHANGE SHALL NOT RESULT IN MORE THAN A MINIMAL INCREASE IN THE FREQUENCY OR OCCURENCE OF AN ACCIDENT PREVIOUSLY EVALUATED IN THE FSAR (AS UPDATED).*

There are four major accidents considered in the SAR. These are: the design base accident (fuel failure in air), a loss of coolant accident, an accidental fuel addition, and the accidental ejection of the pulse rod. Each is evaluated below.

a. The design base accident. (Fuel failure in air.)

Several factors affect the possibility of fuel failure, including the possibility of instrument failure. However, as the instruments to be replaced are exceedingly old, and often unreliable. The installation of the new instruments will increase the overall reliability of the temperature indication and control system and will be less prone to fail. This will result in an overall safety increase.

- b. The loss of coolant accident.
Coolant loss is not a result of a failure in power instrumentation. Cooling and pool level systems will remain unchanged.
- c. Accidental fuel addition.
Fuel addition has nothing to do with console controls or fuel temperature indication.
- d. Accidental Pulse rod ejection.
The upgrade of the fuel temperature system has no bearing or interconnection to the pulse rod control interlocks.

In addition to these postulated accidents, the SAR gives criteria for meter installation; including readability, ease of use, and connection to the SCRAM chain. Since the new indication will directly replace the current indication, and will be hooked up to the SCRAM chain appropriately, there will be no problem meeting these criteria.

3. *THE PROPOSED CHANGE SHALL NOT RESULT IN MORE THAN A MINIMAL INCREASE IN THE LIKELIHOOD OF OCCURRENCE OF A MALFUNCTION OF A STRUCTURE, SYSTEM, OR COMPONENT (SSC) IMPORTANT TO SAFETY PREVIOUSLY EVALUATED IN THE FSAR (AS UPDATED).*

Since fuel temperature indication is an SSC important to safety, this question must be addressed. However, as noted above, the original indication has become unreliable, and prone to spurious SCRAMs. The installation of the new indication system will increase safety and reliability considerably.

4. *THE PROPOSED CHANGE SHALL NOT RESULT IN MORE THAN A MINIMAL INCREASE IN THE CONSEQUENCES OF AN ACCIDENT PREVIOUSLY EVALUATED IN THE FSAR (AS UPDATED).*

The results of the accidents in question are outlined in the appendix A to the SAR. Instrumentation changes in the console should have no effect on the consequences of any of these postulated accidents.

5. *THE PROPOSED CHANGE SHALL NOT CREATE A POSSIBILITY FOR AN ACCIDENT OF A DIFFERENT TYPE THAN ANY PREVIOUSLY EVALUATED IN THE FINAL SAFETY ANALYSIS REPORT (AS UPDATED).*

The replacement components have the same failure modes as the previous instrumentation. Therefore, no new accidents are postulated.

6. *THE PROPOSED CHANGE SHALL NOT CREATE A POSSIBILITY FOR A MALFUNCTION OF AN SSC IMPORTANT TO SAFETY WITH A DIFFERENT RESULT THAN ANY PREVIOUSLY EVALUATED IN THE FSAR (AS UPDATED).*

An instrument failure of this type would result in the same problem as a failure of current instrumentation, namely incorrect fuel temperature indication. These problems have already been evaluated for consequences, and no additional problem/consequence scenarios should occur with newer instrumentation.

7. *THE PROPOSED CHANGE SHALL NOT RESULT IN A DESIGN BASIS LIMIT FOR A FISSION PRODUCT BARRIER AS DESCRIBED IN THE SAR BEING EXCEEDED OR ALTERED.*

The design limits for this reactor, as listed in section 6.3 of the SAR are shutdown margin limit, reactivity addition rate limit, fuel operating temperature limit, operating power limit, reactivity addition during pulsing, and the various fuel inspection limits. In normal operation, none of these limits will be exceeded by this upgrade.

Should the channel fail, the fuel temperature limit could, theoretically, be exceeded. However, this possibility exists with current instrumentation, and there should be no increase in this possibility.

8. *THE PROPOSED CHANGE WILL NOT RESULT IN DEPARTURE FROM A METHOD OF EVALUATION DESCRIBED IN THE FSAR (AS UPDATED) USED IN ESTABLISHING THE DESIGN BASES OR IN THE SAFETY ANALYSIS.*

No such change will occur.

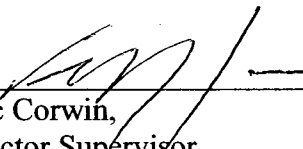
C. DETERMINATION OF RSC REVIEW NECESSITY

Under our current procedures, any change to the facility as described in the SAR needs to be approved by the Reactor Safeguards Committee. As instrumentation is described in the SAR, this change must be approved by the RSC. New procedures will be developed for the new equipment following installation.

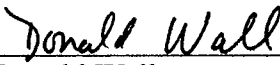
D. RECOMMENDATION

This proposed change, in my opinion, meets the criteria for an acceptable change under 10 CFR 50.59 criteria. I hereby submit this proposal for review by the Facility Director and the RSC. Should there be any more question or comment, please feel free to contact me.

RSC Approval: 11/17/05



Eric Corwin,
Reactor Supervisor



Dr. Donald Wall,
Director