TEXAS A&M UNIVERSITY

RADIATION PROTECTION PROGRAM: 2020 REVIEW

Environmental Health and Safety

Radiological Safety

June 2021

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INTRODUCTION

This document provides a review of the Radiation Protection Program for Texas A&M University over the 2020 calendar year. Topics covered include an overview of the Protection Program scope and organization, followed by a review of several specific elements. Components which are vital to the strength of the program, such as training and maintenance of ALARA practices, are appraised. In addition to these items, a review of routine practices, such as waste disposal, internal and external audits and inspections, and changes to the program, are discussed.

TEXAS A&M UNIVERSITY LICENSES AND REGISTRATIONS

Texas A&M University holds several federal and state licenses and registrations, which authorize the use of byproduct radioactive materials, source materials, special nuclear materials, and radiation-producing devices (both ionizing and non-ionizing). In accordance with state and federal regulations (25 TAC §289.202 (e) (3) and 10 CFR 20.1101(c), respectively) this report reviews the activities conducted under the licenses and registrations for the calendar year 2020. An overview of the various licenses maintained by Texas A&M University is provided in Table 1.

Table 1 – Texas A&M Unievsrity Licenses and Registrations

License No.	Issuing Agency	Expiration Date	Description
42-09082-09	United States Nuclear Regulatory Commission (USNRC)	October 31, 2033	Radioactive Materials License, Use aboard JOIDES (SEDCO/BP 471) and any other TAMU research ship
L00448	Texas Department of State Health Services (TDSHS)	September 30, 2029	Radioactive Materials License, TAMU, College Station, Bryan, Houston and Galveston
L05683	Texas Department of State Health Services (TDSHS)	August 31, 2024	Radioactive Materials License, TAMU College Station, Bryan, University Services Bldg., Riverside Campus, Prairie View A&M, Beeville, Bushland, Dallas, Lubbock, Overton, Plainview, Uvalde, Vernon and Weslaco
L06561	Texas Department of State Health Services (TDSHS)	July 31, 2023	Radioactive Material License, Texas A&M University Cyclotron Institute
R00304	Texas Department of State Health Services (TDSHS)	September 30, 2023	Certificate of Registration (RPD), TAMU, Riverside Campus, Lufkin, TAES-Beeville, Prairie View A&M and Galveston
R14497	Texas Department of State Health Services (TDSHS)	February 28, 2026	Certificate of Registration (RPD), JOIDES (D/V SEDCO/BP-471 aka JOIDES Resolution)
Z00116	Texas Department of State Health Services (TDSHS)	April 30, 2029	Certificate of Registration (Laser), TAMU

42-09082-09

The U.S. Nuclear Regulatory Commission issues this license. It authorizes the University to use selected radionuclides at temporary job sites at sea aboard TAMU and other research vessels. One amendment was completed in 2020 to increase the amount of C-14 for use aboard the JOIDES. The license expires on October 31, 2033.

L00448

The Texas Department of State Health Services (TDSHS) issues this broad-scope license. This license authorizes the use of radioactive materials at Texas A&M University sites: College Station, Bryan, Galveston, Institute of Biosciences and Technology-Houston, and Texas A&M College of Dentistry-Dallas. Two amendments were completed during 2020. Amendment 155 for adding Thorium-232, U-238 (Natural), and U-238 (Depleted), and amendment 156 for the addition of Cs-137 sealed sources for Nuclear Engineering and Science Center. The license was renewed and the new expiration date is September 30, 2029.

L05683

The Texas Department of State Health Services issues this specific license. This license authorizes the use radioactive materials at designated remote sites inside Texas. It includes Prairie View A&M University and also Texas A&M agrilife sites at Beeville, Lubbock, Plainview, Uvalde, Vernon, Weslaco, Bushland, and Dallas. Unlike the braodscope license L00448, license L05683 is relatively specific with regard to the radioactive materials that may be possessed, as well as the individuals authorized to use the materials. Two amendments were completed in 2020. Amendment 42 for site address update for Plainview, amendment 43 for the addition of site 019-Overton. The license expires on August 31, 2024.

L06561

The Texas Department of State Health Services issues this specific license. It authorizes Texas A&M University Cyclotron Institute to produce radioactive material for research and development. Unlike the broad-scope license L00448, this license is relatively specific with regard to the radionuclides that can be produced using the cyclotron and the individuals authorized to possess and use those radionuclides. No amendments were issued in 2020 and the license expires on July 31, 2023.

R00304

This registration is issued by The Texas Department of State Health Services and authorizes the University to possess and use radiation producing devices on the College Station Campus, with remote sites at RELLIS, Beeville, Prairie View A&M University, Galveston, Stephenville, Huntsville, Kirbyville, HSC-Bryan campus, Kingsville and NESC. Three amendments were completed in 2020. Added site 017-Nuclear Engineering and Science Center, added two units at RELLIS, and added one vet unit at Prairie view A&M University. The registration was renewed and the expiration date is September 30, 2023.

R14497

This registration, issued by The Texas Department of State Health Services, authorizes the University to possess and use minimal threat and other industrial X-ray units aboard The JOIDES research vessel. Two amendments were completed in 2020 to add two more units aboard JOIDES. The registration was renewed and the expiration date is February 28, 2026.

Z00116

This registration, issued by The Texas Department of State Health Services and authorizes the possession and use of Class III B and Class IV lasers at the College Station Campus, Bryan, Galveston, Kingsville, Institute of Biosciences and Technology (IBT)- Houston and Prairie View A &M University. One amendment was completed in 2020 that added more units at IBT-Houston. The registration was renewed and the expiration date is April 30, 2029.

RADIOLOGICAL SAFETY PROGRAM ORGANIZATION

Radiological Safety Committee

The Radiological Safety Committee (RSC) advises the Texas A&M University administration on matters related to radiological safety and recommends policies and procedures it deems appropriate to ensure an adequate radiological safety program. The RSC consists of at least six voting members, including the Chair, appointed by the Vice President for Finance and Operations; plus three Ex Officio (non-voting) members as outlined below. The RSC acts as an advisory body to ensure that radioactive materials are safely used in accordance with As Low As Reasonably Achievable (ALARA) principles. The RSC also conducts a series of annual audits in which the entire program is reviewed over a period of three years. The RSC met three times during the 2020 calendar year.

Members	Department
John Ford, Ph.D., Chair	Nuclear Engineering
Jonathan Sczepanski, Ph.D.	Chemistry
Joseph Reibenspies, Ph.D.	Chemistry
Thomas Welsh, Ph.D.	Animal Sciences
Kris Hagel, Ph.D.	Cyclotron Institute
Waruna Kulatilaka, Ph.D.	Mechanical Engineering
Jay Griffin, DVM	Large Animal Clinical Sciences
Bryan Tomlin, Ph.D.	Center for Chemical Characterization
Craig Marianno, Ph.D.	Nuclear Engineering
Ursula Winzer-Serhan, Ph.D.	Neurosciences & Experimental Therapeutics
Christopher M. Meyer, CHP, *Ex-Officio*	Office of Safety and Security
Latha Vasudevan, Ph.D., CHP, *Ex-Officio*	Radiological Safety Officer
Christina Robertson, CIH, CSP, *Ex-Officio*	Environmental Health and Safety

Radiological Safety Staff

The Radiological Safety Staff (RSS) consists of individuals employed by Environmental Health and Safety, under direction of the Radiological Safety Officer (RSO). In 2020, the RSS consisted of the RSO, two Senior Health Physicists /Assistant RSO, one Health Physicist, one Assistant Health Physicist IV, two Assistant Health Physicists II, two Assistant Health Physicists I, a Senior Office Associate, and 5-6 student technicians. A part time program aide position was available for supporting scanning of permit documents and storing in Laserfiche repository.

RADIOLOGICAL SAFETY PROGRAM ELEMENTS

Overview of Permits

Texas A&M Radiological Safety maintains three different radiation permits: Radioactive Material (RAM) permits, Radiation Producing Device (RPD) permits, and Laser permits. The NRC and TDSHS licenses are blanket licenses for the entire university. To adequately maintain oversight, Radiological Safety issues permits, or sub-licenses, to principal investigators authorizing them to possess and use specific quantities of RAM or specific devices. As of December 2020, there were a total of 123 RAM permits, 69 RPD permits possessing a total of 138 RPDs, and 94 laser permits possessing a total of 394 laser units.

Radiological Safety Training

During 2020, several types of training were offered by EHS. There were a total of 2 classroom training sessions (including Zoom) offered and 10 Zoom-exclusive sessions. 2342 people were trained (both classroom and online). EHS offers General Radiation Safety and Veterinary Radiation Safety class room training as well as online refresher training, online General Radiation Producing Device (RPD) training, and online General Laser Safety training. A summary of training provided by the Radiological Safety Staff in 2020 is displayed in Table 2.

Instrument Calibration

Radiological Safety provides response check services for instrumentation used by labs. Radiological Safety also facilitates the shipping and paperwork for instruments requiring calibration by outside entities. In 2020, 52 portable survey instruments were sent to the manufacturer for calibration, and about 79 instruments were provided functional response checks by RSS and verified to be operational with an acceptable efficiency.

Sealed Sources & Leak Tests

Radiological Safety provides leak test services to authorized users with certified sealed sources. Leak tests are performed quarterly. These services are also provided, as a courtesy, to users possessing sources authorized under a general license. In 2020, leak tests were performed for 94 sealed sources (14 of which are neutron soil moisture gauges), and 21 generally licensed sources.

Table 2– Summary of training provided by RSS in 2020

Training Type	Number of Times Offered in 2020	Number of Individuals Attended Training
General Radiation Safety (Classroom & Zoom)	offered monthly	132
Veterinary Radiation Safety (Classroom)	offered monthly	136
DEXA User training (Zoom)	--	24
General Laser Safety (Online)	--	867
General Radiation Producing Device -RPD (Online)	--	244
Electron Beam Facility RPD Training (Online)	--	29
General Radiation Safety Refresher (Online)	--	308
Transportation Training for Moisture Gauge Users (Online)	--	73
Veterinary Hospital General Radiation Safety Laser, and RPD Refresher (Online)	--	337
Veterinary Radiation Producing Device -Vet RPD (Online)	--	192
Total	**~24**	**2342**

Special Nuclear Material

Special Nuclear Materials (SNM) that are possessed by the University should be accounted for and verified on an annual basis. The RSS performs inventory verifications and prepares reports as required by 10 CFR 74 and the Nuclear Material Management and Safeguards System (NMMSS). These NMMSS reports were filed for the period 12/1/2019-11/30/2020 and were reconciled on December 9, 2020.

Review of External Dosimetry Data

This section addresses external dosimetry for the calendar year 2020. Through the end of 2020, 1458 individuals were monitored for external occupational radiation exposure. Of those monitored, 806 people (about 55%), had no reportable whole-body deep dose equivalent (DDE) above background. Of the remaining 652 individuals, two received doses exceeding 10% of the

whole-body annual limit, or 500 mrem. One individual received 1408 mrem and the other received 2350 mrem. The remainder received doses ranging from 1 mrem to 486 mrem. The cumulative dose for all individuals monitored for the entire year was 19 person-rem. The average deep dose equivalent for those who received a measurable dose was approximately 16 mrem. A summary of these data is provided in Table 3 and Figure 1. The average DDE values shown in this table are deep dose equivalent averaged over individuals receiving a non-zero dose. Personnel were also monitored for whole-body shallow dose equivalent (or "skin dose," SDE), dose equivalent to the lens of the eye (LDE).The highest DDE reported in 2020 was 2350 mrem, SDE of 2365 mrem and LDE of 2365 mrem. In addition to whole body dosimeters, some users were issued extremity dosimeters to measure dose to the hand, when applicable. The highest extremity equivalent noted for 2020 was 2465 mrem.

The individuals with the highest dose reported work in Nuclear Medicine and diagnostic radiology at the Veterinary Teaching Hospital. Diagnostic and interventional procedures, such as X-ray, computed tomography, and fluoroscopy are common in the Veterinary Teaching Hospital, and account for the majority of dose received on campus.

For those individuals who received total effective dose equivalent of 100 rem or higher, an annual dose report was provided as per TAC 289.203(d). All occupational dose reports are on permanent file at Texas A&M University Environmental Health and Safety.

Table 3 - Summary of whole-body dose (DDE) by subaccount number

Department	Number Measured	Number with Measured Dose	Cumulative DDE (mrem)	Avg. DDE (mrem)	Max. DDE (mrem)
4th year students	369	286	2797	8	230
Athletics	2	0	0	0	0
Student Health Center	3	0	0	0	0
Bio	1	0	0	0	0
CCCA	3	0	0	0	0
Cyclotron Institute	578	9	496	1	411
E-beam	6	5	23	4	8
EHS	33	6	27	1	13
GI	19	5	19	1	13
Human Clinical	2	2	3	2	2
IBT	0	0	0	0	0
Joides Research Vessel	7	2	183	26	182
LA/MedSurg	18	11	47	3	31
LA/ResInt	24	14	118	5	53
Monthly	42	40	7306	174	2350
NucEng	35	26	331	9	51
SA/FacMed	16	15	526	33	116
SA/ResInt	66	65	1706	26	159
SA/Spec	24	21	550	23	78
Soil & Crop	2	0	0	0	0
School of Public Health	5	0	0	0	0
Staff/Anes	18	15	1010	56	311
Staff/LAICU	14	9	54	4	32
Staff/LAMed	23	17	653	28	143
Staff/LAOR	22	20	388	18	83
Staff/Misc	7	5	132	19	32
Staff/RAD	3	3	77	26	46
Staff/SACardio	3	2	36	12	26
Staff/SADental	1	1	2	2	2
Staff/SAER	22	22	1013	46	222
Staf/SAIntMed	8	8	179	22	35
Staff/SANeuro	5	3	45	9	28
Staff/SAOnco	3	2	27	9	24
Staff/SAOR	27	24	480	18	83

Staff/SAOrtho	7	7	103	15	37
Staff/SASX	7	6	70	10	31
Staff/SAZooMed	2	0	0	0	0
TAES	1	0	0	0	0
TAES2	3	0	0	0	0
TIPS	27	1	1	1	1

*M : "Minimal" indicates no measurable dose above background.

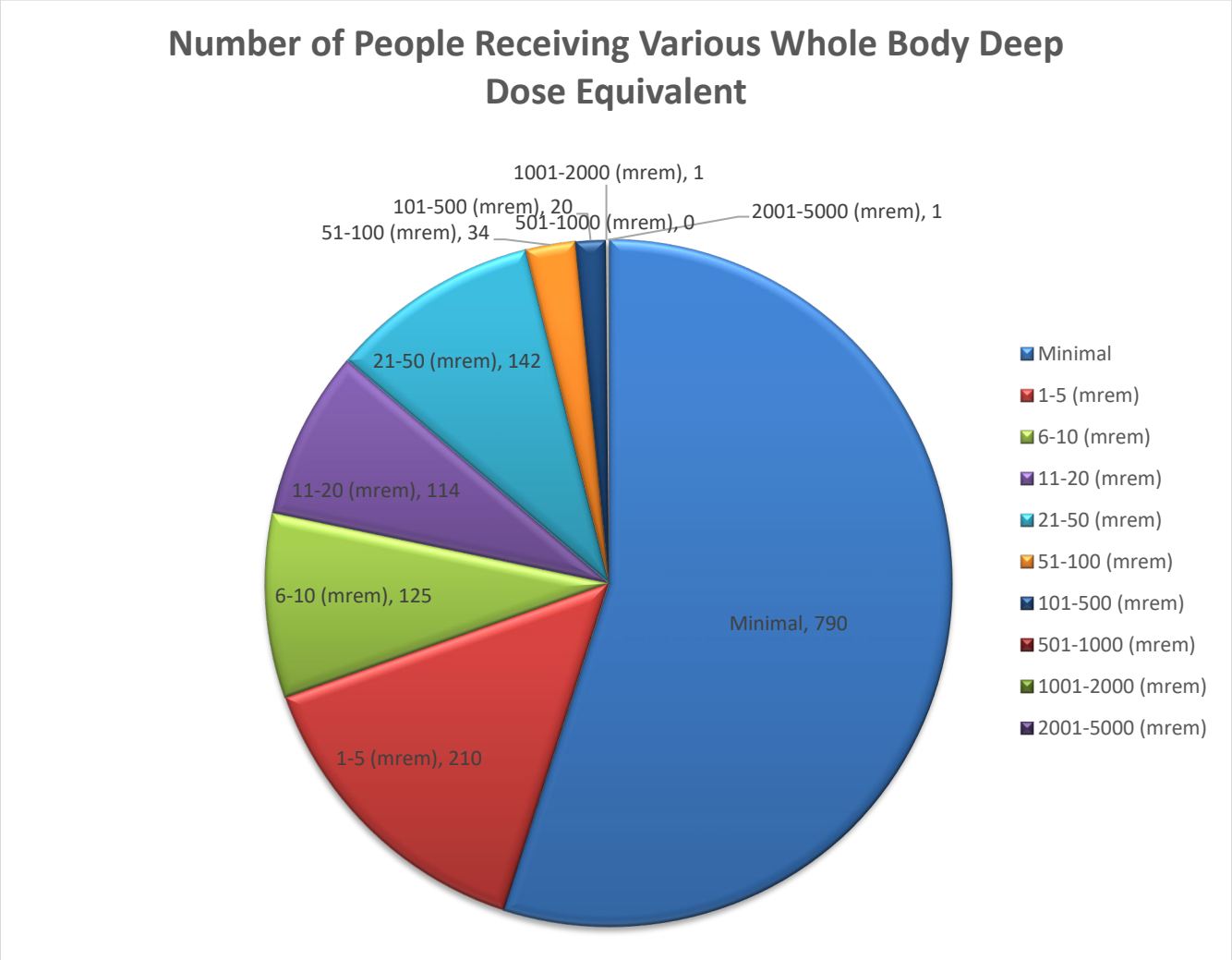

Figure 1 - The number of people receiving various values of whole body deep dose equivalent exposures is shown. M: "Minimal" indicates no measureable dose above background.

Review of Internal Dosimetry Data

There were 68 routine post-work thyroid screening bioassays performed for I-125. Only 1 urine bioassay was performed. No bioassays were performed for I-131. None of the bioassays performed required additional investigation.

Radioactive Waste Disposal

In 2020, three solid waste disposals to the local landfill were conducted via disposal methods allowed under the Texas Administrative Code (TAC), 25 TAC §289.202(fff)(1)(A), 25 TAC §289.202(fff)(1)B, 25 TAC §289.202(fff)(4) and 25 TAC §289.202(ggg)(7).

- On April 9, 2020, 8.48 m^3 of short-lived waste containing P-32, S-35, I-125, and In-111 for a total activity of 2.882 mCi, and 342.6 pounds of long lived waste containing H-3 and C-14 with an activity of 0.139 mCi was sent to the landfill.
- On August 25, 2020, 4.24 m^3 of short-lived waste containing P-32, S-35, I-125, Tc-99m, and F-18 for a total activity of 5.384 mCi and 538.15 pounds of long lived waste containing H-3 and C-14 with an activity of 0.764 mCi was sent to the landfill.
- On December 3, 2020, 0.146 m^3 of short and long-lived waste containing H-3, F-18, and I-125 for a total of 0.012 μCi in 36.96 pounds of mouse carcasses was sent to the landfill.Table 4 shows the summary of disposal via landfill.

Six liquid waste disposals were conducted in 2020. The total activity of all radionuclides released via the sanitary sewer in 2020 was 2.401 mCi. The total activity concentration for the year was 1.04E-08 μCi mL^{-1}. The sum of the ratios of the radionuclides disposed was 3.95 E-04 which is significantly less than 1. All of these values are well below the limits stated in 25 TAC 289.202 (gg) regarding the discharge of radionuclides via sanitary sewer. Table 5 shows the summary of liquid waste disposals.

Shipment of waste to the Texas low-level waste disposal facility was conducted through the waste broker Bionomics, Inc. In 2020, there were four waste shipments from Texas A&M university, College Station. In addition, one 5 gallon plastic pail and one 10 gallon drum containing legacy sources were shipped off from the Nuclear Engineering Science Center (NESC) on June 22nd. A 55 gallon drum of dry solid waste containing 5.799 mCi of H-3 was picked up by Bionomics from the Texas A&M College of Dentistry in Dallas on August 13th. Table 6 shows the summary of waste disposed of through Bionomics.

Table 4 - Summary of 2020 Landfill Disposals

Date	Radionuclide	Volume (m^3) or Weight (pounds)	Activity (mCi)
04/09/2020	^{3}H and ^{14}C	342.6 lbs	0.139
	All Other Short Lived including ^{18}F	8.48 m^3	2.882
08/25/2020	^{3}H and ^{14}C	538.15 lbs	0.764
	All Other Short Lived	4.24 m^3	5.384
12/03/2020	^{3}H, ^{14}C, and I-125 Carcasses	36.96 lbs	0.000012

Table 5 – Summary of 2020 Liquid Disposals to the Sanitary Sewer

Radionuclide	^{3}H	^{14}C	^{32}P	^{35}S	^{125}I
Yearly Total (milliCi)	0.230	0.288	0.089	0.018	1.775
Activity Concentration (uCi/mL)	1.00E-09	1.25E-09	3.89E-10	8.06E-11	7.72E-09
25TAC289.202(gg) Table III limits (uCi/mL)	1E-02	3E-04	9E-05	1E-03	2E-05
Ratios of Concentration to limits	1.00E-7	4.17E-6	4.32E-6	8.06E-8	3.86E-4

Sum of the ratios : 3.95E-04 which is less than 1

Table 6 – Summary of 2020 Waste Disposals through Bionomics

Date	Number	Container	Category	Activity (mCi)
02/19/2020	1	55 gallon drum	Dry Solid Waste	4.57
	1	55 gallon drum	Vials (Exempt)	0.26
	1	5 gallon pail	Primary Vials	76.15
06/22/2020	2	55 gallon drum	Vials (Exempt)	6.434
	3	55 gallon drum	Dry Solid Waste	1.669
	1	55 gallon drum	Vials(Organic)	<0.001
	1	55 gallon drum	Bulk Liquid	<0.001
	1	5 gallon drum	Sources	33.96
08/19/2020	1	4'x4'x4' fiber bag	Dry Solid Waste & Equipment	0.1154
	1	55 gallon drum	Vials (Exempt)	0.962
	1	55 gallon drum	Vials (Organic)	0.853
	1	55 gallon drum	Compacted Dry Solid Waste	0.356
	1	30 gallon drum	Bulk Liquid	0.607
	1	5 gallon pail	Primary Vials & Sources	17.91
	1	5 gallon pail	Fish Pieces	3.13
11/09/2020	1	55 gallon drum	Dry Solid Waste	0.131
	3	55 gallon drum	Vials(Exempt)	0.160

Type

POLICIES & PROCEDURES

The radiological safety program manual and radionuclide laboratory procedures manual were revised and submitted for review as part of license L00448 renewal. The radiological safety procedure manual for veterinary use was updated and included as addendum.

Standard operating procedures for Synovetin OA (Homogeneous Tin (Sn-117m) Colloids) an intra-articular therapy for osteoarthritis in dogs that was submitted for review was authorized by TDSHS.

As part of ongoing efforts to comply with the "two year rule" as per25TAC289.252 (x)(11), procedures have been implemented for having a storage plan for Permit holders who are intending to store radioactive materials longer than 24 months following the last principal use. Adequate disposal options have been implemented. A storage plan outlining the pwas submitted to the State

Annual Radiological Safety Laboratory Reviews

In 2020, the coronavirus pandemic severely impacted radiological safety laboratory reviews/inspections when the campus was shut down and in-person operations were severely limited. As such, a total of 20 radiological safety laboratory reviews/inspections were performed on the TAMU main campus. Moreover, RSS completed inspections of 5 remote site RAM neutron moisture gauge user permits under license L05683, 22 RPD permits under registration R00304, and 27 laser inspections under Z00116. These reviews were conducted in addition to other visits to the labs such as package delivery, waste pickup, contamination/radiation surveys, etc. Laboratories that required follow-up visits by RSS due to minor discrepancies were completed.

Radiological Safety Committee Audit

1. Radioactive materials inventory Audit performed by Dr. Bryan Tomlin on April 28, 2020

Audit findings/recommendations:

- Receipt of radioactive materials:
  - RSS provided a thorough explanation of the materials tracking database and the physical procedures that are used to receive and log shipments of radioactive materials.
  - Receipt procedures were demonstrated in the lab.
  - Processes implemented to reduce the likelihood of any incidents relating to package misdelivery were described in detail.
  - The auditor was satisfied with the level of attention given to assuring that all RAM deliveries are properly accounted. RAM receipt documentation for April 2020 was reviewed.

Delivery of Radioactive Materials

Audit findings/recommendations:

- None

Disposal of Radioactive Materials

Audit findings/recommendations:

- RSS described the whole process of RAM disposal

- Random sampling of waste disposal forms from April 2020 were reviewed.

RSS Comment: RSS thank Dr. Tomlin for the detailed review of the program and comments.

2. Radiation Producing Device Program Audit performed by Dr. Bryan Tomlin on August 27, 2020.

Audit findings/recommendations:

- Overall, the procedures and documentation are in good order. No deficiencies were identified.
- RSS responded to questions regarding recommendations from the previous audit (August 3, 2017), and the RSO has taken actions to implement some of those recommendations.
- Notably, work is well along the way towards transitioning to a web database, which should go live in September.

RSS Comment: RSS thank Dr. Tomlin for the detailed review of the program and comments.

3. Laser program audit performed by Dr. Waruna Kulatilaka on December 16, 2020.

Audit findings/recommendations:

- Reviewed Laser program manual updated in November 2020, Laser Permit Application form and instructions, Laser Permit Amendment form and instruction which are being used for requesting and updating laser safety permits.
- RSS presented a demo of the new online database being implemented to track current and new laser permits and permit holder information, training records and status, and laser device inventories. Paper copies will still be maintained as a backup.
- Especially commend the Radiological Safety Officer and her staff for their efforts in establishing a comprehensive safety program involving nearly 400 laser units system-wide among 94 active permits, and establishing a safe work environment for involved researchers and maintaining required regulatory compliance.

Several areas identified for continuing improvement are listed below:

1. The new online database had some deficiencies. Certain features are not intuitive and higher level of user training is required. It is also recommended that all paper records are transferred to this online system and cross checked for any errors to the best possible extent.

2. All laser permit holders should be notified of this online database. Proper instructions need to be provided to the permit holders so they can track their inventories and training records regularly. Setting up automated reminders for permits updates is recommended.

3. When evaluating new permit applications and amendments, it is recommended to pay close attention to power and pulsed energy values entered in respective forms for CW and pulsed lasers. It has been observed on several occasions that some permit applicants do not fill in this information accurately.

4. It is highly recommended additional voting members be sought for the Radiation Safety Committee, who have extensive background in laser utilization and laser safety. With the large number of lasers and permits already in place and a rapid expansion anticipated at new RELLIS campus facilities, there will be an influx of new permits and amendments in the near future.

State Inspections
Texas Department of State Health Services (TDSHS) Radiation control

L06561 (Site 000 - Cyclotron Institute, College Station). TDSHS inspection was performed on July 20, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L00448 (Site 041- IBT, Houston). TDSHS inspection was performed on August 7, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 000-1111 Research Parkway, Rm 130). TDSHS inspection was performed on October 2, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 005-Lubbock, TX). TDSHS inspection was performed on Feb 19, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 007-Plainview, TX). TDSHS inspection was performed on Feb 20, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 008-Uvalde, TX). TDSHS inspection was performed on October 20, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 010-Weslaco, TX). TDSHS inspection was performed on January 6, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 017- North Harvey Mitchell Parkway). TDSHS inspection was performed on July 20, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

L05683 (Site 018- North Harvey Mitchell Parkway). TDSHS inspection was performed on July 20, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

R00304 (Site 015- Riverside Parkway, Bryan). TDSHS inspection was performed on November 5, 2020. No violations/discrepancies were noted and the radiation safety program is in compliance.

Radiological Incidents/Events

Veterinary Radiograph Incidental Exposure

Incident occurred on 2/18/20. A small animal required manual breathing. A 4th year student on rotation performed the manual breathing. All PPE and dosimetry was properly worn. Between scans an anesthesia tech walked into the CT room without wearing assigned dosimetry. The tech was standing approximately 5 ft. from the CT gantry. The tech was in the room for approximately 15 seconds. The CT was set to 120 kVp with mAs of 300, the scan lasted 39 seconds. Measurements and estimates from RSS have determined the approximate dose received by the tech as 3 mrem.

Incident occurred on 2/23/20. A small animal was not cooperative and the veterinarian did not want to sedate the animal. A radiology student was trying to calm the animal and did not remove her hand fast enough to avoid the x-ray beam. All staff was wearing their assigned dosimetry and PPE. Unfortunately, the radiology technician exposed to the beam was wearing the extremity badge on the opposite hand. The x-ray was set to 85 kVp, 500 mA, with a beam time of 6.3 ms. Estimated dose was not significant.

Incident occurred on 2/28/20. A 4th year student on anesthesia rotation was helping monitor a patient during surgery. The student was wearing the assigned dosimetry but no PPE. The operator of the x-ray did not announce the intent to image so the student did not leave the room. The student was approximately 10 ft. from the patient. The x-ray settings were at 80 kV, 18.67 mA, with an exposure time of 0.12 sec. The dosimetry badge was processed and returned a minimal reading.

Small animal radiology/ER incident on 9/7/20. Vet tech's hand was accidentally imaged. John Griffin explained that an ungloved hand was exposed for a radiographic procedure. Griffin stated personnel are trained to use leaded gloves. The vet technician explained the exposure occurred first, while their own ungloved hand was holding the animal in place. Griffin explained it is common for the technician to do the positioning ungloved prior to the exposure and outside of the field. Usually during the event there is a technician positioning the animal and another taking the scan, but in this incident only one technician was present. Calculated dose was approx. 14 mrem. The technician has worked through the procedure and understands that this type of events cannot happen again.

Cyclotron Institute

On September 2, 2020, Cyclotron HP was decontaminating a vacuum that had been used on ECR 1 that has C-14 contamination. The swipes used for survey (results close to 400 cpm) and the cleaning wipes were placed in a trash bag next to radioactive waste can. Before the HP could tag the trash bag and release the vacuum as clean, the trash was found missing. Apparently the researcher was asked to clean up the vault after experiment and he removed the trash bag and disposed in the regular dumpster. The HP checked the dumpster and couldn't retrieve the trash bag. Calculations indicate that the levels were low enough to go to the landfill.
Cyclotron HP discussed this incident with the researchers and Cyclotron operations and made them aware that items coming out of vault/cave cannot be released without HP approval.

Personnel Contamination-Cyclotron Institute

On 18 September 2020, an experiment to irradiate a Bi-209 target with an alpha beam to produce At-211 was completed. The beam line was vented and target holder assembly removed. The target was removed from the assembly, bagged, and placed in a lead shield and transferred to the lab for further chemistry. Measurements made in the lab indicated contamination and the three persons who were in the irradiation area were surveyed. One person frisked clean, two individuals were contaminated on hair and skin. Decontamination was performed and was successful on removing skin contamination but not on hair. Persons showered and went home in clean attire. HP suggested covering hair until material decayed away. Alpha counts noted were up to 100 cpm. Persons returned and surveyed themselves over the weekend and were clean.

Report Submitted By: Latha Vasudevan Date: June 22, 2021
Radiological Safety Officer

Reviewed By: Date: 6/23/21
Chair, Radiological Safety Committee