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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Technical Specifications 6.7.1
License R-56, Docket 50-83

Subject: CY2019 Annual Report for the UFTR

Please find enclosed the UFTR annual report for calendar year 2019. This report is being submitted as required by our Technical Specifications, Section 6.7.1.

I declare under penalty of perjury that the foregoing and attached are true and correct to my knowledge.

Executed on May 17, 2020.

A handwritten signature in black ink, appearing to read 'Brian Shea', written in a cursive style.

Brian Shea
Reactor Manager, University of Florida Training Reactor

cc: Duane Hardesty, Project Manager, NRC

University of Florida Training Reactor
Annual Report for Calendar Year 2019

The following annual report is submitted in accordance with Section 6.7.1 of the UFTR Technical Specifications.

Summary of Reactor Operations

Total Energy Output for CY2019: 22,785 kW-hrs

Cumulative Energy Output Since Conversion to LEU: 58,611 kW-hrs

Periodic routine reactor operations were conducted through the first half of CY2019 with brief periods of unavailability for maintenance. In mid-July 2019 routine operations were suspended for maintenance and surveillances. Periodic routine reactor operations resumed mid-October 2019 and ran through the end of CY2019 with brief periods of unavailability for maintenance.

Unscheduled Shutdowns

There were no unscheduled shutdowns during CY2019.

Major Maintenance

A listing of all major maintenance is presented in Table I.

In Table I the first date for each entry is the date when the Maintenance Log Page (MLP) was opened; in quite a few cases, this date may be one or more days after the original problem was noted. The second date indicates the day the MLP was closed which can also be one or more days after work completion.

Table I
Major Maintenance Performed

MLP Number	Date Opened	Date Closed	Summary
19-1	3/25/2019	4/8/2019	Corroded galvanized piping and fittings in the city water system were replaced with Schedule 80 PVC to eliminate the corrosion and prepare for future ultrasonic flowmeter installation.
19-2	3/25/2019	5/22/2019	The obsolete Primary Coolant (PC) local level sight glass and level switch were replaced with new PC level indicator and level switch. A permanent PC level switch lamp was installed to eliminate need for installation and removal of a temporary lamp and wire jumpers during surveillance testing
19-3	4/8/2019	4/8/2019	Routine addition of makeup water to the PC Tank.
19-4	5/10/2019	5/22/2019	This corrective action item eliminated the evacuation alarm auto-trip function installed under MLP 17-3 due to the modification being installed in error.
19-5	5/10/2019	5/10/2019	Reopened plugged 3" hole from Pit "A" for installation of electrical conduit.
19-6	5/13/2019	*	Installation of an Ultrasonic Flowmeter for Well Water Flow (* MLP 19-6 remained open through end of 2019).
19-7	5/14/2019	*	Installation of an Ultrasonic Flowmeter for City Water Flow (* MLP 19-7 remained open through end of 2019).
19-8	5/15/2019	*	Installation of an Ultrasonic Flowmeter for PC Inlet Flow (* MLP 19-8 remained open through end of 2019).
19-9	5/23/2019	9/6/2019	Troubleshooting to correct noisy indication from Fuel Box 6 outlet thermocouple.
19-10	6/25/2019	6/25/2019	Routine addition of makeup water to the PC Tank.
19-11	6/25/2019	6/25/2019	Routine addition of makeup water to the Shield Tank.
19-12	7/15/2019	9/19/2019	Performance of factory calibration and repairs/replacements as needed during the Nuclear Instrument Calibration surveillance.
19-13	7/16/2019	7/18/2019	Installation of a Turbine Flowmeter in the PC Demineralized Water system for future remote indication of flowrate.
19-14	8/7/2019	8/7/2019	Installation of a Continuous Level Transmitter in the Shield Tank for future remote level indication.
19-15	8/7/2019	8/7/2019	Routine addition of makeup water to the PC Tank and the Shield Tank.
19-16	8/19/2019	8/19/2019	Replacement of the obsolete glass PC Tank level indicator (local sight glass) with clear PVC pipe containing a Continuous Level Transmitter for future remote indication of tank level.
19-17	10/15/2019	10/15/2019	Routine addition of makeup water to the PC Tank.
19-18	11/13/2019	11/13/2019	Routine replacement of the PC Demineralized Water system resin and filter.
19-19	11/13/2019	11/13/2019	Routine replacement of the Shield Tank Demineralized Water system resin and filter.
19-20	11/13/2019	11/13/2019	Routine addition of makeup water to the PC Tank.
19-21	11/13/2019	11/13/2019	Routine addition of makeup water to the Shield Tank.

Changes, Tests, and Experiments Implemented under 10 CFR 50.59

A listing of changes, tests, and experiments implemented under 10 CFR 50.59 is presented in Table II. Changes numbered 19-9, 19-15, and 19-18 below were conservatively screened-in. All other changes, tests, and experiments implemented during CY2019 screened-out from full evaluation.

Table II
Changes, Tests, And Experiments Implemented Under 10 CFR 50.59

Number	Date Approved	Summary
19-1	1/15/2019	Experiment – Investigation of Radio-purity through Neutron Activation Analysis of Low Background Structural Scintillator (Run Request 19-1).
19-2	2/15/2019	Experiment – Neutron Activation Analysis and Characterization of Modern Urban Materials (Run Request 19-2).
19-3	3/4/2019	Experiment – Nuclear Instrument Testing in the Upper Thermal Column Port (Run Request 19-3).
19-4	4/10/2019	Modification - Corroded galvanized piping and fittings in the city water system were replaced with Schedule 80 PVC to eliminate the corrosion and prepare for future remote indication of flowrate with an ultrasonic flowmeter (MLP 19-1).
19-5	5/2/2019	Procedure Change - SOP-0.5, Quality Assurance Program, was revised to incorporate editorial changes consistent with revision of surveillance Q-1, Check of Scram Functions.
19-6	5/2/2019	Modification - The obsolete Primary Coolant (PC) local level sight glass and level switch were replaced with a new PC level indicator and level switch (MLP 19-2).
19-7	5/13/2019	Procedure Change – Surveillance Q-1 was revised to make the PC level surveillance step consistent with the modification performed in MLP 19-2 and to eliminate the “External” scram check consistent with MLP 19-4 and Condition Report 18-01.
19-8	5/13/2019	Modification - A permanent PC level switch lamp was installed at the local level indicator to eliminate the need to install and remove a temporary lamp and wire jumpers during Q-1 surveillance testing (MLP 19-2).
19-9	5/21/2019	Modification – This corrective action item eliminated the evacuation alarm auto-trip function (“External” scram) installed under MLP 17-3 due to the modification being installed in error (MLP 19-4 and Condition Report 18-01).
19-10	6/11/2019	Experiment – Testing Neutron and Gamma Shielding Properties of Glasses (Run Request 19-4).
19-11	7/1/2019	Emergency Plan Change – Change processed in accordance with 10 CFR 50.54
19-12	7/1/2019	Procedure Change – SOP-0.1, Operating Document Controls, was revised to add “Date” to Facility Director and RSRS Chair signature lines and more spacing between the signatures.
19-13	7/1/2019	Procedure Change – SOP-0.6, Unscheduled Shutdown Review and Evaluation, was revised to improve procedure clarity, ease of use, and to ensure consistency with license renewal Technical Specifications.
19-14	7/1/2019	Procedure Change – SOP-A.5, Experiments, was revised to change the signature blank on Form SOP-A.5A from Reactor Manager to Facility Director.

19-15	7/1/2019	Procedure Change – SOP-A.7, Determination of Control Blade Integral or Differential Reactivity Worth, was revised to enhance the procedure and incorporate the blade swap method.
19-16	9/9/2019	Modification – A Turbine Flowmeter was installed in the PC Demineralized Water system for future remote indication of flowrate (MLP 19-13).
19-17	9/9/2019	Modification – A Continuous Level Transmitter was installed in the Shield Tank for future remote indication of tank level (MLP 19-14).
19-18	9/10/2019	Modification with Procedure Change – This proposed change involves elimination of “Reactor ON” reactor key status indications on the exterior of the reactor building as well as corresponding administrative changes to FSAR 7.5 and SOP-A.1, Pre-operational Checks.
19-19	9/16/2019	Procedure Change – Form SOP-0.5E, Annual QA Audit Checklist, was revised to incorporate two new checklist items.
19-20	9/16/2019	Procedure Change – SOP-E.4, Calibration of Reactor Measuring Channels, was revised to incorporate additional guidance and revised specifications.
19-21	9/16/2019	Modification – The obsolete glass PC Tank level indicator (local sight glass) was replaced with clear PVC pipe and a Continuous Level Transmitter for future remote indication of tank level (MLP 19-16).
19-22	9/16/2019	Modification – Resistor R4 on the Signal Selector Card (Card A6) was changed from 1.650 k Ω to 2.000 k Ω to meet calibration requirements (MLP 19-12).
19-23	9/16/2019	Modification – The Period Meter, meter adjust potentiometer R22, and series resistor R26 were changed to meet calibration requirements (MLP 19-12).
19-24	9/16/2019	Modification – Resistor R5 on Channel 1 Card A8 was removed due to excessive zero readings (MLP 19-12).
19-25	9/16/2019	Modification – Amplifier A2 on Channel 1 Card A8 was replaced due to excessive offset voltage (MLP 19-12).
19-26	10/28/2019	Procedure Change – SOP-A.1 was revised to update the Air Particulate Detector (APD) portions of the procedure to accommodate periodic changes in APD background readings, and associated changes in alarm setpoint, resulting from environmental Radon level changes.
19-27	11/7/2019	Experiment – Irradiation of Boron Doped Concrete (Run Request 19-5).

Radioactive Effluents

Liquid Waste

No wastewater releases were made during CY2019.

Gaseous Waste

The total activity of Argon-41 released during CY2019 was 99.48 curies. Using the calculation method described in the UFSAR, the maximum potential dose to a member of the public from UFTR Ar-41 emissions during CY2019 was 0.5 mrem/year. This is significantly less than 25% of the ALARA constraint of 10 mrem/yr.

Environmental Surveys

In addition to periodic radiation surveys using hand-held instruments, environmental monitoring is accomplished using radiation dosimetry badges. Areas monitored are located around the exterior of the Reactor Building (RB) and nearby buildings, including the Nuclear Sciences Building (NSB), the Reed Lab (RL), and the Journalism Building (JB). The environmental dosimetry reports are tabulated and presented in Table III. Dose equivalents below the minimum measurable quantity are reported as “M”.

Table III
Total Effective Dose Equivalent (TEDE) at Monitored Locations

Area	Quarterly TEDE (mrem)				Annual TEDE (mrem)
	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	
1. Reed Lab south wall (from annex roof)	11	19	11	18	59
2. SE corner of stack near release point	8	7	2	24	41
3. NSB Rm. 316 window - inside	M	2	M	M	2
4. NSB Rm. 316 window - outside	M	1	M	M	1
5. RB east wall under the light	10	14	7	11	42
6. Greenhouse SW corner - NSB roof	M	2	M	M	2
7. Ladder Post Leading to Annex Transformer Area	6	6	M	7	19
8. Stand on north side of NSB roof	M	4	M	2	6
9. Cooling tower east lighting arrestor	M	7	M	M	7
10. JB Third Floor Roof – Stand on west roof edge	M	2	M	1	3
11. JB Third Floor Roof – Stand on south roof edge	2	1	M	1	4
12. Control Badge - Building 683 west wall on electrical box	M	2	M	M	2
13. JB First Floor Roof – Stand in SW corner of roof	1	5	M	M	6

The dosimetry badges located in areas 1, 5, and 7 consistently registered a small dose with no apparent correlation to reactor operations or radiation levels in the reactor cell. These doses are primarily attributed to background radiation from the red brick and mortar used in construction of the Reactor Building and the Reed Lab in the 1950's and 1960's. None of the other badges are attached, or in tight proximity, to this red brick and mortar. Environmental dosimetry badge 2, located at the stack release point, registered dose readings that generally correlate with reactor operations.

Radiation Exposures

There were no exposures received by facility personnel or visitors that were greater than 25% of that allowed in 10 CFR Part 20. Seven individuals received measurable occupational exposures during CY2019. The maximum Total Effective Dose Equivalent (TEDE) received by any individual in CY2019 was 17 mrem for the year. The maximum extremity dose (SDE, ME) received by any individual in CY2019 was 21 mrem for the year.