Alan Cebula, Ph.D.
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Manhattan, KS 66506

US NRC
Attn: Document Control Desk
Washington, DC 20555-0001

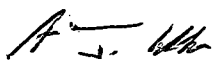
28 February 2020

Subject: 2019 Annual Operating Report for the Kansas State University TRIGA Mark II Nuclear Reactor (Facility License # R-88, Facility Docket # 50-188)

To Whom It May Concern:

This document serves as the annual operating report for the Kansas State University (KSU) nuclear reactor. The report is divided into paragraphs addressing specific items listed as requirements in the Technical Specifications 6.11e.

Sincerely,



Alan Cebula, Ph.D.
Nuclear Reactor Facility Manager
Kansas State University

Attachments:

1. Kansas State University TRIGA Mark II Reactor Annual Report, CY 2019
2. 10CFR50.59 Screening Form

Cc: Linh Tran, Project Manager, NRC
Craig Bassett, Inspector, NRC

A020
NRR

Kansas State University TRIGA Mark II Reactor Annual Report, CY 2019

Introduction

The Kansas State University Nuclear Reactor Technical Specifications (TS) require a routine written report to be transmitted to the US Nuclear Regulatory Commission within 60 days after completion of the first calendar year of operating, and at intervals not to exceed twelve months thereafter, providing the following information:

TS.6.11.e.1 - A brief narrative summary of operating experience (including experiments performed), changes in facility design, performance characteristics, and operating procedures related to reactor safety occurring during the reporting period; and results of surveillance tests and inspections.

TS.6.11.e.2 - A tabulation showing the energy generated by the reactor (in megawatt-hours).

TS.6.11.e.3 - The number of emergency shutdowns and inadvertent scrams, including the reason thereof and corrective action, if any, taken.

TS.6.11.e.4 - Discussion of the major maintenance operations performed during the period, including the effects, if any, on the safe operation of the reactor, and the reasons for any corrective maintenance required.

TS.6.11.e.5 - A summary of each change to the facility or procedures, tests, and experiments carried out under the conditions of 10.CFR.50.59.

TS.6.11.e.6 - A summary of the nature and amount of radioactive effluents released or discharged to the environs beyond the effective control of the licensee as measured at or before the point of such release or discharge.

TS.6.11.e.7 - A description of any environmental surveys performed outside the facility.

TS.6.11.e.8 - A summary of radiation exposures received by facility personnel and visitors, including the dates and time of significant exposure, and a brief summary of the results of radiation and contamination surveys performed within the facility.

This information is transmitted in this report, in sections separated by TS clause. This report covers January 2019 – December 2019.

TS.6.11.e.1 - A brief narrative summary of operating experience (including experiments performed), changes in facility design, performance characteristics, and operating procedures related to reactor safety occurring during the reporting period; and results of surveillance tests and inspections.

The KSU reactor operated for its usual purposes in CY2019. Two reactor operation laboratory classes and a reactor theory laboratory class were directly supported. Approximately five other courses utilized the reactor for one-time operations or tours. Through various outreach activities, classes, and research experiments, the facility hosted 1093 visitors. Compared to CY2018, the number of visitors to the facility decreased by 14 percent. A greater percentage of operations was for classes and tours compared to the previous year. There was a reduction in operating hours for testing as no major maintenance outage occurred. Primary research operations involved detector testing using beamlines, neutron radiography, and neutron activation for flux measurements. Other research activities included gamma irradiations and an investigation of material properties under neutron irradiation.

An operating test procedure was revised to correct a surveillance issue discovered in late CY2018. Procedure 5 – Semi-Annual Minimum Interlock and SCRAM Checks underwent changes to improve implementation and ensure an interlock surveillance was performed in the appropriate operating mode. The result of implementing the new interlock and SCRAM surveillance procedure showed all interlocks and SCRAMs to be operable. Abrasion of a control rod was observed during control rod inspection surveillance test. Dimensional measurements of the control rod were taken to assess the extent of the mechanical wear. Operations were suspended until the inspection findings were reviewed by the Reactor Safeguards Committee (RSC). Following review, the RSC approved restart of operations with the requirement of re-inspecting the control rod after six months. Further abrasion of the control rod was not observed in the follow-up inspection.

The NRC routine annual inspection was completed from October 7 – 11, 2019. A report and notice of violation dated October 30, 2019 was received as a result of the inspection (See Inspection Report No. 50-188/2019-201). Corrective actions taken in response to the inspection findings included restructuring surveillance tracking, surveillance requirements training for staff, and improving documentation for annual reporting.

Water ingress into the beam port facilities is still observed to be minor and intermittent throughout the year. Maintenance steps are under preparation for implementing repairs.

TS.6.11.e.2 - A tabulation showing the energy generated by the reactor (in megawatt-hours).

The monthly total energy generated by the KSU reactor is recorded in Table 1. The same data is shown as a bar chart in Figure 1. Another decrease in operations as measured by energy generation was found from CY2018 to CY2019. The previous decrease was 30% from the prior year while this year was only a decrease of 12% (25.0 MWh to 21.96 MWh).

Table 1 - Energy generated by the KSU Triga Mark II reactor by month for CY 2019.

Month	MWh Burnup
January	0.93
February	7.68
March	4.75
April	3.33
May	0.64
June	0.00
July	0.00
August	0.04
September	0.42
October	2.79
November	0.84
December	0.55
TOTAL	**21.96**

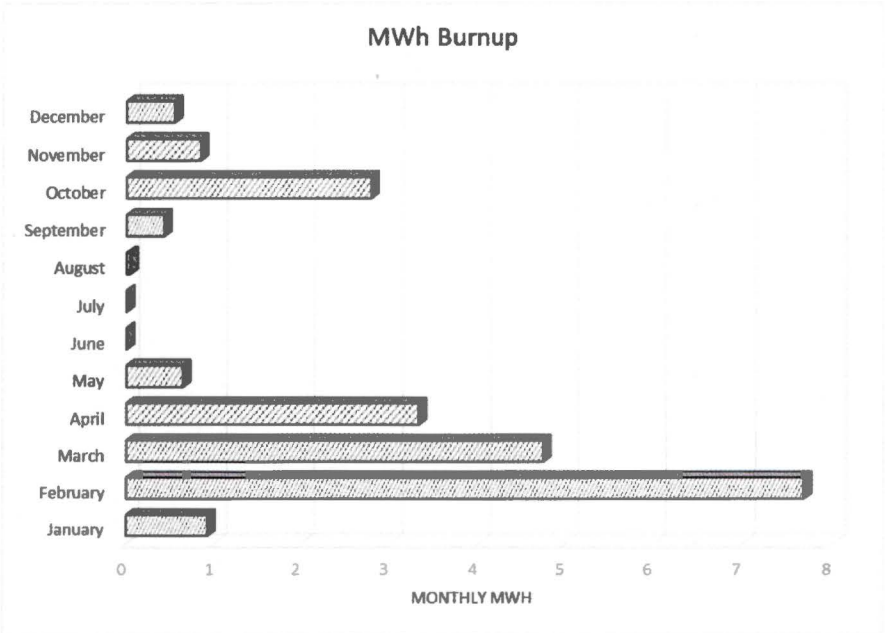


Figure 1 - Energy generated by the KSU Triga Mark II reactor by month for CY 2019.

The reactor operated for a total of 244 hours during 2019, at an average power of 90 kW. Table 2 lists the number of hours operated and Figure 2 shows the percentage of operation for various purposes, i.e., research support, training, education, etc. Training percentage seems low because operator training was often performed when the reactor was being operated for another purpose, such as research support, classes, or maintenance. The chart demonstrates that the reactor is operated in accordance with our stated primary functions: education, research support, operator training, and demonstration (e.g., tours). Compared to CY2018, tour operations increased while research and class operations were reduced. Maintenance and testing operating hours were also reduced as an extended maintenance outage was not needed.

Table 2 – Operating hours grouped by purpose at the KSU TRIGA Mark II reactor for CY 2019.

Purpose	Operating Time [hr]
Research	58
Tours	29
Classes	93
Maintenance	60
Training	3
Testing	1
TOTAL	**244**

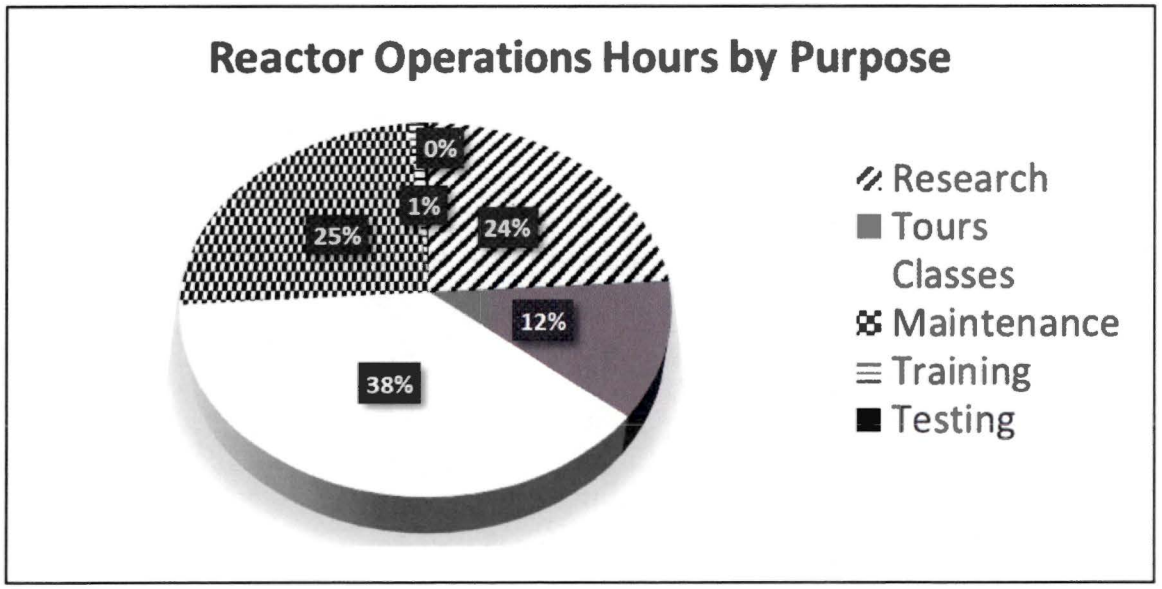


Figure 2 - KSU operations distribution, CY2019, based on purpose of operation.

TS.6.11.e.3 - The number of emergency shutdowns and inadvertent scrams, including the reason thereof and corrective action, if any, taken.

For CY 2019, there was a total of 6 inadvertent SCRAMS. Table 3 summarizes the inadvertent SCRAMS for CY 2019 at the KSU reactor. No emergency shutdowns occurred during the time period reported. CY 2019 had a significant reduction in inadvertent scrams compared to the previous operating year (CY 2018: 20).

Table 3 – Inadvertent SCRAMS.

Date	Action	Comments
2/7/19	Period SCRAM	Operator Error
3/13/19	Percent Power and Fuel Temp Indicated	NMP-1000 at 98% of 100 W, Fuel temperature channels both read 23 C. Spurious SCRAM, relay K15 reseated.
5/10/19	Manual SCRAM	Transient rod position indicator observed reading high. Transient rod drive position potentiometer secured.
5/15/19	Inadvertent SCRAM	Electrical power fluctuation
8/19/19	Period SCRAM	Operator Error
8/19/19	Inadvertent SCRAM	Mode Selector Switch turned to incorrect setting

TS.6.11.e.4 - Discussion of the major maintenance operations performed during the period, including the effects, if any, on the safe operation of the reactor, and the reasons for any corrective maintenance required.

Various system maintenance was performed throughout CY2019 for part failure due to normal wear and tear. No effects on the safe operation of the reactor were observed. The following is a summary of all major maintenance activities during CY2019:

- Air compressor gasket replaced.
- Exhaust Plenum Monitor vacuum pump impeller blades replaced following blade failure.
- Replaced Shim rod contact indicator lamp in console.
- Safety rod drive troubleshoot for movement issues. Drive base alignment adjusted to correct issue.
- Transient rod position indicator potentiometer adjusted.
- During Transient rod inspection, bolt pin was found sheared on one side. Bolt had maintained position and coupling of poison section to connecting rod. Pin replaced.

TS.6.11.e.5 - A summary of each change to the facility or procedures, tests, and experiments carried out under the conditions of 10.CFR.50.59.

The following change was carried out under 10CFR50.59:

- Procedure 5, Semi-Annual Minimum Interlock and SCRAM Checks revised. The revision was part of corrective actions following a reportable occurrence identified in December of 2018. A copy of the screening form is attached to the annual report.

TS.6.11.e.6 - A summary of the nature and amount of radioactive effluents released or discharged to the environs beyond the effective control of the licensee as measured at or before the point of such release or discharge.

Per procedure, the concentration and total activity of liquid effluent were calculated prior to discharge, showing both to be below the limits in 10CFR20. Table 4 summarizes the average concentration and total activity released.

Table 4 – Summary of radioactive effluent (water)

Isotope	Avg. Concentration (Ci / mL)	Total Volume (mL)	Total Activity Released (Ci)
Alpha-emitters	1.02E-15	6.59E+06	6.7E-09
Beta-emitters	<=Bkg	6.59E+06	<=Bkg

TS.6.11.e.7 - A description of any environmental surveys performed outside the facility.

Radiation surveys are performed within and around the facility to verify that radiation levels remain safe when at full-power operation. These surveys indicate that the dose rate (gamma and neutron) at the reactor dome does not exceed the hourly dose limit to members of the public of 2 mrem / hr, as set forth in 10CFR20, which indicates that the outside dose cannot exceed this limit.

A radiation survey of the operations boundary at full power did not measure dose rates (gamma and neutron) above background readings. Two thermoluminescence dosimeters (TLD) are placed at the operations boundary for environmental monitoring on a monthly basis. Table 5 summarizes the monthly TLD measurements for CY2019. All monthly dose measurements at the confinement boundary were reported as zero mrem. Five of the

12 control room door dose measurements were reported above zero. Note during the two lowest operating months in terms of energy production (June and July) the two highest dose measurements of 4 and 2 mrem were reported for the control room door area monitor.

Table 5 – Environmental and Area Monitor Monthly Doses CY 2019.

Month	Control Room Door [mrem]	Reactor Confinement (South) [mrem]
January	2	0
February	0	0
March	2	0
April	0	0
May	0	0
June	4	0
July	2	0
August	0	0
September	2	0
October	0	0
November	0	0
December	0	0
TOTAL	**12**	**0**

TS.6.11.e.8 - A summary of radiation exposures received by facility personnel and visitors, including the dates and time of significant exposure, and a brief summary of the results of radiation and contamination surveys performed within the facility.

Overall, no staff exceeded 50 mrem for CY2019. Table 6 shows the distribution of workers receiving given amounts of dose. The average deep dose equivalent was 14.3 mrem with a maximum of 31 mrem. The lens dose equivalent had a similar average of 14.7 mrem and the maximum for an individual of 32 mrem. Shallow dose equivalent average was 15.4 mrem with a maximum of 31 mrem. Extremity monitoring had an average of 7 mrem and a maximum of 27 mrem.

Table 6 - Summary of total occupational dose received by KSU reactor workers from 1/1/2019 - 12/31/2019.

mrem	DDE	LDE	SDE	Max Extremity
(0, 10]	5	5	4	3
(10, 20]	2	2	3	2
(20, 30]	4	4	4	6
(30, 40]	1	1	1	1
(40, 50]	0	0	0	0
(50,100]	0	0	0	0
(100,150]	0	0	0	0
(150,200]	0	0	0	0

Visitor dose at the KSU TRIGA reactor facility is measured using self-reading pocket ion chamber dosimeters, with an indication range from 0-200 mR. Self-indicated pocket dosimeter readings suffer from imprecision due to parallax error, sometimes resulting in negative values or readings above the true value. Figure 3 summarizes the distribution of visitor exposures recorded. Over 91% of the visitor dose records are at 1 mR or less.

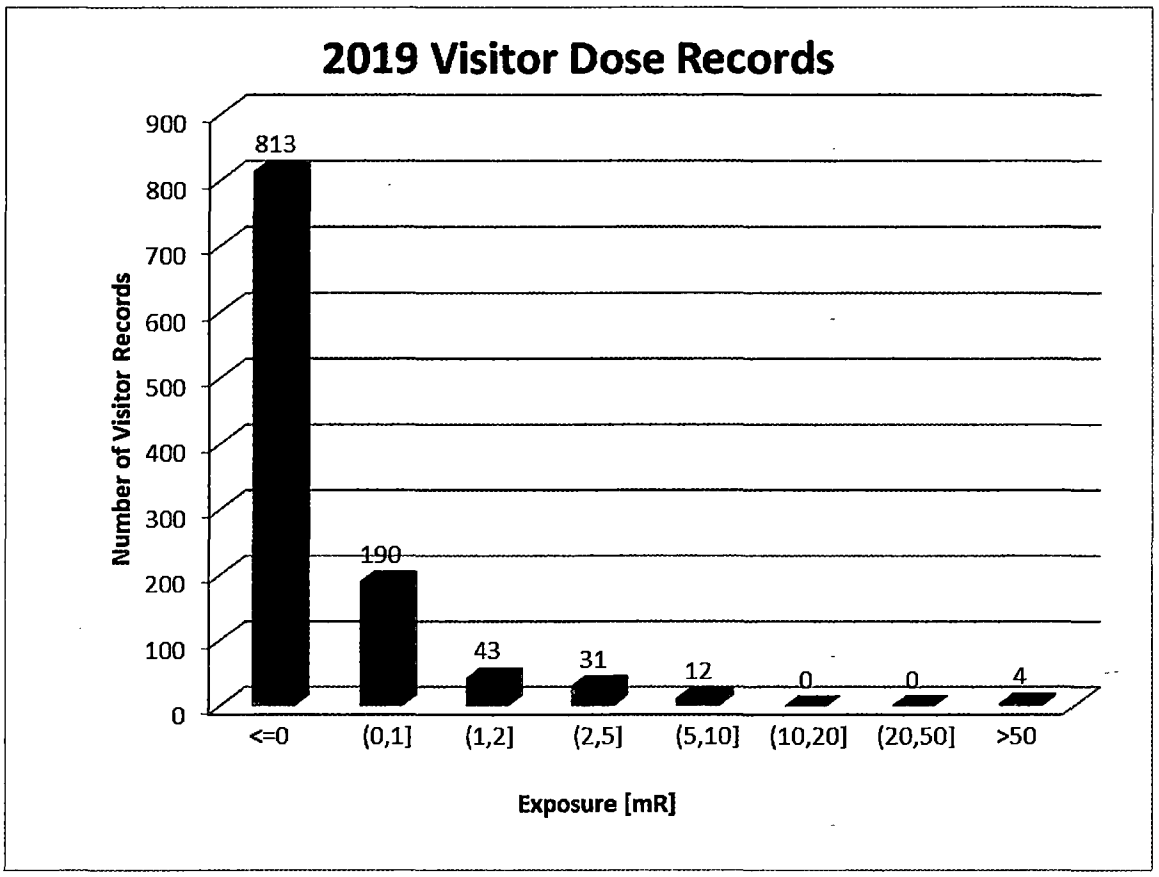


Figure 3 - Visitor exposure records from CY 2019.

All monthly radiation surveys and contamination surveys conducted at the facility in 2019 were nominal.

This concludes the 2019 Annual Report for the Kansas State University TRIGA Mark II Nuclear Reactor.

Date: 1/11/19

Title: Procedure 5 Revision

Performer: Alan Cebula

Description: A revision has been proposed to Procedure 5 Semi-Annual Check Minimum Interlock & SCRAM Checks.

SCREENING – The following guidance provides criteria to screen the proposed change from further assessing the need for NRC review.

SSC Affected	**SSC Design Function**	**Failure Mode(s)**	**Accident Scenario(s)**
Scrams/Interlocks	Scram/Interlock	None	None

Safety Analysis and Accident Response/Mitigation	YES	NO
Decrease SSC design function reliability when failure would initiate accident		x
Decrease SSC design function reliability when failure would affect accident mitigation		x
Reduce redundancy, reliability, or defense in depth		x
Add or delete an automatic or manual design function of an SSC		x

Human Interface	YES	NO
Convert an automatic feature to manual or vice versa		x
Adversely affect ability to perform required actions		x
Adversely affect time response of required actions		x

Interface Outside of the Proposed Change	YES	NO
Degrade seismic or environmental qualification		x
Affect method of evaluation used to establish design basis or safety analysis		x
Introduce unwanted or previously unreviewed system or material interaction		x
(Not described in SAR) indirect effects on electrical distribution		x
(Not described in SAR) indirect effects on structural integrity		x
(Not described in SAR) indirect effects on environmental conditions		x
(Not described in SAR) indirect effects on other SAR design functions		x

EVALUATION - If the change does affects (1) a design function of SSC, (2) a method of performing or controlling design function, or (3) evaluation for demonstrating the design function will be accomplished, as indicated by one or more YES answers in the "Screening" section, complete the applicable tables below.

Does the change result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the final SAR (as updated)?	YES	NO
		x

Accident	***Potential Impact on Accident Frequency***
Reactivity Addition	
LOCA	
Fuel Handling	

Does the change result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the final SAR (as updated)?	YES	NO
		x

Affected SSC	***Potential Impact on Likelihood of Malfunction***

Does the change result in more than a minimal increase in the consequences of an accident previously evaluated in the final SAR (as updated)?	YES	NO
		x

Accident	***Potential Impact on Accident Consequences***
Reactivity Addition	
LOCA	
Fuel Handling	

Does the change result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the final SAR (as updated)?	YES	NO
		x

Affected SSC	***Potential Impact on Consequences of Malfunction***

EVALUATION – continued

Does the change create a possibility for an accident of a different type than previously evaluated in the final SAR (as updated)?	YES	NO
		x

Accident Description (Including Likelihood and Consequences)

Does the change create a possibility for a malfunction of an SSC important to safety with a different result than any previously evaluated in the final SAR (as updated)?	YES	NO
		x

Accident	***Affected SSC***	***Result***
Reactivity Addition		
LOCA		
Fuel Handling		
Other		

Does the change result in exceedance or alteration of a design basis limit for a fission product barrier as described in the SAR (as updated)?	YES	NO
		x

Category	***Reference/Text***	***Value***
Design Basis Limit		
Analysis		
Approach to Limit		

Does the change result in departure from a method of evaluation described in the final SAR (as updated) used to establish design bases or in the safety analysis?	YES	NO
		x

Category	***Reference/Text***	***Value***
Design Basis		
New Analysis		
Comparison		

Comments: Revision will be evaluated pursuant to TS 6.3.

APPROVAL – According to Technical Specifications, Section 6.2(b)4, the Reactor Safeguards Committee is responsible for determining "whether changes in the facility as described in the safety analysis report (as updated), changes in the procedures as described in the final safety analysis report (as updated), and the conduct of tests or experiments not described in the safety analysis report (as updated) may be accomplished in accordance with 10 CFR 50.59 without obtaining prior NRC approval via license amendment pursuant to 10 CFR Sec. 50.90."

Date of RSC approval: 1/11/19

Method of RSC approval: See attached meeting minutes

Attach appropriate records of RSC approval (e.g., email ballots or meeting minutes) to this form.

Reactor Safeguards Committee Meeting
Meeting Minutes
January 11, 2019, 11:00 AM, WD 137

Attendees:

Chair – *ex officio*	Dunn	Present
Radiation Safety Officer – *ex officio*	Bridges	Present
Reactor Manager – *ex officio*	Cebula	Present
Other Members	Bindra	Present
	DePaola	Present
	McGregor	Present
	Roberts	Present
	Schmit	Present
	Shultis	Present
Reactor Supervisor	Hewitt (Acting)	Present
Others	Seymour (SRO)	Present
	Nichols (SRO)	Present

All *ex-officio* and nine of nine total Committee Members present - Quorum

Announcements

- Candidate for Reactor Supervisor has verbally accepted an offer. Expected to start the following week.
- New Nuclear Regulatory Commission (NRC) Project Manager (PM) is Linh Tran with Patrick Boyle as backup PM. License Amendment Request for use of 12% fuel now under Ed Helvenston.

Agenda Items

1. Reactor Safeguards Committee (RSC) Review of December 22, 2018 Reportable Occurrence
    a. RSC reviewed the report on the reportable occurrence due to limiting conditions for operations (LCO) violation from failure to properly test control rod position interlock in pulse mode.
        i. Cebula discussed the two console systems that independently provide a standard control rod position interlock during pulsing.
            1. Rod interlock when setting console mode selector switch to PULSE HI
            2. NLW-1000 Pulse Interlock feature which cuts power signal to the channel resulting in activation of the source interlock. Source interlock activation prevents withdrawal of standard control rods
        ii. Cebula discussed the history of the inadequate procedure and issue of not testing the interlock in the correct mode
        iii. Cebula discussed immediate and additional corrective actions – individuals and groups notified, procedure revision, follow-up testing, and staff training

b. Discussion:
    i. Shultis questioned the revision history of the procedure. Cebula discussed versions of the procedure as far back as 2007 did not test the interlock in the pulse mode
    ii. Roberts requested further details on how the LCO violation was discovered. Cebula discussed new procedure reporting documentation revealed the issue to the Reactor Supervisor while conducting tests following pulse rod maintenance
    iii. RSC questioned if a failure of the interlock would have been evident during operations and if it was observed.
        1. Cebula replied a failure of the interlock could have been noticed by an increase in indicated standard rod position while in pulse mode.
        2. Also, recorded peak power and/or fuel temperature higher than expected during pulsing could indicate increased reactivity addition from standard rod withdrawal due to interlock failure.
        3. Cebula also discussed the interlock was tested by the Reactor Supervisor in pulse mode when the discrepancy was noticed and found it to be operable
        4. Cebula, Hewitt, Nichols, and Seymour also communicated to the RSC that typical standard rod configuration during pulsing is all rods except regulating fully out to achieve criticality with the regulating rod near full out
c. Result: RSC review of reportable occurrence complete

2. Procedure Changes
    a. Procedure 5 – Semi-Annual Minimum Interlock & SCRAM Checks
        i. Proposed by Cebula as part of additional corrective actions following the December 22, 2019 reportable occurrence.
            1. A copy of the proposed procedure was emailed to the RSC in advance of the meeting for review
            2. In addition to the procedure copy, a list summarizing the changes was also emailed to the RSC in advance of the meeting. List is attached to meeting minutes
        ii. 50.59 for procedure approval also presented
        iii. Discussion:
            1. RSC commented the proposed procedure is more prescriptive
            2. Shultis made a general comment that a prescriptive procedure could lead to mistake repetition
            3. DePaola requested an additional overview of the changes. Cebula provided a review of the change list provided to the RSC before the meeting
            4. RSC commented the proposed procedure is now written so that each test can be performed independently whereas previous procedure was inadequate.

5. Bridges provided editorial changes involving consistency in using "test" instead of "check" and "verify" instead of "observe"
6. Bridges asked if the steps were adequate/clear for operator performance. Cebula and Hewitt commented they were.
7. DePaola questioned if the procedure was too onerous for the performer. Cebula and Hewitt commented the steps were minimum required to conduct the tests and ordered appropriately
8. RSC asked if equipment changes would require a procedure revision. Cebula confirmed the procedure was written for current equipment and any changes would likely require a re-write
9. DePaola provided editorial changes to correct grammar
10. DePaola moved to approve the 50.59 and proposed procedure pending editorial changes
11. Bridges seconded the motion to approve the 50.59 and proposed procedure pending editorial changes

iv. Result: Verbal vote – 8 Aye, 0 Nay, 1 Abstain, proposed procedure pending editorial changes approved including 50.59

3. RSC approval to restart operations following a reportable occurrence
   a. RSC approval is required to restart operations following a reportable occurrence due to LCO violation
   b. Discussion
      i. Cebula reviewed the corrective actions in the report
      ii. Cebula discussed actions taken
         1. Reactor Supervisor notice of declared reportable occurrence
         2. Immediate suspension of operations
         3. 24 hour notice to NRC
         4. Written report
         5. Teleconference with NRC discussing follow-up questions
            a. NRC requested clarification of actions taken by Reactor Supervisor to test the interlock
            b. NRC requested new procedure when approved by RSC and reactor staff training to update licensing exam materials
         6. Reactor Supervisor provided a summary to NRC by email of steps taken to test the interlock
         7. Procedure Revision
      iii. Cebula discussed action items remaining
         1. Implement new procedure including transmittal to operators
         2. Review reportable occurrence with staff when they return from break
         3. Train staff on new procedure when they return from break
      iv. Roberts moved to restart operations following implementation of the new procedure
      v. Bridges seconded the motion to restart operations following implementation of the new procedure
   c. Result Verbal vote – 8 Aye, 0 Nay, 1 Abstain, restart approved

4. Console Replacement Project Update
    a. Cebula updated the RSC on Thermo Fisher Scientific turnover caused delays
    b. Cebula discussed the project and expects a Summer 2019 installation
    c. RSC suggested possible leak repair during replacement outage
        i. DePaola discussed use of divers at University of Texas reactor
        ii. Low volume from beam ports
        iii. Reactor Manager is still reviewing previously proposed fix to remove fuel, drain tank, then apply epoxy to weld seams
            1. Roberts suggested fuel unloading could provide an opportunity to assess core configuration optimization
            2. Cebula stated bulk shield tank (BST) condition is not adequate for fuel storage
            3. Cebula will reach out to other facilities who have made similar repairs
        iv. Cebula proposed applying epoxy inside beam port. RSC expressed concerns the water pressure would prevent adequate seal
        v. RSC discussed cleanup of BST
            1. McGregor described previous attempt to repaint BST resulted in many issues
            2. Rotary specimen rack (RSR) is still stored in BST
                a. Re-asses current dose rates from RSR
                b. Locate another storage location
                    i. On-campus
                    ii. Contact decommission companies for removal
                    iii. Contact Test, Research, and Training Reactors community
5. Meeting Adjourned at 11:55 AM

Re: Reportable Occurrence Followup

Alan Cebula <alanc@ksu.edu>

Thu 1/10/2019 4:34 PM

To: Hitesh Bindra <hbindra@ksu.edu>; depaola@phys.ksu.edu <depaola@phys.ksu.edu>; Ronald Bridges <ronbrid@ksu.edu>; Bill Dunn <dunn@ksu.edu>; Douglas McGregor <mcgregor@ksu.edu>; Jeremy Roberts <jaroberts@ksu.edu>; Schmit, Jeremy <schmit@phys.ksu.edu>; J Shultis <jks@ksu.edu>; Joseph Hewitt <josephhewi@ksu.edu>

1 attachments (342 KB)

Procedure 05_Interlock_Checks-DRAFT_v2.pdf;

All,

Please meet in Ward 137 conference room at 11:00 AM tomorrow.

After review by SRO Hewitt, I have made additional revisions (attached) to the proposed procedure:

1. Removed Step 1 and added initial condition sub-steps to each test
2. Added a step (1.9) to replace source if it was removed
3. Added log-keeping notes to Steps 7 and 8
4. Added caution note for current source setup to Steps 7 and 8
5. Added a step to ensure reactor secured following completion of tests (Step 9)

Thanks,

Alan

Alan T. Cebula, PhD, DABR, DABSNM, DABMP
Nuclear Reactor Facility Manager, Department of Mechanical and Nuclear Engineering
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Manhattan, KS 66506
o: 785-532-6657
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f: 785-532-7057

From: Hitesh Bindra
Sent: Thursday, January 10, 2019 2:50:18 PM
To: depaola@phys.ksu.edu
Cc: Alan Cebula; Ronald Bridges; Bill Dunn; Douglas McGregor; Jeremy Roberts; Schmit, Jeremy; J Shultis; Joseph Hewitt
Subject: Re: Reportable Occurrence Followup

Anytime after 9:30 am

Hitesh

On Jan 10, 2019, at 12:41 PM, DePaola, Brett D. <depaola@phys.ksu.edu> wrote:

Right now, I should be available at any time on Friday, January 11. Weather conditions may change that...

Brett

From: Alan Cebula [mailto:alanc@ksu.edu]
Sent: Thursday, January 10, 2019 12:05 PM
To: Hitesh Bindra; Ronald Bridges; DePaola, Brett D.; Bill Dunn; Douglas McGregor; Jeremy Roberts; Schmit, Jeremy; J Shultis
Cc: Joseph Hewitt
Subject: Reportable Occurrence Followup
Importance: High

Reactor Safeguards Committee,

As part of the additional corrective actions following the reportable occurrence, I have revised the interlock testing procedure to correct the inadequacy. Before operations can resume, the procedure requires review and approval by the committee along with approval for restart.

Please let me know your availability tomorrow (1/11/19) for a meeting to discuss the changes.

The proposed procedure is attached in addition to the current procedure. Other than editorial changes throughout, major revisions include:

1. Precautions and Limits - changed "secure the reactor" to "ensure reactor is SHUTDOWN"
2. Clarified which mode the reactor shall be in during each interlock test
3. Corrected "pulse (transient) ON light" to "ON light for each standard control rod..." in Step 3.1
4. Corrected "pulse rod ON light" to "pulse rod AIR light" in Step 4
5. Changed "pulse rod READY light" to "TRANSIENT ROD FIRE READY light" in Step 4
6. Clarified withdraw pulse rod cylinder in Step 4.2
7. Removed TEST Pulse Power Interlock and replaced with TEST the Standard Control Rod Position Interlock - Step 5 (corrects reportable occurrence issue)
8. Added TEST the NLW-1000 Pulse Interlock feature - Step 6 (corrects reportable occurrence issue)
9. Changed "TEST the fuel rod temperature SCRAM" to "TEST the fuel temperature SCRAM"
10. Added two steps to fuel temperature SCRAM test - 7.7 and 7.13
11. Moved Power Channel response verification within each power channel SCRAM test - Steps 8.13-8.15 and 9.13-9.15

Regards,

Alan

Alan T. Cebula, PhD, DABR, DABSNM, DABMP
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