

November 16, 2006
Docket # 50-027

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

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

During September 2006, the existing temperature indication system installed at the Washington State University (WSU) Nuclear Radiation Center was upgraded to a modern digital system. All components and wiring downstream of the existing thermocouples were replaced. This change was approved by our Reactor Safeguards Committee in December of 2005.

Attached is a review of the 50.59 criteria of this modification. The overall safety and performance of the reactor and associated safety systems is enhanced by the upgrade.

The reactor was returned to power after the new temperature indication system was installed and fully tested. All systems and associated parameters continue to perform as expected and indicate normal operating conditions.

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

Sincerely,



Dr. Donald Wall
Director, WSUNRC

Cc: Marvin Mendonca, Project Manager

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. 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 is not a function of console controls or fuel temperature indication.
- d. Accidental Pulse rod ejection.
The modification of the fuel temperature system has no interconnections with 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. The new indication will directly replace the current indication, and will be hooked up to the SCRAM chain accordingly.

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

The installation of the new temperature indication system will decrease the possibility of a malfunction of a SSC, resulting in the overall increase in safety and reliability.

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).*

Instrumentation changes in the console should have no effect on the consequences of a postulated accident, as described in Appendix A of the WSUNRC SAR.

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 lead to the same scenario as a failure of the current instrumentation, namely incorrect fuel temperature indication. This mode of failure has already been evaluated and no additional problems or consequences are foreseeable 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.

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.*

Upgrade of the temperature indication system does not cause a departure from methods of evaluation described in the SAR.

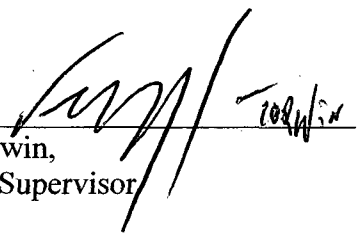
C. DETERMINATION OF RSC REVIEW NECESSITY

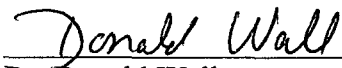
Under current procedures, changes to the facility, as described in the SAR, must be approved by the Reactor Safeguards Committee (RSC). This proposal was reviewed and approved by the RSC in December of 2005.

RSC Approval: 12/8/05

D. RECOMMENDATION

This change 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 the facility.


Eric Corwin,
Reactor Supervisor


Dr. Donald Wall,
Director