WASHINGTON STATE UNIVERSITY
Nuclear Radiation Center

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Re: Docket No. 50-27; Facility License R-76

The Annual Report for the WSU facility, License R-76, Docket 50-27, prepared by C. Corey Hines, Assistant Director for Reactor Operations, of the WSU Facility, is hereby submitted. The report covers the operating period July 1, 2015 through June 30, 2016.

Respectfully Submitted

Donald Wall

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Director

Enclosure

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ANNUAL REPORT

WASHINGTON STATE UNIVERSITY

NUCLEAR RADIATION CENTER

TRIGA REACTOR

Facility License R-76 for the Reporting Period of July 1, 2015 to June 30, 2016

Nuclear Radiation Center
Washington State University
Pullman, WA 99164-1300

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ANNUAL REPORT ON THE OPERATION OF THE WASHINGTON STATE UNIVERSITY NUCLEAR RADIATION CENTER TRIGA REACTOR

Facility License R-76 for the Reporting Period of
July 1, 2015 to June 30, 2016

1. Narrative Summary of the Year's Operation

A. Operating Experience

Core 35A has accumulated 8381 MWH from beginning of life (BOL) through June 30, 2016. During the reporting period, a total of 536 samples were irradiated, for a total of 9,037 user-hours. Additionally, 17 pulses greater than $1.00 of reactivity addition were performed during this reporting period. The quarterly operations summaries are shown in Table I located in Section 2.

B. Changes in Facility Design, Performance Characteristics, and Operating Procedures Related to Reactor Safety.

The Standard Operating Procedures were revised and approved by the Reactor Safeguards Committee on October 1, 2015. The new SOP numbers are used in this report.

C. Results of Surveillance Tests and Requirements

All surveillance tests and requirements were performed and completed within the prescribed time period.

2. Energy and Cumulative Output

The quarterly operations summaries are given in Table I. The cumulative energy output since criticality of the TRIGA core (1967) is 1,579 Megawatt Days (MWD). The mixed Standard Fuel and 30/20 LEU Fuel Core 35A installed in 2008 has accumulated a total of 349 MWD.

Table I
Fiscal Year 2016 Summary of Reactor Operation[1]

	Q3 2015	Q4 2015	Q1 2016	Q2 2016	TOTALS
Hours of Operation	404	235	204	259	1102
Megawatt Hours	299	199	179	190	866
No of Sample Irradiations	26	25	34	51	136
No. of Samples	38	93	99	186	416
No. of Commercial Irradiations	41	30	24	22	120
User Hours	3160	2088	1797	1958	9037
No. of Pulses > $1.00	2	7	4	4	17

[1] Number of samples and sample irradiations do not include commercial irradiations. User hours denotes the total user hours, including commercial irradiations

3. Emergency Shutdowns and Inadvertent Scrams

There were no emergency shutdowns or unplanned shutdown periods that occurred during the reporting period. The dates and causes of the six (6) inadvertent scrams are listed in Table II. No scrams were due to exceeding the limiting safety systems setting or safety limit.

Table II
Inadvertent Scrams

Date	Description of Scram
8/20/2015	Indicated linear high power scram due to an electronic malfunction. Power level did not actually change.
10/5/2015	Indicated pulse high power scram during a pulse due to an electronic malfunction on the NPP-1000.
11/17/2015	Operator trainee switched the reactor to test instead of rundown.
2/18/2016	C.I.C. high voltage failure due to electrical maintenance.
4/12/2016	Indicated pulse high power scram during a pulse due to an electronic malfunction on the NPP-1000.
6/11/2016	Loss of power to the building caused a scram.

4. Major Maintenance

Although they are not part of routine preventative maintenance, the below listed items were performed.

7/7/2015: *Cooling System*
The reactor staff noticed a loud whining noise coming from the secondary cooling pump. WSU FacOps determined that the coupling between the motor and the pump was out of alignment. No damage occurred due to the misalignment. FacOps replaced and aligned the coupler on 7/29/2015. The pump is operating normally.

7/9/2015: *Console Electrical*
The cooling system has been shutting off at random during reactor startup. An investigation showed no obvious system malfunctions, but relay 17K11 was replaced as this is the most likely point of failure. This relay controls the OFF button for the cooling system, and a weak coil may be the responsible for the issue. Since the problem is intermittent, replication is difficult and the system will be observed during operation to see if it continues to occur.

9/17/2015: *Ventilation System*
The filters in the penthouse clogged causing low air flow rates. WSU FacOps replaced the filters with a different kind. The air flow rates are back to normal.

10/8/2015: *Heat Exchanger*
The 3-way valve for the pressure transducer on the secondary inlet started leaking in January 2015. The valve was replaced with a threaded brass nipple pending replacement. On 10/8/2015 the threaded brass nipple was replaced with the same make and model of 3-way valve. The new valve has been checked and no leaks were found.

12/7/2015: *Pulse Rod*
Pulse rod and rod drive were removed for inspection at 1300. The pulse rod was secured and left out of core during the remainder of fuel inspection due to inspection of the pulse rod cluster. On 12/15/2016 the pulse rod and rod drive were reinstalled in the core.

1/4/2016: *Exhaust Gas Monitor Troubleshooting*
The EGM was malfunctioning in a manner similar to the problems noted in the maintenance log entry for 1/7/2015 in which the EGM count rate meter 'rate/minute' and the 'gross counts' were both displaying 0. The instrument was racked out for troubleshooting. In the interim, a scale/timer combination was connected in its place as a rate meter which was monitored by the operator at the controls. This arrangement satisfied the requirements of the technical specifications for reactor operation. On 1/7/2016, further troubleshooting determined that the issue was actually the linear amplifier. An oscilloscope showed that the signal coming from the amplifier was being significantly reduced to the point that the SCA was not registering counts. It was found that wiggling the input connector on the linear amplifier could make the problem appear and disappear intermittently. The input BNC connect had buildup inside the main conductor. It was cleaned with methanol and a small wire brush resolving the issue. A full calibration and channel test were performed; and the system is now functioning normally.

1/29/2016: *Transient Rod Drive*
The transient rod drive movement speed was consistently slowing while being run down between 1.00 and 0.00 inches. The gears inside the gear box appeared to be catching. The gear box was opened and the gears sprayed with WD-40 to clean them. The gears were then wiped down and a fresh coat of Lubriplate was applied. The rod was the raised and lowered several times to evenly coat the gears with lubricant. The transient rod drive is operating normally.

2/22/2016: *Exhaust Gas Monitor*
The EGM was powered down at 0948 to replace the pump switch wire. The counts were reading 66649 at the time the system was shut down. The high voltage, pre-amp signal, pre-amp power, and old pump switch cables were disconnected and were pulled through the console and mezzanine so that new conduit and a junction box on the south wall in the pool room could be installed. Once the new conduit and junction box were in place, all cables were routed back to the console and connected. The EGM was powered up on 2/24/2016 at 1016 with the counts reading 72223. A channel test was performed and was satisfactory.

5/12/2016: *Heat Exchanger Primary Pump*
On 5/11/2016 it was noticed that the primary pump for the heat exchanger had a minor leak. FacOps determined that the seal on the pump was faulty. They will schedule a time to return and fix it. The leak does not exceed the capacity of the make-up feed and does not appear to have an impact on pool level. Safe operations are not affected by the minor leak.

5/25/2016: *Ventilation System*
Ventilation system flowrates were measured by FacOps as part of the Technical Specifications biennial maintenance. During the measurements, FacOps found that automatic damper 4 was not functioning properly and fixed it.

5/27/2016: *ARIES*
Battery C has not been holding a charge for the last 6 months. Batteries A and B have been used instead. On 5/31/20161 battery C was replaced with a new battery

from Les Schwab. The new battery is an RV deep cycle battery, 12 VDC, 550 AMP, product code 131904.

5. Changes, Tests, and Experiments Performed Under 10 CFR 50.59 Criteria

A total of one (1) proposed change to the facility was made during the 2015-2016 year. The proposal was screened with the 10 CFR 50.59 requirements and found to screen out, thus allowing the change to be made without further approval.

1) The rotator motor assembly was updated with a new motor assembly. The rotator assembly is an apparatus that sits above the experimenter platform and rotates in-core samples during irradiation. The new assembly is an update to the experimental facility, but it does not constitute a change to the experimental facilities described in the SAR, so a 10 CFR 50.59 review is not required. WSU Technical Services made a new motor assembly to turn rotator tubes based on the design of previous rotator tube motor assembly. The new assembly attaches to the bridge structure at the same point as the old assembly, and has been shown to be secure. On July 7, 2015 the proposed modification was reviewed for the additional reporting requirements of 10 CFR 50.59, and it was determined that the change could be made without prior NRC approval.

6. Radioactive Effluent Discharges

A. Radioactive Liquid Releases

The liquid effluent releases for the facility during the reporting period can be found in Table III.

Table III
Monthly Liquid Waste Releases

Month	Volume (gallons)
July 2015	0
August	0
September	0
October[2]	22442
November	0
December	0
January 2016	0
February	0
March	0
April	4897
May	0
June	0

[2] The liquid effluent release for October 2015 is higher than normal due to a pump failure. In order to discharge the effluent, the wastewater was released in the dilution mode, although gamma spectroscopy indicated that the radionuclide concentration was already well below 10 CFR 20 release limits.

Approximately 27339 gallons of liquid waste was released from the storage tank during the reporting period. Prior to discharge, a sample of the liquid waste was analyzed using gamma spectroscopy and liquid scintillation counting. Any isotopes in the gamma spectroscopy report for the October release showed a greater uncertainty than activity. The October gamma spectroscopy report and LSC data show that there was no activity above background in the hold-up tank prior to release. The April gamma spectroscopy report indicated an activity of 0.37 μCi. A total activity of 0.37 μCi in liquid effluents is recorded for the reporting period.

B. Radioactive Gaseous Release

During the reporting period, no measurable quantity of gaseous or particulate material with a half-life greater than eight (8) days was released. At no time did the argon-41 release exceed 20% of the effluent release limit. A total of 0.3082 curies of argon-41 was released, with an average argon-41 concentration of 1.56×10^{-11} μCi/mL of air, after environmental dilution. The argon-41 release is used in the 2016 Annual Report for Radioactive Air Emission License (RAEL-004), stack number 7. Per COMPLY v1.7, the reactor facility (stack 7) is in compliance at level 4 with an effective dose equivalent of 2.7×10^{-4} mrem/yr. The monthly releases are summarized in Table IV.

Table IV
Monthly Argon-41 Releases[3]

Month	Quantity (Ci)	Conc. After Dilution, (μCi/mL)	% of DAC Limit
July 2015	2.0×10^{-2}	1.2×10^{-11}	4.0×10^{-4}
August	2.1×10^{-2}	1.3×10^{-11}	4.3×10^{-4}
September	2.3×10^{-2}	1.4×10^{-11}	4.7×10^{-4}
October	3.1×10^{-2}	1.9×10^{-11}	6.3×10^{-4}
November	2.6×10^{-2}	1.6×10^{-11}	5.3×10^{-4}
December	7.4×10^{-3}	4.4×10^{-12}	1.5×10^{-4}
January 2016	2.0×10^{-2}	1.2×10^{-11}	3.9×10^{-4}
February	5.6×10^{-3}	3.8×10^{-12}	1.2×10^{-4}
March	4.5×10^{-2}	2.7×10^{-11}	9.0×10^{-4}
April	1.7×10^{-2}	1.0×10^{-11}	3.4×10^{-4}
May	2.5×10^{-2}	1.5×10^{-11}	5.0×10^{-4}
June	6.7×10^{-2}	4.2×10^{-11}	1.4×10^{-3}

[3] Quantity released based on 4500 CFM effluent of ventilation system in AUTO mode of operation. Concentration after dilution is based on 10 CFR 20 effluent release limit of 1.0×10^{-8} μCi/mL for Ar-41 (Table 2, Col.1), and a dilution factor of 3.4×10^{-3} (WSU Technical Specifications 3.5.2). DAC limits are based on 10 CFR 20 derived air concentration limit of 3.0×10^{-6} μCi/mL for Ar-41 (Table 1, Col. 3) and a dilution factor of 3.4×10^{-3}.

C. Radioactive Solid Waste Disposal

During the reporting period, 1632 mCi in 64 cubic feet of non-compacted solid waste was transferred to the WSU Radiation Safety Office for packaging and disposal.

7. Personnel and Visitor Radiation Doses

The quarterly doses of the WSU Nuclear Radiation Center reactor staff and experimenters who routinely utilize the WSU Reactor are given in Table V. The maximum quarterly dose of a reactor staff member was 55 mrem, whole body.

A total of 1868 individual persons visited the Nuclear Radiation Center during the reporting period, of which 539 entered a controlled access area (CAA).[4] All doses as determined by digital pocket dosimeter were less than or equal to 0.2 mrem. A total of 37 group tours, consisting of 391 individuals, visited the center during the reporting period, also entering a CAA. As determined by digital pocket dosimeter, all doses were less than or equal to 0.2 mrem.

Table V
Quarterly Reactor and Experimenter Staff Dose[5] (in mrem)

Badge No.	Q3 2015	Q4 2015	Q1 2016	Q2 2016
11233	--	5	--	--
10452	27	8	10	24
10921	18	7	4	21
11227	--	--	--	--
11177	3	--	--	--
11240	--	9	2	--
11244	--	7	--	--
11238	--	--	--	--
11242	--	11	--	--
11237	--	13	--	--
10838	4	6	8	9
11232	--	9	--	--
11205	10	8	7	3
11225	--	11	5	12
11219	--	8	--	--
11239	--	9	--	--
11241	--	8	6	12
10460	5	3	2	3

[4] A controlled access area is an area in the building where radioactive materials are used or stored and is a part of the licensed reactor facility.
[5] The "--" denotes data not available either due to departure from the facility or new personnel starting at the facility. An 'M' denotes that the dosimeter reading was less than or equal to the background radiation level for that quarter.

08141	13	6	8	20
11228	--	10	--	--
07588	26	10	6	M
10910	12	6	7	26
11226	--	--	--	--
11221	--	8	3	--
10916	9	6	9	46
11220	--	10	5	7
11234	--	8	--	--
11246	--	8	3	--
10904	8	6	5	7
11249	--	--	--	--
11109	--	--	--	3
11245	--	7	--	--
11236	--	--	--	--
11224	--	17	7	13
10451	55	35	14	29
10641	25	11	13	33
11222	--	11	8	41
11113	--	--	--	--
11230	--	--	--	--
11224	--	5	--	--
10909	4	--	--	--
07748	4	4	4	8
10643	6	8	8	11
10443	3	5	2	--
11229	--	19	M	--
11243	--	4	--	--
11231	--	5	--	--
11255	--	M	2	3

8. Reactor Facility Radiation and Contamination Levels

The method detection limit (MDL) for building survey samples collected for removable contamination determination by liquid scintillation assay averaged over one year is 2.7×10^{-8} µCi/cm^2. Routine building surveys showed average counts less than the MDL for most CAAs and all non-CAAs. Areas that registered removable contamination levels above the MDL were the Room 201 Sample Drop Tube, Room 201 RX Bridge-South, Room 201 RX Bridge-North, Room 201 Experimenter Platform, Room 201 Floor South, Room 101-A Purification Pump Pit, and Room B21 Panoramic Irradiator. All measurable counts were still well below Standard Operating Procedure limits for those areas.

Table VI
Average Removable Contamination (in μCi/cm²) for Weekly Monitoring in CAAs and Non-CAAs[6]

Location	Measured Activity Above MDL (μCi/cm²)
201 B	M
201A	M
201 RX BRIDGE STEPS	M
210 SAMPLE DROP TUBE	1.6×10^{-6}
201 RX BRIDGE - SOUTH	1.3×10^{-6}
201 RX BRIDGE - NORTH	1.2×10^{-7}
201 EXPERIMENTER PLATFORM	2.3×10^{-6}
201 BENCHES	M
201 FLOOR SOUTH	2.7×10^{-7}
201-C HEAT EXCHANGER FLOOR	M
201 FLOOR NORTH	M
106 ION EXCHANGER PIT	M
101-A PURIFICATION PUMP PIT	3.4×10^{-7}
101 DOOR WAY	M
101 SHIPMENT BENCH	M
101 SAMPLE DROP HOOD #2	M
101 HOOD #1	M
101 HOOD #18	M
B21 PANORAMIC IRRADIATOR	3.6×10^{-7}
B21 FLOOR	M
RM 2 SOUTH FLOOR	M
RM 2 THERMAL COLUMN	M
RM 2 THERMAL COLUMN FLOOR	M
RM 2 NORTH FLOOR	M
RM 2 WEST CAVE FLOOR	M
RM 2 EAST CAVE FLOOR	M

The routine area radiation surveys of the building in CAAs and non-CAAs are given in Table VII. The highest average dose rate for a single location in a CAA was 3.8 mrem/hr, which occurred in Room 2 East Cave. This value is less than the limit for CAAs. The lowest average dose rate in a CAA was 0.04 mrem/hr (a level considered background), which occurred in Room 2 Thermal Column. The average dose rate in the radiochemistry sample hoods (a non-CAA) was 0.37 mrem/hr. The highest onsite dose rate was 3.8 mrem/hr, which occurred in the Room 2 East Cave.

[6] Bolded text indicates a non-CAA. Regular text indicates a CAA. "M" indicates the value is below the MDL value of 2.7×10^{-8} μCi/cm². Room 101 hood #18 was added to swipes and surveys in week 31 of 2016.

The East and West cave are a storage area designed to house radioactive sources such that they are shielded and are locked away from daily activities. This space is posted as a high radiation area which permits radiation fields up to 500 rad/hr at 30 cm. Personnel do not typically work in this area and it is kept locked when not in use.

Table VII
Average Radiation Dose Rates (in mrem/hr) for
Weekly Monitoring in CAAs and Non-CAAs[7]

Location	Average Dose Rate (mRem/hr)
Room 201 B	0.06
Room 201 A	0.06
Room 201 Bridge	0.81
Room 201 Benches	0.23
Room 201 South	0.62
Room 201 East	2.7
Room 201 C Heat Exchanger	0.10
Room 201 North	0.41
Room 106 Ion Exchanger Pit	1.5
Room 101 A Purification Pit	0.97
Sample Storage	0.36
Room 101 Doorway	0.06
Room 101 Shipment Bench	0.09
Room 101 Sample Drop Hood	0.37
Room 101 Hood 1	0.52
Room 101 Hood 18	0.02
Room B21 Panoramic Irradiator	0.05
Room 2 South	0.09
Room 2 Thermal Column	0.04
Room 2 North	0.17
Room 2 West Cave	2.4
Room 2 East Cave	3.8

9. Environmental Monitoring Program

The environmental monitoring program uses thermoluminescent dosimeters (TLD's) placed at locations both onsite and offsite. The environmental monitoring program is used to determine the average background radiation levels through the use of

[7] Bolded text indicates a non-CAA. Regular text indicates a CAA. Room 101 Hood #18 was added to swipes and surveys in week 31 of 2016.

offsite TLD locations. The offsite TLD locations are defined by Technical Specifications 1.0 and 5.1.1, and are TLDs 3, 7, 9, 15 through 35, and 39 through 44. The TLD's that are used to calculate the background do not have to meet the less than 20% above background requirement. The average background radiation level is then compared to the nearest occupied dwelling to ensure it does not, on an annual basis, exceed the average offsite background radiation by more than 20%. TLD 4, 5, 6, 8, 9, and 10 show abnormally high readings for Q4 2015, Q1 2016, and Q2 2016 due to irradiated graphite reflector elements stored in the radioactive waste shed on the north side of the facility. The Radiation Safety Office has shielded the reflector barrels such that no public dose rate limits are exceeded. TLD 9 has been removed from background radiation calculations for Q4 2015, Q1 2016, and Q2 2016.

Table VIII shows the quarterly dose rates for those TLD's located at offsite locations. From table VIII, the background radiation levels and the 20% above background radiation levels can be seen in table XI. This data will be used for comparison to the closest offsite area of extended occupancy.

Table IX shows the quarterly exposures for those TLD's located at onsite locations. These locations are not required to be compared to background radiation levels.

The dose rate for the closest offsite points of extended occupancy can be found in Table X. In Chart I the closest offsite points of extended occupancy are compared to both the background radiation levels and the 20% above background radiation levels from Table XI. Technical Specifications describing ALARA effluent releases in 3.5.2(3) specify annual radiation exposure due to reactor operation, at the closest offsite extended occupancy, shall not, on an annual basis, exceed the average offsite background radiation by more than 20%. For the reporting period, the average background radiation dose rate for off-site locations was 0.34 mrem/day, while the average radiation dose rate at the closest extended occupancy area 600 meters away was 0.29 mrem/day. This result indicates that no exposure level above normal background radiation was found. While Chart I indicates TLD 36 was higher than background radiation levels for Q1 2016, TLD 36 was still well below the 20% above background radiation levels required by the Technical Specifications. This result shows that no dose levels exceeded Technical Specifications requirements for an offsite area of extended occupancy.

Table VIII
Environmental Radiation Levels at Offsite Locations to the Nuclear Radiation Center[8]
(dose rate in mrem/day)

Location	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Average
Fence E of NRC	0.30	0.35	0.36	0.35	0.34
Fence, N of Rad Waste Shed	0.35	0.66	0.58	0.62	0.55
Fence directly N Rad Waste Shed	0.67	6.6	5.2	5.2	4.4
S NRC, on parking lot fence	0.32	0.33	0.36	0.33	0.33
Fence S Roundtop Dr, 10th pole W of pole C14	0.32	0.32	0.37	0.35	0.34
Telephone pole C12	0.32	0.35	0.33	0.35	0.34
Telephone pole near golf course gate	0.30	0.32	0.32	0.33	0.32
E across fairway on pine tree	0.30	0.29	0.30	0.31	0.30
Maple tree #54 along driving range	0.29	0.32	0.37	0.32	0.32
NW to fence uphill from driving range	0.36	0.39	0.39	0.38	0.38
Follow fence E to fence corner	0.34	0.38	0.36	0.36	0.36
S to lone spruce tree near water hazard	0.29	0.32	0.33	0.33	0.32
Roundtop hill park, NW fence corner	0.35	0.30	0.32	0.32	0.32
Deciduous tree edge of 18th green	0.34	0.36	0.36	0.35	0.35
6ft pine tree, 3rd W down cart path from clubhouse	0.32	0.35	0.37	0.33	0.34
3rd to last tree after gap in same line of trees	0.30	0.28	0.36	0.30	0.31
SW to fence along path near 2nd to last tee box at bottom hill	0.33	0.35	0.36	0.32	0.34
Follow fence partway up hill after fence turns S	0.33	0.32	0.36	0.33	0.33
Follow fence, 15th pole E after fence turns W	0.34	0.33	0.33	0.33	0.33
Follow fence about halfway between last TLD and corner	0.35	0.35	0.36	0.35	0.35
Largest bush S of NRC	0.33	0.34	0.36	0.35	0.34
2nd fence S NRC, W end at gate	0.32	0.36	0.32	0.32	0.33
S Fairway Rd, 1st light post on right	0.31	0.31	0.36	0.33	0.33
S Fairway Rd, 2nd light post on right	0.32	--	--	--	0.32
Ellis Way and Hog Lane sign	0.30	0.29	0.33	0.37	0.32
Bottom of radio antenna hill, fence next to shrub left of gate	0.34	0.31	0.34	0.37	0.34
3rd fence S of NRC, SE corner, cow pasture	0.31	0.32	0.32	0.33	0.32
Airport fence W end runway at gate	0.32	0.31	0.38	0.32	0.33
Fence/entry bar E of Jewett Observatory	0.31	0.30	0.31	0.31	0.31
Granite rock Terrell Mall, hole in back	0.26	0.27	0.31	0.26	0.28

[8] Offsite defined by the Technical Specification 1.0 and 5.1.1 as any location which is outside the site boundary. The "--" indicates a TLD which was missing.

Table IX
Environmental Radiation Levels at Onsite Locations to the Nuclear Radiation Center[9]
(dose rate in mrem/day)

Location	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Average
E lower loading dock	0.30	0.33	0.38	0.35	0.34
Pool room truck door fence S end	0.49	1.4	1.2	1.2	1.1
Pool room truck door fence N end	0.79	5.3	5.4	4.2	3.9
E wall rad waste shed	0.46	2.4	1.6	1.7	1.5
N wall rad waste shed	0.55	5.1	5.0	2.5	3.3
Cooling tower fence, NE corner	1.0	8.1	6.7	13	7.3
Room 101 window	0.33	0.34	0.37	0.40	0.36
Railing next to upper liquid waste tank	0.33	0.35	0.34	0.36	0.34
Room 2 truck door fence	0.33	0.32	0.37	0.33	0.34
Transformer vault vent louvers	0.35	0.38	0.40	0.39	0.38
NRC main entrance, light fixture	0.36	0.38	0.43	0.39	0.39
NRC roof, pool room vent stack	0.27	0.38	0.34	0.32	0.33
NRC roof, guide wire E end of building	0.29	0.32	0.39	0.41	0.35
NRC roof, E pool room vent support leg	0.70	0.59	0.59	0.54	0.60
NRC roof, air conditioning support leg	0.28	0.34	0.34	0.33	0.32
NRC roof, W pool room vent support leg	0.55	0.61	0.56	0.53	0.56

Table X
Environmental Radiation Levels for the Closet Offsite Point of Extended Occupancy
(dose rate in mrem/day)

Location	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Average
Apt complex C, gas meter	0.30	0.32	0.36	0.31	0.32
Apt complex B, gas meter	0.26	0.28	--	0.33	0.29
1st fence S apt complex A	0.26	0.25	0.30	0.29	0.27

Table XI
Background Environmental Radiation Levels
(dose rate in mrem/day)

	Q3 2015	Q4 2015	Q1 2016	Q2 2016	Average
Background radiation levels	0.33	0.34	0.35	0.34	0.34
20% Above background radiation levels	0.40	0.41	0.42	0.41	0.41

[9] Onsite defined by the Technical Specification 1.0 and 5.1.1 as any location which is within the site boundary.

Chart I

Environmental Radiation Levels for the Closest Off-site Point of Extended Occupancy as Compared to Background Radiation Levels and 20% Above Background Radiation Levels