UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 5, 2020

Dr. Ayman I. Hawari, Director
Nuclear Reactor Program Department of
Nuclear Engineering
North Carolina State University
Campus Box 7909
2500 Stinson Drive
Raleigh, NC 27695-7909

SUBJECT: NORTH CAROLINA STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO. 05000297/2020201

Dear Dr. Hawari:

From June 15-25, 2020, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an inspection at your North Carolina State University PULSTAR Reactor. The enclosed report presents the results of that inspection, which were discussed on June 25, 2020, with you and members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selective procedures and records, observed various activities, and interviewed personnel.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC regulatory requirements occurred. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at https://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it is described in detail in the subject inspection report. The violation is being cited in the Notice because it constitutes a failure to meet regulatory requirements that has more than minor safety significance and the licensee failed to identify the violation.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with Title 10 of the *Code of Federal Regulations* Section 2.390, "Public inspections, exemptions, requests for withholding," a copy of this letter, its enclosure, and your response will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room). To the extent possible, your response should not include any personal privacy or proprietary information, so that it can be made available to the public without redaction.

If you have any questions concerning this inspection, please contact Phil O'Bryan at (301) 415-0266, or by electronic mail at Phil.O'Bryan@nrc.gov.

Sincerely,

/RA/

Travis Tate, Chief
Non-Power Production and Utilization Facility
Oversight Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Docket No. 50-297
License No. R-120

Enclosures:
As stated

cc: w/enclosures: See next page

cc:

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Test, Research and Training
Reactor Newsletter
Attention: Amber Johnson
Dept of Materials Science and Engineering
University of Maryland
4418 Stadium Drive
College Park, MD 20742-2115

SUBJECT: NORTH CAROLINA STATE UNIVERSITY – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE INSPECTION REPORT NO. 05000297/2020201 AND NOTICE OF VIOLATION DATED: August 5, 2020

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DATE	7/17/2020	7/17/2020	8/5/2020

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NOTICE OF VIOLATION

North Carolina State University PULSTAR Reactor

Docket No. 50-297
License No. R-120

During a U.S. Nuclear Regulatory Commission (NRC) inspection conducted June 15-25, 2020, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is described below:

> North Carolina State University (NCSU) PULSTAR Reactor technical specification (TS) Section 6.7.4, "Annual Operating Report," requires that an annual operating report for the previous calendar year be submitted to the NRC. TS 6.7.4, paragraph f, states that the annual operating report shall contain a summary of the nature and amount of radioactive effluent released including the total amount of tritium released (yearly) and the total amount of all activity released (yearly).
>
> Since 2015, a reactor pool leak varying from approximately 1 gallon per hour (gph) to over 8 gph has existed at the NCSU PULSTAR reactor facility. The current leak rate is approximately 5.5 gph. This water has leaked from the reactor pool, out of the reactor facility (i.e. out of the Burlington Nuclear Engineering Laboratories Building) and into the surrounding environment. The reactor pool water leaking into the environment contains detectable tritium and other radioactive material.
>
> Therefore, contrary to the TS 6.7.4, since 2015, tritium and other radioactive material has been released via a reactor pool leak to the environment and this release has not been documented in any of the annual operating reports required to be submitted to the NRC from 2016 to the present.

This has been determined to be a Severity Level IV violation (Section 6.9).

Pursuant to the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 2.201, "Notice of violation," NCSU PULSTAR Reactor facility is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation," and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

In accordance with 10 CFR 19.11, "Posting of notices to workers," you may be required to post this Notice within two working days of receipt.

Dated this 5th day of August, 2020

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No.:	50-297
License No.:	R-120
Report No:	50-297/2020-201
Licensee:	North Carolina State University
Facility:	PULSTAR Nuclear Research Reactor Facility
Location:	Raleigh, NC
Dates:	June 15-25, 2020
Inspector:	Phil O'Bryan
Approved by:	Travis Tate, Chief Non-Power Production and Utilization Facility Oversight Branch Division of Advanced Reactors and Non-Power Production and Utilization Facilities Office of Nuclear Reactor Regulation

Enclosure 2

EXECUTIVE SUMMARY

North Carolina State University
PULSTAR Nuclear Research Reactor Facility
Inspection Report No. 05000297/2020201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the North Carolina State University's (NCSU, the licensee's) Class II research reactor safety programs including: (1) organization and staffing; (2) operating logs and records; (3) procedures; (4) requalification training; (5) surveillance and limiting conditions for operation (LCO); (6) experiments; (7) health physics (HP); (8) design changes; (9) committees, audits and review; (10) emergency planning; (11) maintenance logs and records; (12) fuel handling logs and records; and (13) transportation of radioactive materials procedures. The NRC staff determined that the licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with the U.S. Nuclear Regulatory Commission (NRC) requirements.

Organization and staffing

- Organizational structure and staffing were consistent with technical specification (TS) requirements.

Operations Logs and Records

- Operations logs and records were maintained in accordance with procedures and TSs.

Procedures

- The program for changing, controlling, and implementing facility procedures was acceptably maintained as required by the TSs and the applicable procedures.

Requalification Training

- Operator requalification was conducted as required by the Operator Requalification Plan.

Surveillance and Limiting Conditions for Operation

- The inspector found that the surveillance program and supporting procedures met TS requirements.

- Operations met the TS LCO and surveillance requirements.

Experiments

- Experiments were reviewed and approved as required by TS.

Health Physics

- Surveys were completed and documented as required.
- Postings met regulatory requirements.
- Personnel dosimetry was worn and recorded doses were within the NRC's regulatory limits.
- Radiation monitoring equipment was maintained and calibrated as required.
- The radiation protection training program was administered as required.
- Environmental monitoring satisfied license and regulatory requirements.

Design Changes

- The review, evaluation, and documentation of changes to the facility satisfied NRC requirements.

Committee Audits and Reviews

- The review and audit program was conducted acceptably by the Reactor Safety Review Subcommittee as stipulated in TS.

Emergency Planning

- The emergency preparedness program was conducted in accordance with the emergency plan.

Maintenance Logs and Records

- Maintenance logs, records, reviews, and performance satisfied TS and procedure requirements.

Fuel Handling Logs and Records

- Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

Transportation Activities

- The program for shipping radioactive material satisfied regulatory requirements.

REPORT DETAILS

Summary of Facility Status

The NCSU Nuclear Reactor Program (NRP) PULSTAR nuclear research reactor has been operated in support of graduate and undergraduate research and laboratory instruction, service irradiations, reactor operator training, and periodic surveillance. During the inspection, the reactor was operated in support of ongoing work and research.

1. Organization and Staffing

a. Inspection Scope (Inspection Procedure (IP) 69001 [02.01])

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of TS Section 6.1 were met:

- organizational structure
- management responsibilities
- staffing requirements for safe operation of the research reactor facility
- PULSTAR reactor logbook, January 2018 through present
- procedure NRP-OP-103, "Reactor Operation," Revision 4, dated February 21, 2019

b. Observations and Findings

The inspector found the licensee's functional organization wasn't changed since the last NRC inspection in this area. The minimum staffing required when the reactor is not secured is specified in TS Section 6.1.3. The inspector reviewed the console records for the period covering January 2018 to the present and determined that staffing requirements were met.

c. Conclusion

The inspector determined the licensee's organization and staffing comply with the requirements specified in TS Section 6.1. The operations log and associated records confirmed that shift staffing met the minimum requirements for duty and on call personnel.

2. Operations Logs and Records

a. Inspection Scope (IP 69001 [02.02])

The inspector reviewed the following selected maintenance and reactor operations records to ensure that the requirements of TS Section 6.8 were met:

- procedure NRP-OP-103, "Reactor Operation," Revision 3, dated February 21, 2019
- NCSU PULSTAR reactor logbook, January 2018 through present

- procedure NRP-OP-101, “Reactor Startup and Shutdown, Appendix A – Startup Checklist” (2018 through June 2020)

b. Observations and Findings

Reactor operations were carried out following written procedures and TS requirements. The inspector conducted observations of the reactor operations.

The inspector observed that the reactor operations logbook, an official record of reactor operations, was used as a chronological account of operations. Readings from operating equipment were recorded in the Operating Parameters Log. This data was used by the licensee for preemptive maintenance to prevent equipment failures during operation. In addition, the inspector found equipment maintenance records contained detailed information regarding equipment failures, the failure mode, repairs, calibrations, and operational testing prior to return to service. The factors used to calculate the estimated critical position of the control rods during reactor startup were also recorded appropriately. For the records included in this review, the inspector found the licensee’s administrative requirements were met.

c. Conclusion

The inspector determined the licensee’s record keeping program conformed to TS requirements.

3. Procedures

a. Inspection Scope (IP 69001 [02.03])

The inspector reviewed the following to ensure that the requirements of TS Section 6.4 were met:

- procedure NRP-OP-301, “Reactor Fuel Handling,” Revision 2, dated November 1, 2014
- procedure NRP-OP-104, “Reactor Experiments,” Revision 4, dated August 1, 2015
- procedure NRP-OP-105, “Response to Scrams, Alarms, and Abnormal Conditions,” Revision 8, dated June 23, 2014
- procedure NRP-OP-101, “Reactor Startup and Shutdown,” Revision 12, dated April 1, 2020
- procedure NRP-OP-103, “Reactor Operation,” dated February 21, 2019

b. Observations and Findings

The inspector observed that the licensee maintained written procedures covering the areas specified in TS Section 6.4. The inspector found new procedures and major changes were reviewed and approved by the Reactor Safety and Audit Committee (RSAC) and the Radiation Safety Committee (RSC), in accordance with a written procedure on document control. Minor changes did not require committee approval, but were also reviewed by the committees. The reviews and

approvals were documented in the minutes of the respective committee meetings.

c. Conclusion

The inspector found the licensee maintained and implemented written procedures in accordance with TS requirements.

4. Requalification Training

a. Inspection Scope (IP 69001 [02.04])

The inspector reviewed the following to verify that the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses," and the licensee's Operator Requalification Program were met:

- active license status of current operators
- medical examination records for licensed operators
- requalification written examination administered during the 2017-2018 requalification cycle
- requalification lecture records, 2018 through June 2020
- special procedure (SP) 2.6, PULSTAR operator requalification program, dated November 1, 2018
- individual requalification training records, 2018 through June 2020

b. Observations and Findings

The licensee's requalification program included the regulatory requirement for an annual operating test and a biennial written examination. The inspector verified that both examinations were administered at the specified frequency and that the level of difficulty was comparable to that of NRC-administered examinations.

The inspector reviewed the content of the written and oral examinations and found them adequate. The inspector reviewed the training and medical records of licensed operators. The inspector reviewed documentation indicating that all operators had performed the required number of reactor manipulations at the frequency specified in the requalification program.

c. Conclusion

The inspector determined the licensee conducted operator requalification as required by the requalification program and NRC regulations.

5. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001 [02.05])

The inspector reviewed the following to determine if the LCO specified in TS Section 3.0 was effectively implemented and if the periodic surveillance tests on safety systems were performed in accordance with TS Section 4.0:

- PULSTAR surveillance and maintenance files
- procedure NRP-OP-101, “Reactor Startup and Shutdown, Appendix A – Startup Checklist” (2018 through June 2020)
- NCSU PULSTAR reactor logbooks covering the period 2018 to present

b. Observations and Findings

The inspector found surveillances were completed on schedule and in accordance with licensee procedures. The protocols and techniques were effective in verifying the performance of the safety equipment. All the recorded results were within the TS and procedurally prescribed parameters, or the LCO was met. The inspector observed records and logs were complete and were maintained as required. Checks and calibrations were completed as required by TS.

c. Conclusion

The inspector determined the licensee properly implemented TS LCO and surveillances requirements.

6. Experiments

a. Inspection Scope (IP 69001 [02.06])

The inspector reviewed the following to verify compliance with TS Sections 3.7, 3.8, and 6.5 requirements:

- experiment logbook
- procedure NRP-OP-104, “Reactor Experiments,” Revision 4, dated August 1, 2015
- experiment records, 2018 through June 2020

b. Observations and Findings

The inspector observed the licensee maintained an experiment logbook including administrative and technical records for experiments. It also contained approved experiments for miscellaneous reactor utilization and experiments for neutron activation analysis, neutron irradiation, and neutron flux mapping. The inspector found experiments are approved by the RSC and the RSAC in accordance with TS Section 6.2.

c. Conclusion

The inspector determined the licensee reviewed and performed experiments in accordance with TS requirements and the licensee’s written procedures.

7. Health Physics

a. Inspection Scope (IP 69001 [02.07])

The inspector reviewed the following to verify compliance with 10 CFR Part 20, "Standards for Protection against Radiation," and TS Sections 3.5 and 4.4 requirements:

- PULSTAR Nuclear Reactor Annual Report for 2015, 2016, 2017, 2018, and 2019
- PULSTAR Nuclear Reactor Radiation Protection Program 2018 and 2019 Annual Self-Assessments
- personnel dosimetry reports for 2018 through 2020 to date
- file of weekly contamination surveys for 2018 to 2020 to date
- file of monthly radiation surveys for 2018 to 2020 to date
- procedure HP-1, "Radiation Protection Program," Revision 8, dated October 14, 2013
- procedure HP-3, "Radiological Surveys," Revision 2, dated April 17, 2009
- procedure HP-5, "Access Control and Training," Revision 0, dated October 14, 2013
- procedure HP-6, "Transport of Radioactive and Hazardous Material," Revision 1, dated September 25, 2003
- procedure HP-8, "Radiation Work Permits," Revision 3, dated November 8, 2004
- procedure SP 5.10, "Primary Water Inventory," and associated leak rate data from 2015 through 2020 to date
- isotopic analysis results of reactor pool water from 2015 through 2020 to date

b. Observations and Findings

(1) General Results and Observations

The inspector toured the facility and observed maintenance activities. The inspector found practices regarding the use of dosimetry, radiation monitoring equipment, placement of radiological signs and postings, use of protective clothing, and the handling and storing of radioactive material or contaminated equipment was in accordance with regulations and the licensee's written radiation protection program. The licensee performed and documented annual self-assessments of the program as a tool for assuring radiation exposure was maintained as low as reasonably achievable.

The inspector reviewed records of radiation surveys and performed additional surveys during the inspection of the nuclear reactor facility (NRF) and found them low and in line with facility postings. No unmarked radioactive material was found in the facility. A copy of the current NRC Form 3 notice to radiation workers required by 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," was posted at the entrance to the control room and reactor bay. Dosimetry results were reviewed by the inspector, indicating doses to most NRF

occupants was minimal. Radiation monitoring devices were found by the inspector to be calibrated within the frequencies specified in procedures.

The inspector noted from records that training was provided for radiation workers assigned to the NRF and individuals were not issued dosimetry or given access until the training was successfully completed. The annual reports referenced above described the gaseous, liquid, and solid waste generated at the NRF, with gaseous Argon-41 produced by the irradiation of atmospheric air was the most significant isotope noted. The licensee also reported the results of air sampling and thermoluminescent dosimeters placed at locations around the NRF as environmental radiation monitors. Surface water and vegetation were analyzed by the licensee for indications of environmental impacts and showed no significant difference from background levels.

(2) Reactor Pool Leakage

NCSU PULSTAR Reactor TS 6.7.4 states, in part, that an annual operating report for the previous calendar year is required to be submitted to the NRC. The annual operating report is required to contain the total activity and the total tritium activity released from the facility for the previous year (TS 6.7.4.f.i.6 and 6.7.4.f.i.7).

The inspector observed that since 2015, a reactor pool leak varying from approximately 1 gallon per hour (gph) to over 8 gph has existed at the NCSU PULSTAR reactor facility. The current leak rate is approximately 5.5 gph. The inspector found this water has leaked from the reactor pool, out of the reactor facility (i.e. out of the Burlington Nuclear Engineering Laboratories Building) and into the surrounding environment. The inspector found the water varies in activity levels due to variations in reactor operations, but 10 CFR Part 20 release concentrations for individual radioisotopes have not been exceeded according to reactor pool isotopic analyses. The inspector found the activity levels of tritium have also been below 10 CFR Part 20 release limits, averaging 2.4 E^{-5} microcuries per milliliter in 2019.

NCSU has one ground water monitoring well on the west side of the Burlington Nuclear Engineering Laboratories Building. The inspector found that no radioactivity has been detected in samples of this well water, or any other environmental samples including surface water, soil, or vegetation.

NCSU indicated it has taken various actions to identify the location of the reactor pool leak and has applied leak patches to suspected leak locations with different levels of success. The latest patch, which was applied by the licensee in February 2020, reduced the leak rate by approximately 2 gph. The inspector found further actions to address the reactor pool water leak are ongoing.

Contrary to NCSU PULSTAR Reactor TS 6.7.4, the inspector found NCSU has not documented the release of radioactivity via the reactor pool leak to the NRC in any of the annual reports that they have submitted since the leaks started in 2015. Failure to document the activity released by the NCSU

reactor facility to the environment in the annual operating report is a violation of the NCSU PULSTAR TS 6.7.4 (VIO 50-120/2020-201-01).

c. Conclusion

The inspector verified that the licensee's radiation protection program was effective in minimizing radiation doses to individuals through training, notices to workers, radiation monitoring and surveys, and equipment calibration and maintenance. With the exception of the TS violation described in paragraph b of this section, the inspector determined the program met regulatory requirements.

8. Design Changes

a. Inspection Scope (IP 69001 [02.08])

In order to verify that any modifications to the facility were consistent with 10 CFR 50.59, "Changes, tests and experiments," the inspector reviewed selected aspects of:

- procedure SP 2.1, review and approval of documentation, Revision 10
- PULSTAR annual operating reports for 2018 and 2019
- 10 CFR 50.59 screenings and evaluations for 2018 and 2019

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector found that no changes requiring prior NRC approval was initiated and/or completed at the facility since the last NRC operations inspection.

The inspector found the licensee completed the 10 CFR 50.59 screenings and evaluation as required.

c. Conclusion

The inspector determined the licensee acceptably reviewed changes at the facility in accordance with 10 CFR 50.59 and applicable licensee administrative controls.

9. Committees, Audits and Review

a. Inspection Scope (IP 69001 [02.09])

The inspector reviewed the following to ensure that the audits and reviews stipulated in TS Section 6.2 were completed:

- RSC membership, dated August 31, 2019
- RSAC membership, dated August 31, 2019
- RSAC minutes of meetings held during 2018 and 2020 to date
- RSC minutes of meetings held during 2018 and 2020 to date

- 2018 RSAC audit summary dated April 9, 2019
- draft 2019 RSAC audit summary

b. Observations and Findings

The inspector observed that the composition of the RSC and RSAC were as specified in the TS. A review of records indicated that both committees met at the prescribed frequency and provided the oversight and reviews of the reactor programs as required by the TS.

c. Conclusion

The inspector determined the RSC and RSAC provided the oversight required by the TS.

10. Emergency Planning

a. Inspection Scope (IP 69001 [02.10])

The inspector assessed the emergency preparedness program and its implementation through review of the following:

- PULSTAR nuclear reactor emergency plan, Revision 10, dated March 29, 2017
- emergency procedure (EP) 1, emergency plan activation, response and actions, Revision 19
- EP 2, off-site notification, Revision 21
- EP 4, Emergency Classification, Revision 7
- EP 7, training, Revision 6
- training records of emergency support groups
- PULSTAR Nuclear Reactor drill summary and critique, for the drill conducted November 7, 2019
- PULSTAR Nuclear Reactor drill summary and critique, for the drill conducted January 9, 2020
- letter of agreement (LOA) with city of Raleigh fire department, dated August 12, 2019
- LOA with state of North Carolina division of emergency management, dated May 28, 2019
- LOA with Wake County emergency management, dated August 7, 2019
- LOA update with Rex Healthcare Hospital, dated May 20, 2019

b. Observations and Findings

The inspector reviewed the licensee's emergency preparedness program as defined in the above-referenced emergency plan and implementing procedures. The inspector also reviewed documentation related to annual drills, the critiques of the drills and lessons learned. The inspector found that letters of agreement with support agencies were available and current.

c. Conclusion

The inspector determined the licensee conducted the emergency planning program in accordance with the emergency plan and implementing procedures.

11. Maintenance Logs and Records

a. Inspection Scope (IP 69001 [02.11])

The inspector reviewed the following selected maintenance and reactor operation records to ensure that the requirements of TS Section 6.8 were met:

- PULSTAR maintenance log and history report
- PULSTAR Reactor logbooks covering the period 2018 to present

b. Observations and Findings

The inspector reviewed the maintenance records related to scheduled and unscheduled preventive and corrective maintenance activities that occurred during the inspection period.

The inspector observed that routine and preventive maintenance was controlled and documented in the appropriate logs. These documents indicated that all maintenance activities were in accordance with the requirements in licensee administrative controls. The inspector verified that all maintenance was conducted in accordance with the requirements of TS Section 4.0.

c. Conclusion

The inspector determined the licensee performed maintenance and maintained records consistent with TS and licensee procedure requirements.

12. Fuel Handling Logs and Records

a. Inspection Scope (IP 69001 [02.12])

The inspector reviewed the following records to verify implementation of the requirements of TS Section 4.1:

- procedure NRP-OP-301, reactor fuel handling, Revision 2, dated November 1, 2014, Appendix A, confirmations of fuel movement and Appendix B, fuel movements schedule during the period 2018 to 2020 to date
- core map records of fuel element locations

b. Observations and Findings

The inspector found the procedures used for fuel handling provide for the safe handling of fuel elements. The inspector observed data sheets and the Core Map Records adequately documented the fuel element locations.

c. Conclusion

The inspector determined the licensee completed fuel movements in accordance with TS requirements and licensee procedural requirements.

13. Transportation Activities

a. Inspection Scope (IP 86740)

The inspector interviewed personnel and reviewed the following to verify compliance with regulatory and procedural requirements for transferring licensed material:

- file of radioactivity material shipments for 2018 to 2020 to date
- procedure HP 6, "Transportation of Radioactive and Hazardous Material," Revision 1, dated September 25, 2003
- hazardous material transfer and shipment records for material shipped in 2018 and 2020 to date

b. Observations and Findings

The inspector found shipments of radioactive material made from 2018 to 2020 to date were appropriately documented.

c. Conclusion

The inspector determined the licensee completed radioactive material shipments in accordance with procedures and regulatory requirements.

14. Exit Interview

The inspector presented the inspection results to licensee management at the conclusion of the inspection on June 25, 2020. In addition, the NRC branch chief participated in the exit interview and discussed the pool leakage observation. The inspector described the areas inspected and discussed the inspection observations. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Cook	Manager, Nuclear Reactor Program and Reactor Operations Manager
G. Gibson	Reactor Engineer
A. Hawari	Director, Nuclear Reactor Program
K. Kincaid	Chief of Reactor Maintenance
G. Wicks	Reactor Health Physicist

INSPECTION PROCEDURES USED

IP 69001	Class II Non-Power Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

50-120/2020-201-01	VIO	Annual operating reports do not include activity released via reactor pool leak.

Closed:

None

Discussed:

None

LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
EP	Emergency Procedures
GPH	Gallon Per Hour
HP	Health Physics
IP	Inspection Procedure
LOA	Letter of Agreement
LCO	Limiting Conditions for Operations
NCSU	North Carolina State University
NRC	U.S. Nuclear Regulatory Commission
NRF	Nuclear Reactor Facility
NRP	Nuclear Reactor Program
RSAC	Reactor Safety and Audit Committee
RSC	Radiation Safety Committee
SP	Special Procedure
TS	Technical Specification