

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 17 TO

FACILITY LICENSE NO. R-120

NORTH CAROLINA STATE UNIVERSITY

DOCKET NO. 50-297

1.0 INTRODUCTION

By letter dated February 6, 2007, as supplemented November 20, 2007, the North Carolina State University (the licensee or NCSU) submitted requests to change the Technical Specifications (TSs).

2.0 BACKGROUND

The licensee is authorized to operate the PULSTAR Research Reactor at steady-state power levels not in excess of 1 megawatt thermal. The reactor is located on the NCSU Campus in Raleigh, NC.

Proposed changes to TSs in Amendment No. 17 are made for consistency with ANSI/ANS-15.1-1990, "The Development of Technical Specifications for Research Reactors." (Ref 1)

In addition, changes to TSs 3.5 and 3.8 regarding radiation monitoring set points and fueled experiments, respectively, are proposed based on 10 *Code of Federal Regulations* (CFR) Part 20, the facility radiation protection program, and the facility Emergency Plan.

Also, changes to TSs in Section 6 regarding the line organization, Radiation Safety Committee (RSC), and Reactor Safety and Audit Committee (RSAC) are proposed for administrative efficiency and consistency with their areas of expertise and responsibility. Changes to the line organization include a more active role in the administration of the facility by the Director of the Nuclear Reactor Program (NRP) and consolidates the roles of the Associate Director and Reactor Operations Manager positions in a new position titled "Manager of Engineering and Operations" (MEO). No responsibilities or functions are lost by the proposed changes. Changes to the campus RSC and RSAC are proposed regarding membership, items reviewed, and RSC meeting frequency. All items currently listed in the TS continue to be reviewed by either RSAC or both RSAC and RSC with this amendment.

Other changes are made involving grammar, format, consistency with the Safety Analysis Report (SAR), and wording clarification. Because of the number of changes proposed and the number of revisions currently in place, the entire TSs document was rewritten and replaced in its entirety.

### 3.0 EVALUATION

#### Table of Contents

The table of contents was updated, where necessary, with new titles, specification numbers, and page numbers. Titles for the third level of specifications (1.2.3) were deleted. These changes are acceptable.

#### Figures

The title for this section of the table of contents was changed from "List of Figures" to "Figures." Page numbers, where necessary, were revised. These changes are acceptable.

#### Tables

This section was added to the table of contents. Table numbers, table titles, and the page numbers of the tables were added. These changes are acceptable.

### **Section 1.0**

#### Introduction

Section 1.0 was changed to the "Introduction" to the TSs with section 1.1 becoming the "Purpose."

#### Purpose

The following text was added regarding the purpose statement:

These Technical Specifications provide limits within which operation of the reactor will assure the health and safety of the public, the environment and on-site personnel. Areas addressed are Definitions, Safety Limits (SL), Limiting Safety System Settings (LSSS), Limiting Conditions for Operation (LCO), Surveillance Requirements, Design Features and Administrative Controls.

In addition to the above text, the first sentence in the next paragraph was changed to:

Included in this document are the "Bases" for the Technical Specifications.

The remaining text in this paragraph was not changed.

These changes provide information that adds to the usefulness of the document and are acceptable.

## Definitions

All of the definitions were renumbered as necessary. In addition minor changes were made to the following definitions:

1.2.2 Channel Calibration, 1.2.3 Channel Check, 1.2.4 Channel Test, 1.2.6 Confinement, 1.2.8 Excess Reactivity, 1.2.9 Experiment, 1.2.15 Operating, and 1.2.32 Unscheduled Shutdown

The definitions were reworded to be more consistent with the standard, ANSI/ANS-15.1-1990. The changes do not significantly alter the meaning of the definitions from those in the previous version of the TSs. Likewise the changes in the definitions do not significantly change the meaning of specifications in which the terms are used. The staff finds the changes acceptable.

The definitions, 1.2.11 Limiting Condition for Operation, 1.2.12 Limiting Safety System Setting, and 1.2.25 Safety Limit, were added. They are consistent with the descriptions in Sections 2 and 3 of ANSI/ANS-15.1-1990 and 10 CFR 50.36(c). The staff finds the addition of these definitions acceptable.

The following definitions are modified from the previous version of the TSs:

The definition 1.2.17 Reactor Building, was modified to include the Ventilation Room. The space above the Control Room was modified by 10 CFR 50.59 design change to house ventilation equipment and to increase security. The staff finds this change acceptable.

The licensee reworded the definitions, 1.2.19 Reactor Operator and 1.2.27 Senior Reactor Operator, to reference the regulations, 10 CFR Part 55, under which reactor operator and senior reactor operator are licensed. The staff finds this change acceptable.

The licensee removed the reference to the unit of reactivity,  $\Delta k/k$ , from the definitions, 1.2.22 Reactor Secured and 1.2.24 Reportable Event, stating that this was done for consistency and to limit confusion for reactivity values. The staff finds this change acceptable.

## Section 2.0

Minor formatting changes were made. The order of the interrelated variables associated with core thermal and hydraulic performance in Specifications 2.1.1 and 2.1.2 was changed. These variables are now presented in an order that is consistent throughout TSs, 2.1 Safety Limits and 2.2 Limiting Safety System Settings. This change does not change the meaning of the specifications and is therefore acceptable to the staff.

## Section 3.0

TSs 3.1.e and 3.2.a,b,d,e and f

The use of the unit  $\% \Delta k/k$  was deleted. The licensee is making the changes for consistency and to limit confusion by using "pcm" as the only unit used for reactivity in the TSs. The unit "pcm" is defined in section 1.2.16. The value of reactivity in each specification was unchanged. The specifications are functionally equivalent and therefore the changes are acceptable by the staff.

### TS 3.2.e

This specification was modified so that the limits for TS 3.2.e are now listed in Table 3.2-1. In addition, the licensee reduced the secured experiment reactivity limit from 1600 pcm to 1590 pcm to be consistent with Section 13.2.2.1 of their present version of the Safety Analysis Report. This change is conservative. The staff finds the change acceptable.

### TS 3.2.f

In this specification the sum of the reactivity of all experiments was reduced from 2900 pcm to 2890 pcm to be consistent with the Section 13.2.2.1 of the SAR. This change is conservative. The staff finds the change acceptable.

### TS 3.3

The specifications are now presented in Table 3.3-1. This is just a format change and therefore acceptable.

#### TS 3.3-1 g

The requirement for the operator to manually SCRAM was removed. The licensee stated that the requirement for the alarm will remain, but the appropriate operator response for this alarm will be controlled through procedures relating to responses to alarms and abnormal conditions.

The pool temperature measuring channel, Specification 3.3-1 h, and its reactor safety SCRAM set point remains unchanged. The latter SCRAM is the Limiting Safety System for pool temperature and is required to meet 10 CFR 50.36 (c)(2). There is reasonable assurance that removing the Manual SCRAM from TS 3.3-1 g does not increase the risk to the health and safety of the public and the retention of the Limiting Safety System SCRAM meets the regulations. The staff finds the change acceptable.

#### Specification 3.3-1 I

The requirement for the operator to manually SCRAM was removed. The licensee stated that the requirement for the alarm will remain, but the appropriate operator response for this alarm will be controlled through procedures relating to responses to alarms and abnormal conditions.

The alarm function remains in the TS. The previous TSs have an exception which allows the licensee to bypass the alarm for periods of from 2 to 5 minutes while removing activated samples from the core. That exception, which prevented the alarm during those actions, was in the TS to prevent a forced manual shutdown if the alarm was triggered during actions that were planned and did not place the staff or the public at risk of overexposure. The bypass exception remains in the TSs. Removing the requirement to manually SCRAM the reactor if the alarm occurs allows the operator to make a response decision informed by the reactor status and condition. The licensed operator is trained and licensed by the Commission to assess operational events and act appropriately to protect the safety of reactor and the health and safety of the facility staff and the public. That response could include manual SCRAM if warranted. The staff finds that there is reasonable assurance that removing the Manual SCRAM from TS 3.3-1 I does not increase the risk to the health and safety of the public. The change is acceptable.

TS 3.4.a

The specification in the previous version of the TSs had a footnote that placed a condition on the specification that it was applicable only if reactor power was greater than 500 kW. The licensee rewrote the specification to incorporate the condition in the specification and remove the footnote. Functionally the specification is equivalent. The staff finds the change acceptable.

TS 3.5

The acceptable set point limits are now given in Table 3.5-1 and have changed from the existing TSs. The licensee indicates that the area radiation monitor set points are based on 10 CFR Part 20 dose limits. The control room area monitor alert set point is changed from 2.5 mR/h to 2 mR/h which is based on the instantaneous exposure rate for members of the public and non-occupational personnel. The control room area monitor alarm set point is changed from 25 mR/h to 5 mR/h and the alert set point for the Over-the-Pool and the West Wall area monitors are changed for 10 mR/h to 5 mR/h. The 5 mR/h exposure rate is based on the definition of radiation area. The alarm set point for the Over-the-Pool and the West Wall area monitors remains at 100 mR/h. It is based on the definition for high radiation area. Area radiation monitors provide exposure rate readings which are taken to be equivalent to dose-equivalent rates, i.e. for gamma radiation mR/h is equivalent to mrem/h. The alert and the alarm set points for the three area monitors have remained the same or have become more conservative. This change is acceptable.

TS 3.6.a

The specifications are now in table format, Table 3.6-1, otherwise unchanged. This format change is acceptable.

TS 3.7.e(iii)

Text was changed from:

Experiments reviewed by the RSC in which material is considered to be potentially...

to

Experiments in which the material is considered to be potentially...

The removal of the statement that the experiments will be reviewed by the RSC is acceptable since the requirement remains in other specifications in the TSs. All new experiments are approved by the RSC and RSAC in accordance with TS 6.2.3. Additionally, TS 6.5 requires review and approval by RSC and RSAC for untried experiments and members of the reactor staff for tried experiments. The staff finds the change acceptable.

TS 3.7.e(v)

In this specification, the phrase "approved by the Radiation Safety Committee" was replaced with "approved as specified in Specification 6.2.3." TS 6.2.3 applies to the review and

approval of experiments by the RSC and RSAC. Additionally, TS 6.5 requires review and approval by RSC and RSAC for untried experiments and members of the reactor staff for tried experiments. The staff finds that the removal of the phrase is acceptable.

### TS 3.8

The licensee has changed TS 3.8, Operations with Fueled Experiments, to limit the fissionable material to U-235 and limit accidental dose from a failed experiment to less than 10 mrem total effective dose equivalent (TEDE) for members of the public and less than 500 mrem TEDE and less than 5000 mrem total organ dose-equivalent for occupationally exposed workers. The public dose is based on 10 CFR 20.1101(d) and the occupational dose limit is based on 10 percent of the applicable limits in 10 CFR 20.1201.

ALARA consideration is required by reactor health physics procedures as specified in TS 6.4.e and 10 CFR 20.1101(b). The TS 3.8.e specifies that the fueled experiment is always classified as a new (untried) experiment and as such the requirements in TS 6.2.3 and TS 6.5.1 a review must be performed before the experiment is conducted. The regulation 10 CFR 50.59 also applies for a new experiment.

To support this TS, the licensee provided an accident analysis of a hypothetical failed fueled experiment, designed and irradiated within the limitations specified in TS 3.8, that is assumed to release the entire inventory of fission products. This analysis shows that a failure of a fueled experiment that is designed within the requirements specified in TS 3.8 would result in off-site doses to the public that are approximately a factor of 10 greater than the dose consequences of the (fuel handling) maximum hypothetical accident (MHA) previously analyzed in the NCSU SAR. However, the constraints in TS 3.8 and the included figure and table were determined such that the dose consequences from a release of the entire inventory of fission products does not exceed 10 percent of the annual limits in 10 CFR Part 20 (see above for dose limits).

Figure 3.8-1 and Table 3.8-1 specify the design constraints for the fueled experiment of irradiation time, U-235 mass, and fission produced power. For example, if the irradiation time is 60 seconds the maximum U-238 mass allowed in the experiment is 8.34 mg and the power produced in the experiment will not exceed 4.01 W over the 60 second irradiation. In addition, as mentioned above, TS 3.8.e requires that each fueled experiment must be considered an untried experiment. An untried experiment is required to be designed and analyzed by the facility staff under 10 CFR 50.59 and, according to TS 6.5.1, reviewed by the RSC, the RSAC, the Director of the NRP, MEO, and the Reactor Health Physicist, prior to irradiation of the experiment.

The staff reviewed the analyses and performed scoping calculations on the source term to verify the methods used by the licensee and similar results were obtained. This TS is similar to fueled experiment specifications at other comparable research reactor facilities except that it is more typical to place a limit on the number of curies of fission products (i.e. Curies of the Iodine isotopes I-131-135) and the total fission energy produced in the experiment. By using Figure 3.8-1 and Table 3.8-1 in the NCSU specification the licensee provides an absolute limitation on the fission product inventory but allows flexibility in irradiation times and total U-235 mass. With the limitations in TS 3.8 and the review and oversight required by TS 6.5.1 and the regulations

(10 CFR 50.59) the staff finds the change to TS 3.8 and its new limits on fueled experiments continues to provide reasonable assurance that the health and safety of the public is protected.

The staff considers the failed fueled experiment as the new MHA for the NCSU PULSTAR Research Reactor since the consequences from the failed fueled experiment that releases the entire inventory of fission products bounds the consequences of the previous MHA analyzed in the NCSU SAR and does not exceed the limits in 10 CFR Part 20.

#### **Section 4.0**

##### TS 4.3.b

The text was reworded from:

A channel test of each channel in the RSS shall be performed prior to each day's operation, or prior to ...

to

A channel test of each channel in the RSS shall be performed prior to operation each day, or prior to...

The staff interprets the proposed TS to mean that the channel test is performed daily prior to the first operation of that day. Because this change may remove some ambiguity, the staff finds the change acceptable.

##### TSs 4.3.d.(i) and (iv) (previously 4.3.d.1 and 4)

The references to T<sub>2</sub>, T<sub>5</sub> and T<sub>6</sub> were deleted. Deleting the number associated with the temperature sensor (i.e. T<sub>2</sub>, T<sub>5</sub>, T<sub>6</sub>) allows renumbering of the sensors at a later date without seeking a license amendment.

The description of the parameter is sufficient to uniquely identify the parameter and channel to be calibrated. The staff finds the change acceptable.

##### TS 4.6.b

Text was changed to from:

The secondary coolant shall be analyzed bi-weekly, but at intervals not to exceed 18 days. This analysis shall include gamma spectroscopy of a liquid sample.

to

The secondary coolant shall be analyzed bi-weekly, but at intervals not to exceed eighteen (18) days. This analysis shall include gross beta/gamma counting of the dried residue of a one (1) liter sample or gamma spectroscopy of a liquid sample.

Gross beta analysis of dried residue of a 1 liter sample or gamma spectroscopy for analyses of secondary coolant was added. Analyses of primary and secondary coolant are now consistent. Common gross beta radiation counting equipment is sensitive to environmental radioactivity limits and is a viable option.

The surveillance in this TS provides the licensee with information about the radioactivity content of the primary and secondary coolant. This information allows the licensee to assess the integrity of the fuel, presence of significant corrosion, purity of water, and detection of a failed experiment that has released fission products to the pool water. It also provides information to allow assessment of the total radioactive material released if a leak of coolant to the environment occurs. In addition, compliance with this TS helps the licensee, in part, to meet 10 CFR 20.1501. The staff finds it acceptable to add the option of gross beta/gamma counting of the dried residue of a 1 liter sample to the specification.

### **Section 5.0**

In TS 5.2.d, the word PULSTAR was deleted as a modifier to "Reactor Bay" and the Ventilation Room was added to the description of the restricted area. The staff finds this change acceptable.

### **Section 6.0**

#### TS 6.1

The statement of responsibility was moved to TS 6.1.2 to be consistent with ANSI/ANS-15.1-1990. This change is acceptable to the staff.

#### TS 6.1.1

This specification was significantly modified to meet the needs of the NRP and to be consistent with ANSI/ANS-15.1-1990.

Level One personnel now include the Chancellor, The Dean of the College of Engineering, and the Head of the Department of Nuclear Engineering.

Level Two personnel now include the NRP Director, who is specified as a faculty member.

Level Three personnel now include the MEO, the position created from the combination of the Associate Director and Reactor Operations Manager positions. The MEO position qualification requirements meet or exceed those listed in ANSI/ANS-15.4-1988.

Level Four personnel now include all operating and support staff. Qualification for licensed operators was added.

Reactor Health Physicist position description and qualifications were changed to meet those given in ANSI/ANS-15.1-1990. Regulatory compliance monitoring function was added.

These changes are consistent with ANSI/ANS-15.1-1990 and the staff finds them acceptable.

#### Figure 6.1-1

Figure 6.1-1 was changed to reflect the new organizational structure as described in TS 6.1.1 and is therefore acceptable.

#### TS 6.1.2

This specification was created to be consistent with ANSI/ANS-15.1-1990 Section 6.1.2 and contains text that was previously located in TS 6.1. The staff finds this change acceptable.

#### TS 6.1.3.a (previously 6.1.2.a)

The terminology “certified reactor operator” was replaced with “licensed reactor operator” to be consistent with 10 CFR Part 55. The staff finds the change is acceptable.

#### TS 6.1.3.c (previously 6.1.2.c)

The specification was reworded to remove ambiguity and confusion. This minor rewrite is acceptable.

#### TS 6.2 (previously 6.2.1)

As now stated:

The RSC has the primary responsibility to ensure that the use of radioactive materials and radiation producing devices, including the nuclear reactor, at the University are in compliance with state and federal licenses and all applicable regulations. The RSC reviews and approves all experiments involving the potential release of radioactive material conducted at the University and provides oversight of the University Radiation Protection Program. The RSC is informed of the actions of the RSAC and may require additional actions by RSAC and the Nuclear Reactor Program (NRP).

RSAC has the primary responsibility to ensure that the reactor is operated and used in compliance with the facility license, Technical Specifications, and all applicable regulations. RSAC performs an annual audit of the operations and performance of the NRP.

The wording was changed based on the primary responsibilities of the review committees. With this change, RSC reviews only those items affecting the facility license and experiments involving the potential release of radioactive materials. RSAC continues to review all items and provides reports to the RSC. Based on ANSI/ANS-15.1-1990 and the expertise of the committee members, RSAC was made into a separate, independent committee that reports directly to the University Chancellor (license holder). This direct communication with the Chancellor may be beneficial in addressing the needs of the reactor facility since

communications are no longer through the RSC. The chair of the RSAC serves as a member of the RSC. The staff finds these changes acceptable.

TS 6.2.1.a (previously 6.2.2.a)

RSC composition and qualifications were reworded. RSC membership reflects the on-campus user community of radiation devices and radioactive materials and university radiation safety administration. The specification now states:

RSC shall consist of members from the general faculty who are actively engaged in teaching or research involving radioactive materials or radiation devices. RSC may also include non-faculty members who are knowledgeable in nuclear science or radiation safety. RSC membership shall include the University Radiation Safety Officer, RSAC Chair, RHP, and a member of the NRP.

There is no longer a requirement that a person from the Radiation Safety Division of the Environmental Health and Safety Center be a permanent member on the RSC. However, TS 6.2.1.b specifies that a member from the campus Radiation Safety Division of the Environmental Health and Safety Center is a permanent member of RSAC. The change to TS 6.2.1.a is acceptable.

TS 6.2.1.b (previously 6.2.2.b)

RSAC continues to be comprised of persons knowledgeable in reactor operations and continues to report its activities to the RSC. The first paragraph of the specification now states that:

RSAC shall consist of at least five individuals who have expertise in one or more of the component areas of nuclear reactor safety. These include Nuclear Engineering, Nuclear Physics, Health Physics, Electrical Engineering, Chemical Engineering, Material Engineering, Mechanical Engineering, Radiochemistry, and Nuclear Regulatory Affairs.

In addition, the specification requires that the NRP Director, RHP, and a member from the campus Radiation Safety Division of the Environmental Health and Safety Center are now permanent members of RSAC. The staff finds these changes acceptable.

TS 6.2.2.a

RSC and RSAC member appointments were separated in this specification and contains text previously given in TSs 6.2.2.a and 6.2.2.b to be consistent with ANSI/ANS-15.1-1990. "University Management" was listed as making committee term appointments rather than a specific office within the University.

The definition of "University Management" was added as TS 1.2.31:

University Management is the Chancellor or Office of the Chancellor other University Administrator(s) having authority designated by the Chancellor or as specified in University policies.

The staff finds the changes to TS 6.2.2.a and the addition of TS 1.2.31 acceptable.

TS 6.2.2.b (previously 6.2.2.d)

The proposed TS change states that the RSC meeting frequency is specified in the broad scope radioactive materials license issued by the State of North Carolina for the University and that additional meetings may be called by the RSC Chair.

This is a change from the previous meeting frequency that was specified in previous TS 6.2.2.d. The meeting frequency is being changed to meet the requirements of the broad scope license with the chair having the authority to call additional meetings as necessary. The staff finds this change acceptable.

TS 6.2.2.c (previously 6.2.2.d)

The staff accepts the change to the TS numbering and the move of the RSC meeting frequency, with no change in frequency, to TS 6.2.2.b.

TS 6.2.2.d (previously 6.2.2.c)

Committee rules regarding RSC and RSAC continue to ensure that members from the NRP line organization do not constitute a majority of the quorum. This TS wording does not change the meaning of the specification. The staff finds the change acceptable.

TS 6.2.3

The review and approval functions of the RSC and RSAC were changed to be consistent with ANSI/ANS-15.1-1990 and the respective areas of expertise and responsibility of the two committees. The changes clarify items reviewed by the two committees. All items currently listed in the TSs continue to be reviewed by either RSAC or both RSAC and RSC with this TS amendment with the exception of safeguards information (SGI).

In the proposed TSs, only RSAC reviews SGI. This arrangement satisfies the review requirement while limiting access to SGI, thereby increasing the protection of SGI. RSAC members will undergo fingerprinting and criminal history checks as required for having access to SGI. Furthermore, RSC has the primary mission of radiation safety for the campus rather than physical security at the reactor and therefore does not have a need-to-know SGI. RSAC on the other hand, has the mission of verifying compliance with license conditions at the reactor and therefore has a need-to-know SGI.

Distribution of RSC summaries and meeting minutes was changed to include the RSAC Chair and NRP Director rather than listing all recipients since RSC has approval authority for reactor experiments and licensing documents. The RSAC Chair and NRP Director are the appropriate individuals who need to be informed of RSC actions affecting the reactor facility.

In TS 6.2.3, the MEO was added to the distribution for receiving a summary of RSAC meeting minutes.

A statement that the RSAC annual audit report and any recommendations would be provided to the RSC was added to TS 6.2.4.

#### TS 6.2.3.c

This specification was rewritten to specify what is required to be reviewed by both RSC and RSAC.

The staff reviewed the changes to 6.2.3 and find that they are consistent with ANSI/ANS-15.1-1990 and that there is reasonable assurance that the RSAC and RSC will continue to provide acceptable oversight.

#### TS 6.2.4

The licensee concluded that RSAC meets the guidance, ANS/ANSI 15.1-1990, for a review and audit group. However, they recognized that the RSC is necessary to maintain consistency and final approval for licensing matters, regulatory compliance issues, and University policies on the use of radioactive materials. RSC membership was revised to include positions knowledgeable in reactor operations and radiation safety. TSs are proposed with limited independence for the RSAC and continue to require approval of licensing and policy level matters affecting the nuclear reactor facility. Final authority is divided between RSAC and RSC, with RSC having the ability to require additional actions by RSAC and the NRP. Therefore, it is concluded that the level of review maintained in the proposed TSs ensures that safety and oversight is maintained.

The Associate Director was deleted from receiving reports of deficiencies uncovered by the audit. The NRP Director may notify members within the NRP.

The following text was added: "In no case shall an individual immediately responsible for an area perform an audit in that area." The licensee stated that this basic audit practice has always been observed, but is being specifically listed to be consistent with ANSI/ANS-15.1-1990.

Wording referencing the summary of the annual audit was moved from TS 6.2.3 to TS 6.2.4.

These changes specify a practice for audits that enhances independence. The staff finds the changes acceptable.

#### TS 6.2.4.e

A frequency of annually, but at intervals not to exceed fifteen (15) months, was added to the radiation protection audit specification. This is consistent with ANSI/ANS-15.11-1993, "Radiation Protection for Research Reactors," and 10 CFR 20.1101. The RSAC audit in this area may be used to partially fulfill the 10 CFR Part 20 requirements for an annual review of the content and implementation of the radiation protection program. The annual review required by 10 CFR Part 20 is performed by the Reactor Health Physicist using internal procedures and includes applicable audits and inspections performed by other organizations.

This change is consistent with the standard, ANSI/ANS-15.11-1993 and 10 CFR 20.1101. The staff finds it acceptable.

### TS 6.3

This section was added to be consistent with ANSI/ANS-15.1-1990. This TS is a repeat of two sentences under the Reactor Health Physicist section of TS 6.1.1 and similar to the same section of the existing TS 6.1.1. The staff finds that the addition of TS 6.3 is acceptable.

### TS 6.4 (previously 6.3)

The following changes were made to be consistent with the restructuring of the NRP. The positions of Reactor Operations Manager and the Associate Director no longer exist.

Approval for substantive changes to procedures was changed from RSC and the former Associate Director position to RSAC and MEO.

Authority to make minor changes to procedures was changed from Reactor Operations Manager to MEO, but the change must be approved by the NRP Director within 14 days. This final approval was changed from the Associate Director to the NRP Director.

For temporary deviations, the authority now lies with the Designated Senior Reactor Operator or the MEO. The latter replaced the Reactor Operations Manager. Such deviations are documented and reported to the NRP Director.

The staff finds these changes acceptable.

### TS 6.5.1 (previously 6.4.1)

New (untried) experiments are now approved by the RSC, RSAC, the NRP Director, the MEO, and the Reactor Health Physicist.

Wording previously given in TS 6.4.1 regarding issuance of an authorized experiment by the RSC was deleted since the requirement for review and approval of experiments is provided in TS 6.2.3.

TS 6.5.1, as proposed, is functionally equivalent to the previous TS 6.4.1. The staff finds the change acceptable.

### TS 6.5.2 (previously 6.4.2)

All proposed "tried" experiments are now reviewed by the MEO and the Reactor Health Physicist.

Wording previously given in TS 6.4.2 regarding scheduling of an experiment request was deleted since scheduling is a time management issue rather than a licensing or safety issue.

The change in the management structure necessitates the change in the review personnel. The staff finds TS 6.6.1 acceptable.

#### TS 6.6.1 (previously 6.5)

The specification was reworded to require SL violations to be reported to the NRP Director instead of the former Associate Director position.

The report of the event is reviewed by both the RSC and RSAC because licensing issues are involved.

A minor grammar change was made to TS 6.6.1.d.iii.

The change in the management structure necessitates the change in the reporting chain for a SL Violation. The committee review responsibility is appropriately shared by both the RSC and the RSAC. The changes to TS 6.6.1, (previously TS 6.5) are acceptable.

#### TS 6.6.2 (previously 6.6)

The specification was reworded to require the NRP Director, rather than the former Associate Director position, take action regarding reportable events other than SL violations. The occurrence is reviewed by both the RSC and RSAC because compliance issues are involved.

The change in the management structure necessitates the change in the reporting chain for a SL violation. The committee review responsibility is appropriately shared by both the RSC and the RSAC. The changes to TS 6.6.2, (previously TS 6.6) are acceptable.

#### TS 6.7

The time to submit the annual operating report was extended from 60 days to 90 days. This extension allows for completion of radiation dosimeter and environmental sample analyses, which, in the past, have taken up to 90 days after the end of the report period. As a result, data that was not available was reported in the following annual operating report. This change will allow inclusion of all data relevant to a given period to be provided in one report.

The staff finds this change acceptable.

#### TS 6.8

TS 6.8 subsections were renumbered for consistent format with other TSs.

TS 6.8.1.d (formerly 6.8.a.iv) was changed: The phrase "as detailed in Specification 4" was added to be consistent with ANSI/ANS-15.1-1990.

TS 6.8.1.g was added: "Facility radiation and contamination surveys" was moved from lifetime records to 5 year records to be consistent with ANSI/ANS-15.1-1990. Surveys used to document personnel exposures are retained for the life of the facility under the newly worded Specification 6.8.2.c.

TS 6.8.1.h and i were renumbered.

TS 6.8 2.c (formerly 6.8.b.iii)

The records to be retained for the life of the facility was changed: The phrases “for monitored personnel” and “and associated radiation and contamination surveys” were added to agree with ANSI/ANS-15.1-1990 and 10 CFR 20.2103.

TS 6.8.c was renumbered to 6.8.3.

The changes made to TS 6.8 to change the format and to make it conform to the ANSI/ANS-15.1-1990 are acceptable to the staff.

### **Summary**

The licensee justified the proposed changes based on the following reasons:

1. Conformity with ANSI/ANS-15.1-1990, which is the applicable standard for TSs at research reactors, was increased.
2. The changes to radiation monitoring set points are based on requirements given in 10 CFR Part 20, and monitoring operations.
3. Specifications for fueled experiments were changed based on meeting 10 CFR Part 20 requirements and license conditions. Changes to fueled experiments are now determined, similarly to those determined for non-fueled experiments, by the reactor staff, Reactor Health Physicist, and review committees using the regulations (10 CFR 50.59) and the TSs.
4. The specifications regarding the RSC were reworded to ensure an adequate review of reactor related items within their area of expertise and responsibility. RSAC membership and function has not been changed, but has been reorganized and clarified, by this amendment. RSAC serves as the review and audit group assigned to the reactor facility while RSC serves in an oversight capacity for the entire University. Therefore, RSAC is the primary review and audit group that fulfills the requirements of ANSI/ANS-15.1-1990 for the reactor facility. The RSC reviews and approves experiments using radiation and radioactive materials conducted anywhere at the University, including the reactor, for consistency and compliance with applicable regulations and license conditions. The RSC has limited expertise in nuclear research reactor operations and relies on the RSAC. Therefore, the RSAC and the RSC have a relationship that must and continues to be described in the TSs.
5. Other changes are associated with grammar, format, consistency with statements made in the SAR, and clarification of wording. These changes did not significantly alter the meaning of the specifications and followed from the other changes to the TS (i.e. changes to recordkeeping, reporting, or administrative procedures or requirements and changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes in inspection and surveillance requirements).

#### 4.0 ENVIRONMENTAL CONSIDERATION

The significant changes in this amendment fit into two categories. The first category is changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes in inspection and surveillance requirements. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and no significant increase in individual or cumulative occupational radiation exposure. The second category is changes to recordkeeping, reporting, or administrative procedures or requirements.

Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and 10 CFR 51.22(c)(10)(ii) respectively. Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

#### 5.0 CONCLUSION

The proposed changes to the TSs improve conformity with the applicable standards, provide clarification of set points of radiation monitoring equipment, set the limits and oversight procedures for fueled experiments, reflect the present organizational and administrative structure, and make necessary editorial corrections. The staff reviewed the changes and has determined that the TSs continue to meet the requirements in 10 CFR 50.36.

The staff has concluded on the basis of the considerations previously discussed that because any analyzed accident doses are significantly less than the limits in 10 CFR Part 20, the amendment does not involve a significant hazards consideration; there is reasonable assurance that the health and safety of the public will not be endangered by the proposed activities; and such activities will be conducted in compliance with the Commission's regulations, and the issuance of this amendment will not be inimical to the common defense and security or the health and safety of the public.

#### References

1. ANSI/ANS-15.1-1990, "The Development of Technical Specifications for Research Reactors," American Nuclear Society, 1990
2. ANSI/ANS-15.11-1993, "Radiation Protection for Research Reactors," American Nuclear Society, 1993
3. 10 Code of Federal Regulations (CFR) 50.36, "Technical Specifications"
4. 10 CFR Part 55, "Operators' Licenses"

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