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

July 19, 2017
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 6.7.1). 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 6.7.1.1

Month	Year	Operating Hours	MWH of Operation
July	2016	27.52	30.33
August	2016	32.47	31.50
September	2016	26.28	24.36
October	2016	14.40	16.57
November	2016	36.00	41.02
December	2016	30.45	37.36
January	2017	13.35	8.42
February	2017	52.95	54.38
March	2017	77.27	86.81
April	2017	123.42	206.18
May	2017	161.93	269.45
June	2017	154.38	261.78
Total	**FY2017**	750.42	1068.15 MWH or 44.51 MWD

Total Energy Output Since Initial Criticality
66,785.33 MWH or 2782.72 MWD

ENCLOSURE 2

UNSCHEDULED SHUTDOWNS OR SCRAMS

Technical Specification Section 6.7.1.2

The following is a list of the unscheduled shutdowns or scrams that occurred during the 2016-2017 reporting period:

Date	Run No.	Logbook	Page	Cause	Description
07/0/016	9179	62	75	Watchdog Scram	Scrammed twice during start-up due to computer communication error, had to reboot com device on the reactor bridge
07/20/16	9183	62	80	Instrumentation	Scrammed twice due to range isolator output for WR channel 1 being irratic. Isolator was replaced.
09/19/16	9201	62	102	Operator	Operator error during the performance of rod worth testing with trainee.
09/22/16	9202	62	104	Power surge	Momentary loss of power to scram magnets attributed to AC power pertibations.
11/03/16	9212	62	115	Operator	Auto scram while raising reactor power, range selection error.
02/07/17	9238	62	148	Instrumentation	Short period Scram prior to reaching criticality due to signal noise.
02/18/17	9239	62	149	Operator	Auto scram while changing reactor operating mode for training.
02/14/17	9241	62	152	Equipment failure	Manually scrammed due to exhaust blower motor failure, confinement ventilation inoperable to support reactor operation.
02/16/17	9244	62	155	Instrumentation	Scram while raising blade 1, no indications, no known cause.
02/21/17	9245	63	1	Instrumentation	Scram while raising blade 3, prior to reaching criticality due to signal noise.
03/02/17	9252	63	8	Instrumentation	Scram while raising blade 1, prior to reaching criticality due to signal noise.
03/07/17	9255	63	11	Instrumentation	Scram prior to reaching criticality due to signal noise.
03/08/17	9256	63	12	Instrumentation	Short period Scram twice just after reaching criticality due to signal noise.
03/16/17	9260	63	17	Instrumentation	Operator manually scrammed reactor due to erratic indication on shim safety blade #2
05/04/17	9287	63	46	Operator	Operator inadvertently initiated a manual rundown.
05/17/17	9292	63	52	Instrumentation	Instrument rack 4 UPS pertibation caused loss of flow auto scram
05/18/17	9293	63	54	Instrumentation	Instrument rack 4 UPS failure caused loss of flow auto scram
06/29/17	9314	63	77	Instrumentation	Scram while raising blade 1, prior to reaching criticality due to signal noise.

ENCLOSURE 3

MAINTENANCE OPERATIONS

Technical Specification 6.7.1.3 requires a listing of the major maintenance operations performed in the 2016-2017 reporting period including their impact upon the safe operation of the reactor and the reasons for the corrective maintenance.

The new stack radiation monitor was installed. 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 be placed in service as the primary stack monitor as soon as it has been made capable of indicating in the control room and the old monitor will continue to be maintained as a backup for as long as it continues to remain functional.

The Inlet Temperature Scram was implemented to comply with the new RINSC Technical Specifications that were approved as part of the re-licensing effort.

ENCLOSURE 4
FACILITY CHANGES – 10CFR50.59 REVIEW

Technical Specification 6.7.1.4 requires that we provide a listing and description of any 10 CFR 50.59 evaluations conducted during the 2016-2017 reporting period.

A 10 CFR 50.59 evaluation was performed on the following facility changes:

- New stack radiation monitor
- Inlet Temperature Scram implemented, Outlet Temperature Scram eliminated to comply with the new TS requirements.
- Area Radiation Monitor upgrade. **Note:** This screened out as no review required, however, at the last NRC inspection visit, it was strongly recommended that we do a review. After completing the review, a conference call was held to try to understand why we were asked to complete a review on something that clearly screened out as no review required. After coming to a better understanding of the configuration and operation of our facility, it was agreed that a review was not necessary or required.

All three of these 50.59 reviews are attached.

ENCLOSURE 5
RADIOLOGICAL CONTROLS

1. Environmental Surveys outside the Facility – Technical Specification 6.7.1.6

   Quarterly TLD[1] badges are deployed outside the reactor building in three separate locations. The quarterly doses in units of mrem are shown in the table below.

LOCATION	3rd QTR 2016	4th QTR 2016	1st QTR 2017	2nd QTR 2017
Northeast Wall	8	4	0	16
Demineralizer Door	53	59	75	390
Heat Exchanger Door	26	39	53	171

   The general public does not frequent these locations and therefore occupancy factors may be used to approximate annual dose. The allowable annual external dose must be below 100 mrem per year. 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 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 14.43 mrem. The dose received at the Heat Exchanger Door would be 7.23 mrem. The annual dose received at the Northeast wall would be 0.7 mrem. The variations from quarter to quarter and from previous reports are also 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 500 mrem for facility members, 100 mrem for non-staff members or 10 mrem for members of the general public – Technical Specification 6.7.1.7

   There were no personnel exposures greater than Technical Specification 6.7.1.7. requirements.

---

[1]Thermoluminescent Dosimeter; Mirion Technology reads the dosimeters at minimum of 1 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.

3. Radioactive Effluents – Technical Specification 6.7.1.5

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. Average concentrations released during the year were less than 0.0683 of the limit. The total Argon-41 release during the reporting period was 149.54 curies. The calculated effective dose equivalent for this release is 3 mrem/year (COMPLY Code). The Comply Code report is attached.

B. Liquid effluent concentrations released to the environment 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 1.84E7 ml. The isotopes and their relative activities discharged are given below.

Radioisotope	**Total Activity Discharged (microcuries)**
H-3	1720.1
C-14	60.15
Pb-214	2.86
Bi-214	5.58
K-40	34.56

[3] Technical Specifications, Section 3.7.2.1

Date: 1/27/17 Approved By: Michael J. Davis

Title: Stack 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 3.7.1.1

Whenever the following operations are in progress:

- The reactor is operating.
- Irradiated fuel handling is in progress.
- Experiment handling is in progress for an experiment that has a significant fission product, or gaseous effluent activation product inventory.
- Any work on the core or control rods that could cause a reactivity change of more than 0.60 %Δk/k is in progress.
- Any experiment movement that could cause a reactivity change of more than 0.60 %Δk/k is in progress.

3.7.1.1.1 A minimum of one radiation monitor that is capable of warning personnel of high radiation levels in the confinement gaseous and particulate effluent (Table 3.2, Required Radiation Monitors, lines 1.1 and 1.2) shall be operating.

3.7.1.1.2 If the detector described in specification 3.7.1.1.1 fails during operation, within one hour, place in service a suitable alternative air monitor or begin an hourly grab sample analysis (grab sample analysis applies to particulate only) in lieu of having a functioning monitor.

B. Section 3.7.1.2

3.7.1.2.1 The stack gaseous monitor shall alarm when radiation levels of the stack gas are 2.5 times normal levels, or greater.

3.7.1.2.2 The stack particulate monitor shall alarm when radiation levels of the stack particulates are 2 times normal levels, or greater.

C. Section 3.7 Table 3-2 Required Radiation Monitors

3.2.1 Required Radiation Monitors					
Line #	**Description**	**Maximum Set Point**	**Minimum Required**	**Function**	**Operating Mode**
1.1	Confinement Building Exhaust Stack Gaseous	2.5 times normal	1	Indication and alarm both locally and in control room	As per 3.7.1.1.1
1.2	Confinement Building Exhaust Stack Particulate	2 times normal	1	Indication and alarm both locally and in control room	As per 3.7.1.1.1

The new stack monitor is capable of fulfilling all of the monitoring and alarm capabilities required by the Technical Specifications. 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 effect 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 effect 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 effect 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 effect 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 effect 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 effect 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.

Date: 3/1/17 Approved By: Michael J. Davis

Title: Area Radiation 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 3.7.1.1.3

This specification requires that a minimum of one gamma sensitive radiation monitor that is capable of warning personnel of high radiation levels shall be on the main floor of the Confinement Building and over the pool when the reactor is operating. The new monitors are both gamma and neutron sensitive, and will be maintained on the main floor and at the pool top.

B. Section 3.7.1.2.3

This specification requires that the area radiation monitors shall alarm when radiation levels are 2 times normal levels, or greater. The new monitors have alarming capability, and will be set to alarm when radiation levels are 2 times normal levels, or greater.

C. Sections 4.7.1.1.1 and 4.7.1.1.2

This specification requires that the area radiation monitors on the main floor of the Confinement Building and over the pool are verified to be operable each day prior to the reactor being started up from the shutdown condition, and after the channel has been repaired. This schedule will be maintained.

D. Sections 4.7.1.2.1 and 4.7.1.2.2

This specification requires that the area radiation monitors on the main floor of the Confinement Building and over the pool shall be channel calibrated and channel tested annually. This schedule will be maintained.

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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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 radiation monitoring instruments which are 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.

Date: 1/10/17 Approved By: Michael J. Davis

Title: 170110 Coolant Temperature Scram Set Point Change

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

   This modification involves implementing a change in the facility Technical Specifications so that cooling system temperature scram set points are consistent with new specifications. The new settings are:

Indicator	Function	Required Set Point	Actual Set Point
Pool Temperature	Scram	127 F	126 F
Inlet Temperature	Alarm	None	115 F
Inlet Temperature	Scram	122 F	119 F
Outlet Temperature	Alarm	None	126 F

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 modification has no impact on reactor operation, or anything that could cause an accident. It is strictly a slight change in the cooling system temperature alarm and scram set points.

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 modification has no impact on the ability of the temperature system displays, and their associated relays from functioning.

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

   The new Safety Analysis shows that these changes in temperature set points will have no significant increase in the consequences of an accident that has been 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

   The new Safety Analysis shows that these changes in temperature set points will have no significant 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 modification is simply a set point change and has no impact on any type of accident other than those involving overheating the fuel cladding, which 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 modification has no impact on structure, system, or component malfunctions.

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 modification has no impact on design basis limits for fission product barriers as described in the SAR.

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 modification cannot 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.

COMPLY: V1.7. 7/12/2017 9:40

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY CODE - V1.7.

Prepared by:

RI Atomic Energy Commission
RI Nuclear Science Center
16 Reactor Road, Narragansett, RI 02882

Sangho Nam
401-874-2600

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation and Indoor Air
Washington, DC 20460

COMPLY: V1.7. 7/12/2017 9:40

2017 Ar-41 Realse Report

SCREENING LEVEL 4

DATA ENTERED:

Nuclide	Release Rate (curies/YEAR)
AR-41	1.495E+02

Release height 35 meters.

Building height 18 meters.

The source and receptor are not on the same building.

Building width 18 meters.

Building length 20 meters.

STACK DISTANCES, FILE: stack data 100.dat

DIR	Distance (meters)
N	100.0
NNE	100.0
NE	100.0
ENE	100.0
E	100.0

ESE	100.0
SE	100.0
SSE	100.0
S	100.0
SSW	100.0
SW	100.0
WSW	100.0
W	100.0
WNW	100.0
NW	100.0
NNW	100.0

COMPLY: V1.7. 7/12/2017 9:40

WINDROSE DATA, FILE: 2016 windrose data 2m.dat

Source of wind rose data: 2016 Windrose data
Dates of coverage: 1954-1994
Wind rose location: Narragansett, RI
Distance to facility: 155 m

Percent calm: 0.05

Wind FROM	Frequency	Speed (meters/s)
N	0.062	2.00
NNE	0.058	2.00
NE	0.044	2.00
ENE	0.013	2.00
E	0.012	2.00
ESE	0.013	2.00
SE	0.058	2.00
SSE	0.049	2.00
S	0.058	2.00
SSW	0.084	2.00
SW	0.105	2.00
WSW	0.064	2.00
W	0.068	2.00
WNW	0.095	2.00
NW	0.104	2.00
NNW	0.068	2.00

Distance from the SOURCE to the FARM producing VEGETABLES is 100 meters.

Distance from the SOURCE to the FARM producing
MILK is 100 meters.

Distance from the SOURCE to the FARM producing
MEAT is 100 meters.

NOTES:

The receptor exposed to the highest concentration is located
100. meters from the source in the NE sector.

He gets his VEGETABLES from a farm located
100. meters from the source in the NE sector.

He gets his MEAT from a farm located
100. meters from the source in the NE sector.

He gets his MILK from a farm located
100. meters from the source in the NE sector.

Input parameters outside the "normal" range:

COMPLY: V1.7. 7/12/2017 9:40

Windrose wind frequency is unusually LOW.

RESULTS:

Effective dose equivalent: 3.0 mrem/yr.

*** Comply at level 4.

This facility is in COMPLIANCE.

It may or may not be EXEMPT from reporting to the EPA.

You may contact your regional EPA office for more information.

********** END OF COMPLIANCE REPORT **********