STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
Rhode Island Atomic Energy Commission
16 Reactor Road
Narragansett, RI 02882-1165
Telephone # 401-874-2600

August 25, 2016
Docket No. 50-193
Document Control Desk
U.S. Nuclear Regulatory Commission (NRC)
11555 Rockville Pike
Rockville, Maryland 20852

Attn: Mr. Patrick Boyle, Project Manager

Dear Mr. Boyle:

This letter and the enclosures constitute the annual report required by the RINSC Technical Specifications (Section 6.8.4). Enclosure 1 provides reactor operating statistics. Enclosure 2 provides information pertaining to unscheduled reactor shutdowns or scrams. Enclosure 3 discusses maintenance operations performed during the reporting period. Enclosure 4 describes changes to the facility carried out under the conditions of Section 50.59 of Chapter 10 of the Code of Federal Regulations. Lastly, Enclosure 5 summarizes the radiological controls information. If there are any questions regarding this information, please call me at 401-874-9442.

Sincerely,

Paul W Martin Jr
Reactor Supervisor

Enclosures (5)
Copy to:
Mr. Craig Bassett, USNRC
Dr. John J. Breen, Chairman, NRSC
Dr. Clinton Chichester, Chairman, RIAEC
Dr. Nancy Breen, RIAEC
Mr. Howard Chun, RIAEC
Dr. Yana K. Reshetnyak, RIAEC
Dr. Nitin Padture, RIAEC

Enclosure 1

REACTOR OPERATING STATISTICS

Technical Specification Section 6.8.4.a

Month	Year	Operating Hours	Energy (MWH)	Energy (MWD)
July	2015	27.05	26.32	1.097
August	2015	29.53	20.30	0.846
September	2015	23.85	22.03	0.918
October	2015	31.80	43.97	1.832
November	2015	46.48	73.00	3.042
December	2015	39.23	50.77	2.115
January	2016	5.25	0.88	0.037
February	2016	65.72	68.74	2.864
March	2016	38.53	12.82	0.534
April	2016	54.55	33.95	1.415
May	2016	23.95	27.29	1.137
June	2016	12.17	8.96	0.373
Totals	**FY2016**	398.11	389.03	16.210

Total Energy Output since Initial Criticality:
65,717.18 MWH or 2738.22 MWD

ENCLOSURE 2

UNSCHEDULED SHUTDOWNS OR SCRAMS

Technical Specification Section 6.8.4.b

The following is a list of the unscheduled shutdowns or scrams that occurred during the 2015-2016 reporting period:

Date	Run No.	Logbook	Page	Cause	Description
08/26/15	9048	61	87	Instrumentation/ Operator	Scrammed twice during rod testing due to wide range selection error, range down button sticking.
11/03/15	9068	61	109	Instrumentation	Short period Scram prior to reaching criticality due to signal noise.
11/17/15	9074	61	115	Computer interlock	New rod control computer sleep mode not disabled, watchdog scram.
12/10/15	9083	61	124	Operator	Operator error during the performance of TP-03 for a lab. Power at >57% with select switch in the .1 MW mode of operation, auto scram set point.
1/06/16	9088	61	129	Instrumentation/ Operator	Wide range indication mismatch between remote and rack, auto scram setpoint reached prior to noticing mismatch
1/08/16	9093	61	136	Power surge	Winter storm caused power surge causing momentary loss of power to scram magnets
2/11/16	9097	61	140	Operator	Auto scram while raising reactor power for training, range selection error.
3/01/16	9114	62	1	Instrumentation	Auto scram with power on the 20kW scale due to wide range 1 range indicator malfunction.
3/03/16	9116	62	4	Power surge	Momentary loss of power to scram magnets due to power surge.
3/17/16	9130	62	19	Power surge	Momentary loss of power to scram magnets due to power surge.
3/31/16	9135	62	25	Power surge	Momentary loss of power to scram magnets due to power surge.
4/01/16	9137	62	28	Instrumentation	Short period Scram prior to reaching criticality due to signal noise.
4/06/16	9140	62	32	Instrumentation	Short period Scram prior to reaching criticality due to signal noise.
4/13/16	9146	62	38	Instrumentation	Short period Scram twice prior to reaching criticality due to signal noise.
4/14/16	9150	62	43	*Computer communication	At time of scram could not determine the cause, no indications were evident. After a period of time it was determined that the rod control computer was having communication card issues and giving us a watchdog scram, without the normal test indications of a watchdog scram.
4/18/16	9152	62	45	Instrumentation	Short period Scram prior to reaching criticality due to signal noise.
4/18/16	9153	62	46	Instrumentation	Scram from full power due to signal noise.
4/19/16	9155	62	48	Instrumentation	Scram while raising power due to signal noise.

ENCLOSURE 2

UNSCHEDULED SHUTDOWNS OR SCRAMS

Technical Specification Section 6.8.4.b

Date	Run No.	Logbook	Page	Cause	Description
4/22/16	9159	62	53	*Computer communication	Watchdog scram, later determined to be due to computer communication issues
5/12/16	9167	62	62	*Computer communication	Scrammed twice, at time no apparent reason, later determined to be due to communication card issues giving us a watchdog scram
5/19/16	9168	62	64	*Computer communication	At time of scram, no apparent reason, later determined to be due to communication card issues giving us a watchdog scram
5/26/16	9171	62	67	*Computer communication	At time of scram, no apparent reason, later determined to be due to communication card issues giving us a watchdog scram
6/01/16	9173	62	69	*Computer communication	At time of scram, no apparent reason, later determined to be due to communication card issues giving us a watchdog scram
6/08/16	9175	62	71	*Computer communication	Watchdog scram, operator actually noticed computer blinking light stopped blinking for a few seconds. This helped us find the communication issue.
6/14/16	9177	62	73	Instrumentation	Short period Scram prior to reaching criticality due to signal noise.

*Note: When the rod control computer communication card problem was discovered, a new rod control computer was installed. This was a hardware change only, software remains the same.

ENCLOSURE 3

MAINTENANCE OPERATIONS

Technical Specification 6.8.4.c requires a listing of the major maintenance operations performed in the 2015-2016 reporting period including their impact upon the safe operation of the reactor and the reasons for the corrective maintenance.

The Main Floor Particulate Monitor was replaced. The new monitor is a significant upgrade and has the latest technology and far more capabilities than the old monitor. The current plan is that it will also be made capable of indicating in the control room as well as locally.

A major upgrade was also implemented for area radiation monitors. All of the existing radiation monitors have been replaced and additional radiation monitors have been installed in other locations. The new monitors detect both gamma and neutrons, are capable of both visual and audible alarm, and they all indicate both locally and in the control room.

ENCLOSURE 4
FACILITY CHANGES – 10CFR50.59 REVIEW

Technical Specification 6.8.4.d requires that we provide a listing and description of any 10 CFR 50.59 evaluations conducted during the 2015-2016 reporting period.

Even though there were no facility changes made during this period that required a 10 CFR 50.59 evaluation, an evaluation was performed on the replacement of the Main Floor Particulate Monitor discussed in the previous section to insure that there was nothing overlooked. A copy of that evaluation is attached.

ENCLOSURE 5
RADIOLOGICAL CONTROLS

1. Environmental Surveys outside the Facility – Technical Specification 6.8.4.e

   Quarterly TLD[1] badges are deployed outside the reactor building in three separate locations. The general public does not frequent these locations and therefore occupancy factors may be used to approximate annual dose. The allowable external dose rates must be below 100 mrem per year. The quarterly doses in units of mrem are shown in the table below.

LOCATION	3rd QTR 2015	4th QTR 2015	1st QTR 2016	2nd QTR 2016
Northeast Wall	0	0	0	0
Demineralizer Door	88	55	65	21
Heat Exchanger Door	27	25	35	16

   These areas are in locations where access is limited. Consequently, the general public will not frequent these areas, and appropriate occupancy factors can be used to approximate annual dose. Assuming that the maximum time that a member of the general public would be present in one of these locations is 10 minutes per day, an occupancy factor of 0.025 can be used to obtain the annual dose that would be received by a member of the general public, in any of these areas.

   The annual dose rate at the Northeast Wall, Demineralizer and Heat Exchanger Doors is dependent on the operations schedule of the reactor. Ignoring the fact that the dose rate is not present 24 hours per day, and applying the occupancy factor of 0.025[2], the annual dose that would be receive by an individual in the demineralizer room would be 5.73 mrem. The dose received at the Heat Exchanger Door would be 2.58 mrem. The annual dose received at the Northeast wall would be 0 mrem. The variations from quarter to quarter and from previous reports are due in part to movements of items within the reactor building during the fiscal year and varying use of the different irradiation facilities.

2. Annual Exposures Exceeding 500mrem – Technical Specification 6.8.4.f

   There were no personnel exposures greater than 500 mrem.

3. Radioactive Effluents – Technical Specification 6.8.4.g

[1]Thermoluminescent Dosimeter; Radiation Detection Co. reads the dosimeters at minimum of 10 mrem.

[2] Occupancy factor was changed from 0.01 to 0.025. 0.01 was derived using occupancy factor and use factor (it was assumed that the reactor is not running 8 hours every day). We will use 0.025, from NCRP 147 for Outdoors, unattended parking lots, attics, stairways, unattended elevators, janitor's closets. 0.025 is more conservative number than 0.01.

A. Individual gaseous effluent concentrations for each reactor operation are recorded on the Monthly Information Sheets (Form NSC-78). The concentration of radioactive materials in the effluent released from the facility exhaust stacks shall not exceed 1E+05 times concentrations specified in 10CFR20, Appendix B, Table II, when averaged over time periods permitted by 10CFR20.[3]
Gamma spectroscopy of stack gas samples has shown that the principal gaseous effluent is Argon-41. The maximum concentration for this principle contaminant permitted under Technical Specifications is 1E-8 µCi/cc x1E+5 = 1E-3 µCi/cc. Concentrations released during the year were less than 0.075 of that limit.
The total Argon-41 release during the reporting period was 5.491E+1 curies. The calculated effective dose equivalent for this release is 1.2 mrem/year (COMPLY Code).

B. Liquid effluent concentrations released to the sewer are documented on the Sewer Discharge Report (NSC-09). Each release was approved prior to discharge with its pH being within the acceptable range and with the sum of the fractions of the respective radioisotopes per month being below the discharge limit of 1. For the reporting period, the total volume of discharge was 24,800,000 ml. The isotopes and their relative activities discharged are given below.

Radioisotope	**Total Activity Discharged (microcuries)**
H-3	2.52E4
C-14	3.18E3
Pb-214	7.61E3
Bi-214	8.87E3
Pb-212	1.46
K-40	3.73E2
Ce-141	5.62
Co-60	1.24E1
Sb-122	6.02
Sb-124	2.09E1
I-124	3.32

[3] Technical Specifications, Section 3.7.2.

Date: 9/24/15 Approved By: _____

Title: Main Floor Particulate Monitor Upgrade

As an attachment to this form, provide a written description of the proposed modification, the purpose for making the modification, and a justification for the answer to each of the following questions:

1. Does the change require a change to the Technical Specifications of the R-95 License? Y N

A review of the RINSC Technical Specifications indicates that:

A. Section 3.7.1.2

This specification requires that at least one air monitoring unit inside the confinement building is operating when the reactor is operating. The new system is located inside confinement, and continuously monitors the confinement air during reactor operation.

B. Section 4.7.1

This specification requires that the Particulate Air Monitor be calibrated annually. The calibration schedule for the new system will be on an annual schedule.

C. Section 4.7.3

This specification requires that a channel check of the Main Floor Monitor be performed each day the reactor is in operation. The new system is a self checking system that performs a periodic channel check of the system every few minutes when the instrument is in operation.

D. Table 3.2

Item 11 requires that a Continuous Air Monitoring Unit with an alarm function be in operation when the reactor is in operation. The new system has audio and visual high radiation warnings and alarms.

Consequently, this change does not require a change to the Technical Specifications of the R-95 License.

2. Could the change result in more than a minimal increase in the frequency of occurrence of an accident that has been previously evaluated in the SAR? Y N

This change involves replacing a radiation monitoring instrument which is not associated with any of the reactor safety systems and does not have any affect on reactor operation. Consequently, this change will not increase the frequency of occurrence of an accident that has been previously evaluated in the SAR.

3. Could the change result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component that is important to safety and evaluated in the SAR? Y N

This change involves replacing a radiation monitoring instrument which is not associated with any of the reactor safety systems and does not have any affect on reactor operation. Consequently, this change will not increase the likelihood of occurrence of a malfunction of a structure, system, or component that is important to safety and evaluated in the SAR.

4. Could the change result in more than a minimal increase in the consequences of an accident that is evaluated in the SAR? Y N

This change involves replacing a radiation monitoring instrument which is not associated with any of the reactor safety systems and does not have any affect on reactor operation. Consequently, this change will not increase the consequences of an accident that is evaluated in the SAR.

5. Could the change result in more than a minimal increase in the consequences of a malfunction of a structure, system, or component that is important to safety and evaluated in the SAR? Y N

This change involves replacing a radiation monitoring instrument which is not associated with any of the reactor safety systems and does not have any affect on reactor operation. Consequently, this change will not result in an increase in the consequences of a malfunction of a structure, system, or component that is important to safety and evaluated in the SAR.

6. Could the change result in creating the possibility of an accident of a different type than the accidents that have been evaluated in the SAR? Y N

This change involves replacing a radiation monitoring instrument which is not associated with any of the reactor safety systems and does not have any affect on reactor operation. Consequently, this change will not

result in creating the possibility of an accident of a different type than the accidents that have been evaluated in the SAR.

7. Could the change result in creating the possibility for a malfunction of a structure, system, or component that is important to safety, with a different result than predicted in the SAR? Y N

   This change involves replacing a radiation monitoring instrument which is not associated with any of the reactor safety systems and does not have any affect on reactor operation. Consequently, this change will not result in creating the possibility of a malfunction of a structure, system, or component that is important to safety, with a different result than predicted in the SAR.

8. Could the change result in a design basis limit for a fission product barrier as described in the SAR being altered or exceeded? Y N

   This change involves replacing a radiation monitoring instrument which is not part of any fission product barrier. Consequently, this change will not result in a design basis limit for a fission product barrier as described in the SAR being altered or exceeded.

9. Could the change result in a departure from a method of evaluation used in the SAR for establishing the design bases for the facility? Y N

   This change involves replacing a radiation monitoring instrument which was not used in the SAR as a method of evaluation for establishing the design bases for the facility. Consequently, this change will not result in a departure from a method of evaluation used in the SAR for establishing the design bases for the facility.

If the answer to any of these questions is yes, then an NRC approved license amendment pursuant to 10 CFR 50.90 shall be obtained before the modification is implemented.

Documentation Review to support 50.59 for new Main Floor Particulate Monitor

1. Safety Analysis Report Review

The RINSC Safety Analysis Report does not refer to specific radiation monitoring instrumentation. The report provides a technical analysis of the likely consequences of accidental radioactive material release, but it does not discuss the monitoring system that is available for detecting a release. Consequently, there is no reference to the Main Floor Particulate Monitor in this document.

2. Technical Specification Review

A. Section 3.7.1.2

This specification requires that at least one air monitoring unit inside the confinement building is operating when the reactor is operating. The new system is located inside confinement, and continuously monitors the confinement air during reactor operation.

B. Section 4.7.1

This specification requires that the Particulate Air Monitor be calibrated annually. The calibration schedule for the new system will be on an annual schedule.

C. Section 4.7.3

This specification requires that a channel check of the Main Floor Monitor be performed each day the reactor is in operation. The new system is a self-checking system that performs a periodic channel check of the system every few minutes when the instrument is in operation. The system provides a fault alarm if the instrument stops functioning properly.

D. Table 3.2

Item 11 requires that a Continuous Air Monitoring Unit with an alarm function be in operation when the reactor is in operation. The new system has audio and visual high radiation warnings and alarms.

3. Emergency Plan Review

A. Section 4.1.3

This section of the Emergency Plan describes potential initiating events for an Unusual Event. One of the initiating events is an indication on the main floor particulate monitor that is 10X normal. With the new system, this is still valid.

B. Section 7.2

This section of the Emergency Plan describes how airborne radiological releases are assessed. In addition to the fixed monitoring systems, it describes the portable air sampling instrumentation that is available, and the sampling station that makes it possible to sample confinement air from a location outside the Emergency Protection Zone in the event that "fixed instruments are inoperable or off scale". This section suggests that the main floor particulate monitor has a readout that is outside the EPZ. While this is true for the original system, it is not presently true for the new system. This is mitigated by the fact that we have the sampling station, which is available in the event that the main floor monitor is not working.

4. EP – 01 Emergency Plan Implementing Procedure Review

A. Section V.F.5.A.1.C

This section of the procedure suggests that one of the ways that a fuel cladding failure would be detected is by the main floor particulate monitor alarm that would be due to halogens plating out on the filter, and noble gases being delayed in passing through a charcoal filter. The new main floor particulate monitor does not have a charcoal filter associated with it. However, in the event of a fuel cladding failure, the particulate alarm would still be set off due to iodine release, and noble gases would be detected by the charcoal filter associated with the stack particulate monitor. The system that is being replaced has a thin charcoal filter, but it is never analyzed for iodine. The Stack monitor system still has a particulate, and a gaseous effluent monitor. Consequently, the new system does not decrease the ability to detect fuel failure.