

**CASE WESTERN RESERVE UNIVERSITY**  
**DEPARTMENT OF ENVIRONMENTAL HEALTH & SAFETY (EHS)**  
**RADIATION SAFETY**  
**ANNUAL REPORT 2013-2014**

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**Felice T. Porter, Assistant Director/Assistant RSO**  
**Report Editor and Departmental Auditor**



## **INTRODUCTION**

This report is submitted to the President and designated members of the Senior Administration of the University, as required by the Radiation Safety Committee (RSC) Operating Guidelines (Nuclear Regulatory Commission Agreement State) Broadscope License. The report summarizes the activities of the Radiation Safety Office (RSOF) of the Department of Environmental Health & Safety (EHS) at Case Western Reserve University. Its contents cover the period from July 1, 2013 through June 30, 2014.

## **SUMMARY**

### **DEPARTMENT STRENGTHS**

The RSOF has a staff with broad and diverse backgrounds that can address and resolve a wide range of issues faced in Radiation Safety at Case Western Reserve University (CASE). The RSOF has developed programs that meet or exceed regulatory requirements. This program proactively anticipates new safety requirements by promulgation of new programs. Success of these programs is enhanced by excellent Administrative Support.

### **DEPARTMENT OPPORTUNITIES**

The RSOF enjoys excellent interaction with other departments that are developing safety-related initiatives and outside agencies that are dedicated to improving environmental quality in our facilities.

### **RADIATION SAFETY ACCOMP**

and suppression system installations in our CWRU waste facilities aided this effort. This reexamination of our waste Facility, alarm and fire suppression systems was necessitated by a mechanical failure leading to accidental release of carbon dioxide suppression gas into our waste Facilities.

In 2014, the Radiation safety group of EHS formed a partnership with the Department of Energy (DOE) through The Pacific National Laboratory (PNNL) to implement security systems and develop programs to ensure that high radiation sources are secure at the University. This program made available substantial funding to harden our high activity radiation sources and to put them behind highly effective security barriers on our Campus. Programmatically, program development from this security effort on the Campus is also aimed at tightly coordinating the Radiation Safety, Dispatch, the Police and Security personnel to respond as a coordinated body to any activities or breakdowns that threaten the security of our irradiator sources. Members of each of the above units are or will soon complete special training in emergency response to situations that might threaten the security of our radiation sources. Training and automated equipment installation began in 2



**PURPOSE FOR RADIOACTIVE MATERIAL (RAM) USE**

**RADIATION SAFETY PROGRAM - RESPONSIBLE PARTIES**

**RADIATION SAFETY COMMITTEE (RSC)**

The Radiation Safety Committee sets policy for use of radioactive materials for the University Community. Members of this Committee are appointed by the President of the University and have responsibility for Safety Program as outlined in Ohio Department of Health (ODH) Broadscope License. Radiation Safety Committee members are chosen from diverse disciplines to provide comprehensive expertise. The Committee reviews all applications for use of radioactive materials.

The 2013-2014 Radiation Safety Committee membership and their affiliations are listed below. The ODH is informed of committee membership changes. The Committee is also aided by input from ex-officio (non-voting) and visiting members (non-voting).

**VOTING MEMBERS**

Dr. Thomas McCormick Dept. of Dermatology BRB 530 Term Expires: 11/8/2014 Chairperson Term Expires: 11/8/2014	Dr. Jeffery Coller Dept. of RNA Center HG Wood 113 Term Expires: 10/15/2016
Colleen Croniger Dept. of Nutrition BRB 925 Term Expires: 10/15/2016	Dr. Eckhard Jankowsky Dept. of Biochemistry HG Wood 137 Term Expires: 10/15/2016
Dr. W. David Sedwick Radiation Safety Officer (RSO) Dept. of Medicine EHS - Service Building, 1 <sup>st</sup> Floor	Dr. Saba Valadkhan Dept. of RNA Center Research Tower 100

SUPPORT STAFF

Gwendolyn Cox-Johnson  
Department Assistant  
Service Bldg.



Richard Jamieson reported that Marc Rubin is now responsible for two additional departments, Emergency Management and IT.

Chair thanked the members for their continued support serving on the committee.

ARSO will attend the next UH Radiation Safety Committee meeting.

Chairperson is on jury duty for Dec 2013 meeting.

X-Ray reclassification change as CT units was rescinded. They are being called cabinets instead of CT units.

Meeting with PNNL Group regarding irradiators is scheduled for April 2014 in EHS office.

UH has acquired several small hospitals but will put them on their license at a later date.

There are six liquid scintillation counters that any AU can acquire at no cost. Disposal of the LSCs is the second option.

Quarterly audits will be conducted in April 2014.

Two researchers passed away, Roger Marchant (Laser) and Richard Hanson (Radiation). Their laboratories and personnel have been placed under the responsibility of the Department Chairperson.

Laser Safety Officer and Assistant attended Laser Safety Training in Cincinnati, OH.

DOA Radiation Waste Facility was certified by Cleveland Fire Department in April 2014.

Department of Energy meeting regarding Irradiators was scheduled. Architects will need to expedite  
Disev-3( )-onhty vJETB70(x)20(p)-1(w)15(a)-n.

## **ADMINISTRATIVE CONTROLS**

Administrative controls are established and approved by the Radiation Safety Committee for laboratories where radioactive material (RAM) is used. Controls include signage, training, laboratory access, and dosimetry. Written procedures document procurement, use, and the disposal of all RAM at the University.

General Safety Compliance Enforcement Procedures prescribe sanctions for those who jeopardize safety or the continued favorable relationship between the University and the Ohio Department of Health. These procedures are designed to encourage the participation and cooperation of users of RAM and to promote safe use of such materials in a manner consistent with the rules and regulations of the ODH as interpreted by the RSC and the RSOF.

There are three classes of violations defined as minor, moderate, and major severity.

Minor Severity violations are listed under the following categories:

- Improper laboratory records
- Noncompliant RAM use and storage
- Maintenance of an unsafe laboratory environment

Moderate Severity violations include the following:

- Food/cosmetics in laboratory
- RAM unsecured
- RAM in unauthorized areas
- Unapproved radiation laboratories
- Unapproved disposal of radioactive materials
- Unidentified contamination
- Failure to respond to written notice

## **AU CATEGORIES:**

### **RADIATION ACTIVE (RA)**

the RSOF three times per year. Audits are more frequent if there are particular concerns in a laboratory. A listing of AUs and their radioactive materials can be found in the Appendix.

### **RADIATION INACTIVE (RI)**

These AUs do not currently use RAM and do not possess radioactive materials. AUs in storage mode for more than two years were placed in Radiation Inactive mode this fiscal year.

### **RADIATION ACTIVE (STORAGE MODE) – RA (SM)**

AUs who did not actively use RAM for a period of at least six months and no more than two years, but who wished to maintain their RAM inventory are, by their request, placed in storage mode status this fiscal year.

### **DEPARTED (D)**

AUs who no longer carry out research at Case Western Reserve University and whose laboratories have been decommissioned for radioactive material use are placed in the Departed category this fiscal year.

<b>AUs</b>	<b>13/14</b>	<b>12/13</b>	<b>11/12</b>	<b>10/11</b>	<b>09/10</b>	<b>08/09</b>	<b>07/08</b>	<b>06/07</b>	<b>05/06</b>	<b>04/05</b>
RA	66	78	89	87	87	91	92	112	124	116
SM	13	15	13	16	3	4	5	6	4	9
RI	6	6								

## **RADIATION SAFETY OFFICE (RSOF)**

### **STAFFING**

The RSOF operated under University approval with the following positions:

RSO (1)	Asst. Director/Asst. RSO/Quality Assurance Specialist (0.5)
Specialist Positions (4)	Accountant (0.5)
Department Assistant (1)	
Student (1)	

The position for Joseph Nikstenas has changed from supervisory in Radiation Safety to add Chemical Safety duties in May 2014.

personnel that are required for response to safety incidents and for maintenance of regulatory mandates. Specialists are encouraged to attend training and continuing education. Seminars, training, and conferences attended or completed during 2013-2014 included Radiological Instrument Training, RCRA Selected Hazardous Waste Training, 8-Hour HAZWOPER Refresher Training, & Hazardous Materials Transportation Security Awareness.

One member of the EHS Staff is responsible for maintaining the EHS website that houses all on-line departmental training programs and schedules, safety manuals, safety newsletters, MSDSs, and safety information resources. The website is an essential resource for the campus community that requires continuous updating. This individual also monitors and backs up134(up)BT15.39s

## AU

An Authorized User is a Faculty member who has been approved by the RSC to use RAM.

## RADIATION WORKER

A Radiation Worker is any person who uses RAM under the supervision of an AU.

## ANCILLARY RADIATION LABORATORY WORKER

Personnel listed under an AU who work in RAM laboratories but have only minor incidental contact with radioactive material or have to service radioactive laboratories or classrooms where RAM is used.

## ANCILLARY WORKER

An Ancillary Worker is a Non-Radiation worker who may have contact with laboratories or classrooms where RAM is used. This includes individuals working in Facility Services, Protective Services, In-house and contract Custodial Services, Shipping/Receiving, Animal Resource Center, and Research Department Assistants. During orientation, non-laboratory personnel are required to attend training that includes a radiation safety component.

## RADIATION GENERATING EQUIPMENT (RGE) WORKER

An X-Ray Worker is any person who uses RGE as part of the research program of an AU.

## IRRADIATOR USERS

Personnel using irradiators are required to attend initial Radiation Safety training conducted by the RSOF and site-specific training with the manager of the irradiator. An Irradiator Worker is any person that has met the requirements for unescorted room access, including background & fingerprint check and radiation safety, site-specific, & laboratory safety training.

## TRAINING

The RSOF documents dates of training, attendees, and content of training. Records of refresher training offered online are also maintained. Classes and online sessions attended are essential components of Case Western Reserve University safety philosophy. Training is audited on a monthly basis by the Assistant RSO to ensure compliance.

<b>TYPE</b>	<b>NEW CLASSES</b>	<b>NEW USERS</b>	<b>ONLINE RETRAINING</b>
Radiation Safety	23	168	652
X-Ray	13	48	0
Laser	10	35	39

RTK (Right to Know)	50	355	630
Irradiator (site specific)	4	38	0

New isotope user training classes are offered at least two times per month. Annual radiation safety retraining is done online. X-Ray training classes are conducted once a month. AUs are responsible for machine and performance-specific annual refresher training for workers who use X-Ray equipment in their laboratory programs. Fluoroscopy users are required to complete a Fluoroscopy Training Module (kindly provided by University Hospitals CASE Medical Center) in addition to the general X-Ray and site-specific trainings. Right-To-Know Fluoroscopy training is provided on an as-needed basis to individuals who desire to observe Fluoroscopy procedures. Additionally, there are monthly training classes for users of Class 3B and Class 4 lasers. The RSOF requires annual retraining for all workers involved with these units and this training is offered on-line.

All non-laboratory personnel are required to attend Hazard Communication & Ancillary Radiation training. Groups trained now include Custodial, Plant, ARC, Shipping, Security departments, and Contractor workers. Employees who do not complete training are restricted from working in areas where radioactive materials are used.

<b>TRAINING</b>	<b>13/14</b>	<b>12/13</b>	<b>11/12</b>	<b>10/11</b>	<b>09/10</b>	<b>08/09</b>	<b>07/08</b>	<b>06/07</b>	<b>05/06</b>	<b>04/05</b>
Radiation Online	168	239	279	186	279	223	240	297	284	284

analytical detection and measurement equipment, waste receptacles, and decontamination supplies.

LABORATORY USE	# OF ROOMS
Radiation	149
X-Ray	37
Laser	39

### Radiation Safety Office (RSOF)

Facilities and equipment used by the RSOF to support laboratory inspection or isotope storage are located in the Service Building (1<sup>st</sup> Floor), Medical School (Rm. DOA990), and the Wolstein Building (Rms. 1118, 1119, & 1120).

#### Information Technology and Data Analysis Group:

The HELIX system is no longer in use however, it is accessible if needed.

The HELIX stand-alone database for the Irradiator Program will be switched to another program by the end of the year.

HP Assist or OnSite has met Radiation Safety needs.

Consistency checker has benefited Radiation Safety with fewer problems to be found during inspection, more training emails sent to the right people and right address, and better statistics.

A manual rewrite of the EHS and Radiation Safety website was done last year. Porting to T4 by 2<sup>nd</sup> quarter of 2015 is planned.

Training self-check has benefited Radiation Safety with reduced phone time.

Radiation Safety has not utilized the online training signup.

The Laser Safety online retrain is now in Articulate. Radiation Safety Online Retrain is still an HTML read-through document.

The following reports were built to automate Radiation data collection:

- List of Radiation PIs
- Sewer totals in a given date range
- Summary of sewer disposal in a given date range
- Update waste records to include proper waste disposal code
- List of x-ray people
- Environmental Releases
- Total packages received in a given date range
- Isotopes and total activity
- Total Activity for all isotopes
- Check particular isotopes for problems

Some backups are done to the terabyte array, others to onsite-server.

Two computer drives were replaced. More computer systems were replaced than parts.

OnSite serve backs up via Carbonite.

The webserver Aurora is still in use until the T4 move. The backup is presently to disk.

EHS has transitioned from use of social security number to employee IDs since 2008.

RSOF Laboratory:

The RSOF is located in the Service Building on the 1<sup>st</sup> Floor at 2220 Circle Drive. The laboratory in the RSOF is equipped with a Packard Model 1900C Liquid Scintillation Counter (duplicate machines are located in both Radioactive Waste Facilities), and a Packard 5000 Gamma Counter. The RSOF maintains bioassay equipment consisting of a single-channel



### ANIMAL RESOURCE CENTER (ARC)

Conventional animal care/use facilities are located in the Robbins Building, Wearn Building, Metrohealth Hospital, Small Animal Imaging Research Center, and the Wolstein Research Building. These facilities are used by AUs to conduct animal studies with radioactive, chemical, and biological materials. A variety of animals (mice, rats, hamsters, rabbits, groundhogs, ferrets & large animals such as sheep, dogs, and pigs) are housed in the Robbins facility as needed. The Wearn and Wolstein facilities predominantly house mice and rats. Contaminated items are stored in the ARC freezer in Robbins until disposal. Animals used in studies involving radioactive materials are not housed in the Wolstein facility. A major renovation was completed in the Robbins facility during in 2009 which added an Ultra Barrier Facility. One irradiator behind the Ultra Barrier is not in current use but is being considered for re-commissioning in the program.

### EQUIPMENT CALIBRATION

Annual calibration procedures consist of an electronic assessment of survey instruments, plus a measurement of their performance using calibrated isotope reference standards. Survey meters that require dose rate calibrations or repairs are not calibrated by the RSOF. These

simple repairs are repaired in-house.

Packard Auto Gamma Minaxi 500 Counter calibrations are conducted monthly for the EHS Radiation Laboratory and as needed for the LSCs in Radiation Laboratory, DOA 990 and WRB 1119. The continuous air monitor (CAM) and the connected air pump in DOA 990 are in service and were calibrated. The LSCs in the Radiation Laboratory, WRB 1119, and in DOA 990 were serviced and cleaned.

## **RADIATION SAFETY PROGRAM**

### **PURCHASE OF RADIOACTIVE MATERIALS**

AUs and their approved designees purchase radioactive material. All radioactive isotope purchases must be approved by the RSOF before the order is processed through the Purchasing Department.

AUs must be approved for the isotope and the quantity of isotope ordered. The activity, when added isotope. Replacement shipments, trial kits, and free samples also must be approved by the RSOF. All deliveries are sent to the Shipping and Receiving Area for RSOF inspection and

### **TRANSFER OF RADIOACTIVE MATERIALS**

The RSOF reviews and approves the transfer of all radioactive material internally (on campus) and externally (off campus) to, or from, an AU. Before initiating a transfer, either the internal or external transfer form must be completed and forwarded to the RSOF for approval. There were 72 isotope transfers approved this year, for a total of 1,261 mCi.

### **RECEIPT OF RADIOACTIVE MATERIALS**

Every package of radioactive material is inspected by the RSOF for contamination, dose rates, and evidence of damage or breakage. If a package is contaminated or has dose rates greater than 10 mR/hr at 1 meter or 200 mR/hr at the surface, the package is held by the RSOF and the laboratory is contacted. An inspection sticker and the RAM Package Receipt Form placed on the package confirm that inspection has been completed by the RSOF. The Campus mail group delivers packages to most laboratories. Laboratories located across Adelbert Rd or Cornell Rd use direct pickup. Direct pickup by a laboratory designee alleviates the need to

by 61 AU-directed disposals into the sanitary sewers (27mCi). The following table presents a breakdown by isotope of radioactive materials entering and leaving laboratories.

## **SEALED SOURCES**

these, 94 sealed sources are required to be inventoried every six months. Five (5) sealed sources require six-month leak tests, as stated in our ODH license. This includes 4 gamma sources and 1 neutron source.

There are three (3) high-dose irradiators and two (2) low-dose irradiators on campus. Both of the low-dose irradiators and one of the high-dose irradiators are not in use. There are two (2) active high-dose irradiators. These irradiators are the only radioactive material sources that could produce significant external dose hazards should their shielding be compromised.

See the Appendix for a list of sealed sources on campus. These sources are not included in the

INVENTORY	13/14	12/13	11/12	10/11	09/10	08/09	07/08	06/07	05/06	04/05
Sealed Sources	94	149	142	147	213	211	213	207	168	204
Exempt	89	144	134	138	203	201	190	188	154	183
Irradiator	3	3	4	4	4	5	4	4	4	3
Neutron	1	1	1	1	1	1	1	1	1	1

## RADIATION SURVEY METER CALIBRATIONS

portable survey meters. Properly calibrated meters are necessary for laboratories to perform accurate radiation surveys. AUs are responsible for the annual calibration, maintenance, and repair of their survey instruments. Count rate calibrations on survey instruments and minor repairs are provided by the RSOF as a free service. The EHS provided in-house services that generated \$10,450 in cost saving over the fiscal year in lieu of using outside vendors.

CALIBRATION/ SERVICE	COST PER SERVICE	COST SAVINGS
109 meters	\$80/meter	\$8,720
2 pumps	\$70//F1 8.04 Tf1	

12/2013	17	13	7
1/2014	11	7	10
2/2014	10	8	14
3/2014	12	16	7
4/2014	8	9	13
5/2014	16	15	15
6/2014	1	11	16

## **RAM SECURITY**

Radioactive materials and potentially hazardous chemicals must be secured against

worn to conservatively measure any dose to the developing baby. One woman declared their pregnancy. During monitoring, no fetal doses above background radiation levels were detected.

**NEUTRON USERS**

For experiments and procedures involving the use of neutron sources, personnel monitors sensitive to neutron radiation must be worn. These can be obtained from the RSOF. There were two neutron dosimeter users during the fiscal year.

**USERS OF RGE/ X-RAY**

The RSOF provides special dosimeters for individuals carrying out experiments and procedures involving the use of radiation generating (x-ray) equipment, such as fluoroscopy and X-Ray Diffractometers. The eleven Fluoroscopy users had collar badges.

Although only 20% of the workers currently monitored are required to wear dosimeters to comply with the terms of the Case Western Reserve University Broadscope License or Radiation generating equipment programs, the use of dosimeters is encouraged because it provides an excellent method for early detection of activities that might be dangerous to individual workers.

<b>PERSONNEL MONITORING</b>	<b>13/14</b>	<b>12/13</b>	<b>11/12</b>	<b>10/11</b>	<b>09/10</b>	<b>08/09</b>	<b>07/08</b>	<b>06/07</b>	<b>05/06</b>	<b>04/05</b>
Pregnant Workers	1	2	2	2	1	1	2	2	6	6
Neutron	2	4	4	4	4	4	4	0	0	0
RGE/ X-Ray	33	30	30	28	45	103	70	38	60	201
Dental	46	36	47	34	28	28	28	28	28	28
General	552	456	456	448	518	698	665	705	905	1005

<b>RADIATION-GENERATING UNITS (Not In Use)</b>	<b>13/14</b>	<b>12/13</b>	<b>11/12</b>	<b>10/11</b>	<b>09/10</b>	<b>08/09</b>	<b>07/08</b>	<b>06/07</b>	<b>05/06</b>	<b>04/05</b>
Diagnostic units Disposed	0	4	4	3	3	3	4	4	7	3
Diagnostic units Purchased	0	3	4	3	3	3	3	4	11	2

The ODH has changed the Radiation Generating Units classification. One hand-held Dental unit was added July 2013. The table below reflects that change.

<b>RADIATION GENERATING EQUIPMENT (IN USE)</b>	<b>13/14</b>	<b>12/13</b>	<b>11/12</b>	<b>10/11</b>	<b>09/10</b>
Closed Beam Analytical	6	6	6	6	6
Computer Tomography	1	1	2	1	1
Electron Microscope/ Photoelectron Spectrometer	11	11	11	11	11
Enclosed System	4	4	4	4	4
Fluoroscopy	3	3	2	3	3
Hand-held Dental	1	2	2	1	1
Intraoral	27	27	27	27	27
Open Beam Analytical	1	1	1	1	1
Panoral	1	1	1	1	1
Particle Accelerator	1	1	1	1	1
<b>RADIATION GENERATING EQUIPMENT (IN-OPERABLE)</b>					
Closed Beam Analytical	3	3	3	3	3
Electron Microscope/ Photoelectron Spectrometer	2	2	2	2	2

With regard to airborne exposure control, the primary concern is to safeguard against exposure to airborne radioactive iodine that is used for protein iodination experiments. To control exposures, the RSOF requires that reactions involving use of volatile radioactive iodine isotopes be performed in an iodination hood that is housed in a chemical hood. The charcoal-filtered exhaust from the iodination hoods typically reduce radioactive material emissions by approximately 90%. Experiments requiring use of large amounts of iodine in especially volatile form are routinely carried out in closed systems to prevent airborne release of radioactive iodine. There were two experiments requiring the use of volatile iodine conducted this fiscal year.

## **BIOASSAY PROGRAM**

Bioassays are required for employees who may receive an internal, measurable radiation dose. Bioassay procedures include, but are not limited to, thyroid screening and urinalysis. The RSOF can perform bioassays for radioactive iodine (thyroid scan) and tritium uptake (urinalysis). Bioassay records are retained in the RSOF and are available for review by the assayed individuals.

## **RADIOACTIVE IODINE**

During 2013-2014, there was one (1) active iodination laboratory. The RSO maintains an inventory of five iodination hoods to be deployed when needed. A bioassay is required when more than 1 mCi of radioactive iodine is used in volatile form. The RSOF must be notified prior to:

Handling mo4(i)5(v)11(e)-45(i)5(odJETJETB71 0 0 1 94.104 356.81 (3)N(i)5(dJETJ.81 (3)1T1 0)7.81 (3) 0 1 Ci024 482.-7(iT1



## TRITIUM

Urine bioassays must be carried out for individuals using more than 10 mCi of tritium, with a baseline bioassay required prior to experiment. There were no urine bioassays required during this fiscal year.

## **RADIOACTIVE MATERIALS INCIDENTS**

### EMERGENCY RESPONSE

Emergency response procedures have been developed and approved by the RSOF and RSC for spills, releases or loss of RAM, small fires, large fires, internalized contamination and medical emergencies. The goal during any emergency response is to protect people first and property second. The RSO or designee provides instruction, assistance and supervision of clean up as required. The RSO is authorized to act independently and take prompt remedial action in situations involving RAM that present imminent danger or threat to personnel, property, or the community at large.

### INCIDENT/ SPILL RESPONSE

#### MAJOR INCIDENT/ SPILL

This is a spill that involves personnel contamination or results in contamination outside of the intended work area that cannot be easily and effectively contained and cleaned up.

#### MINOR INCIDENT/ SPILL

This is a spill that does not involve personnel contamination and that remains inside the intended work area; one that can be easily and effectively contained and cleaned up without assistance from the RSOF.

There were no major and eight (8) minor incidents documented over the past year.

INCIDENTS	13/14	12/13	11/12	10/11	09/10	08/09	07/08	06/07	05/06	04/05
Major	0	2								

			laboratory was contaminated with 22Na.	and worker trained.
3/24/2014	Minor Incident	Irradiator Biometric Reader Malfunction	Biometric Reader malfunctioned although irradiator room was secure.	The reader was rebooted remotely.
2/25/2014	Minor Incident	Irradiator Alarm	Irradiator Intrusion Alarm accidentally set and RSOF was called.	The person will be more careful.
1/12/2014	Minor Incident	Flood	Water pipe burst and leaked in Wood 333, 337, 217, & 151. Areas were cleared for Radiation.	All was collected and area cleaned.
10/31/2013	Minor Incident	Irradiator Intrusion Alarm	Person tripped alarm in Irradiator room.	Person was contacted and reminded to briskly close the door

## EHS WEB SITE & NEWSLETTER

The updated EHS home web site (<https://case.edu/ehs/>) provides integrated web-based access to EHS services. Information on training classes, on-line retraining, and safety manuals is available at this site. All information is updated on a regular basis.

The EHS newsletter is filled with articles that are designed to keep the campus community abreast of safety issues and concerns. It covers the latest government regulations, addresses concerns that are found during laboratory inspections, and provides answers to questions frequently asked by laboratory personnel. Articles that were submitted during this year included:

- Research Isotopes
- Properly Securing Radioactive Materials
- When to Record a Post-Experimental Survey
- Electron Microscopes
- Radiation-Generating Equipment

## LASER SAFETY PROGRAM

There are a total of 154 lasers/laser systems noted in our database for the campus for 43 Laser PIs in 14 buildings (36 Active, 7 Inactive). Two units are portable where a temporary posting would be applied when used. There are currently 95 active users of lasers in 45 laboratories. This includes 26 laboratories in the class 1-3A/3R groups and 19 laboratories in the class 3B-4 groups. The lasers of greatest concern are those labeled Class 3B and Class 4. There are 57 Class 4 (26 active and 31 inactive), 38 Class 3B lasers (29 active and 9 inactive), and 59 lasers in the other classes of 1, 2, and 3A/3R. left the Laser Program during this fiscal year.

There are 19 class 3B/4 enclosed laser systems that are considered eye-safe under normal use thus decreasing the hazard to the user. Forty (40) audits were performed during this fiscal year. There were no Laser incidents reported this year.

The CWRU Blackboard system is being used to track the laser retraining tests. It automatically updates the training information in our database. The Onsite database is updated as audits and inventory checks occur. An online Laser Awareness training for classes of 1, 2, and 3A/3R users was developed that will address eye-safe and enclosed laser use on campus. This work had been put on hold this past year.

## **ULTRA VIOLET (UV) SAFETY PROGRAM**

With increased use of UV equipment on campus, a program for UV Safety has been implemented. A UV safety PowerPoint presentation has been placed on the EHS website. UV users are being identified through laboratory inspections and new employee orientations and training.

## **CLEARANCES/ RELOCATION PROGRAM**

tories. An orchestrated effort between the RSOF, the Safety Services division of EHS, Facilities Services, and the AU facilitates these operations. There were 450 pieces of equipment and 49 rooms that were cleared in this reporting period.

## **WASTE MANAGEMENT**

### RADIOACTIVE WASTE FACILITY

Our Radiation Waste Facility decay-in-storage licensing with the ODH specifies that we must dispose of any interim generated waste as soon as practical when a waste site is open. The Case Western Reserve University Radioactive Waste Facility (RWF) is used to segregate waste streams and prepare the waste for disposal. The different waste streams include aqueous waste, sharps, animals, scintillation vials, beta plates, and dry solid waste.

<sup>32</sup>P solid waste is held for decay (for at least 10 half-lives) in the Radioactive Waste Facility. The waste is surveyed and subsequently sent to Stericycle (formally BFI), a commercial disposal facility for incineration. Currently, only the outside of waste bags are surveyed (with approval from ODH), followed by immediate placement into a burn box. This simplifies handling by staff and provides for compliant and economical disposal of these materials. This procedure has greatly decreased hazard exposures to RSOF personnel handling radioactive waste at Case Western Reserve University. Reducing the volume of waste to be disposed remains a continuing aim of the waste program. As part of the waste minimization program, isotope users are encouraged to reduce the volume of waste generated i





## **RADIATION SAFETY COMMITTEE AUDITS**

Radiation Safety Committee (RSC) audits are carried out in two different ways:

Performance audits are conducted on-site at the Radiation Safety Office (RSOF) by individual RSC members at various times throughout the year

A compliance inspection of RSOF records is conducted shortly after the end of each fiscal year by a team of RSC Members.

Performance audits of RSOF activities included the following areas:

<u>AREA AUDITED</u>	<u># OF INDIVIDUAL FILES EXAMINED</u>
RAM Applications	10
Isotope Orders/ AU Possession Limits	10
RGE inventory/ training	10
Ancillary staff training	10
AU/ worker training	10
Radiation survey meters	10
Waste disposal facility	2
Shipping papers	10
RAM security checks	10
Bioassays	10
Semi-Annual mailings	10
Sealed sources	10
Web site Accuracy	1
Irradiators	5
Room Surveys (Active/Decommissioned)	10
Compliance Reviews	10
Lasers	10
Licensing	10
Dosimetry	10
Incidents	10

These audits were conducted between October and December 2013 and between March and June 2014. This effort resulted in the review of more than 170 files, in the program areas listed above.

## **RSC TRI-ANNUAL AUDITS FOR 2013-**

Each audit consisted of randomly selecting five (5) to twenty (20) files from the past year to ensure its contents were up-to-date, accurate, and consistent with the database.





## SURVEY METERS

Dr. McCormick examined ten (10) survey meters to audit the calibration dates and match the dates with the database of survey meter calibration. Dr. McCormick reported no deficiencies in the audited meters.

### RSOF RESPONSE

No response required.

## WEB PAGE (RADIATION SAFETY) OF EHS WEBSITE

the links were active and accessible. Dr. Devireddy audited ten (10) random links and reported one (1) non-operational link. The EHS webmaster was alerted to this link and the link was repaired.

### RSOF RESPONSE

The Web link has been repaired.

**In February 2014**, the Radiation Safety Committee Members conducted a tri-annual audit of the following components of the Radiation Safety Office:

- Waste Disposal Facilities
- Valid RAM Applications
- Dosimetry Program
- Compliance Review
- Direct Package Pickup
- Incident Reports
- Laser Program
- Licensing Status
- Web Page (Radiation Safety) of EHS Website
- Support Staff Training

Each audit consisted of randomly selecting five (5) to twenty (20) files from the past year to ensure its contents were up-to-date, accurate, and consistent with the database.

## WASTE DISPOSAL FACILITIES

The waste disposal facilities (DOA990/Wolstein) and RSOF Laboratory were inspected to ensure safe operation and maintenance as required by RSOF for the quarterly audit in February 2014. Dr. Valadkhan inspected the facilities and reported that all records of maintenance, housekeeping, records and waste storage and handling were all in compliance.

### RSOF RESPONSE

No response required.

### VALID RAM APPLICATIONS

RAM applications were audited for the quarter on 2/19/2014 to verify that the applications were complete and valid. Dr. McCormick audited 10 files and reported 7 deficiencies. Deficiencies were due to three (3) instances where the Personnel List was not updated, three (3) reported meter calibrations post-due and one (1) instance where monitoring equipment did not match the application. RSOF was notified of the deficiencies.

#### RSOF RESPONSE

Those in non-compliance were contacted and information corrected. RAM applications have many categories where non-compliance can occur and audit is the best way to identify small discrepancies.

### DOSIMETRY PROGRAM

An audit of Current Dose records held by the RSOF was performed on 2/19/2014 to verify that AU laboratory workers were current in dose record and active radiation badges. Dr. Valadkhan audited ten (10) records and reported nine (9) deficiencies. Workers were contacted and badges were updated except in one case where the worker had left the University.

#### RSOF RESPONSE

Those in non-compliance were contacted and badges retrieved.

### COMPLIANCE REVIEW

Compliance review audits were performed on 2/19/2014 to ensure that any non-compliance issues were appropriately resolved. Upon examination of 10 files Dr. Croniger noted no deficiencies. Dr. Croniger further noted that the database was in need of updating for six (6) AU and two (2) upcoming AU were due in the next month. The RSOF was notified.

#### RSOF RESPONSE

The database was corrected.

### DIRECT PACKAGE PICKUP

Dr. Coller audited 5 files on 2/19/2014 to verify that ordered radioactive material (RAM) was picked up by the AU (or laboratory) and that all orders placed were in the Helix Database. Dr. Coller noted no deficiencies.

#### RSOF RESPONSE:

No response required.

### INCIDENT REPORTS

A review of incident reports was performed on 2/19/2014 by Dr. Coller for verification and documentation of follow-up by the RSOF. During this quarterly report there were no incidents reported.

RSOF RESPONSE:

No response required.

LASER PROGRAM

The laser program was audited by Dr. Jankowsky on 02/19/2014 for accuracy regarding laser inspections, inventory and status of personnel training. Five (5) files were audited. Two deficiencies were noted in inventory of equipment. Each deficiency was corrected.

RSOF RESPONSE:

The inventory was corrected.

RAM security checks  
Radiation Generating Equipment (RGE) Inventory and Training  
Room Surveys  
Sealed Source Leak Tests  
Bioassay  
Irradiator Program  
AU/Worker Training  
Semi-Annual Mailings  
Survey Meters  
Web Page (Radiation Safety) of EHS Website

Each audit consisted of randomly selecting five (5) to twenty (20) files from the past year to ensure its contents were up-to-date, accurate, and consistent with the database.

RSOF RESPONSE:

No response required.

BIOASSAY

The bioassay program was audited by Dr. Jankowsky on 04/16/2014 for accuracy regarding bioassay

RSOF RESPONSE:

No response required.

#### WEB PAGE (RADIATION SAFETY) OF EHS WEBSITE

whether or not the links were active and accessible. Dr. Devireddy audited ten (10) random links and reported no non-operational links.

RSOF RESPONSE:

No response required.

Overall, this tri-annual part of the audit process was successful. Records were easily accessed and reviewed. The program was found to be efficient. Productive interaction among committee members and RSOF staff during the audit process helped expedite the process. All corrections to the files and OnSite database were made following each trimester audit.

### **ANNUAL RADIATION SAFETY PROGRAM AUDIT REPORT**

The Radiation Safety Committee conducted its annual audit of the Radiation Safety Office the first week in June 2014. Members of the RSC conducted the audit. The committee reviewed the performance of 20 components of the RSOF. The areas were:

- Ancillary Staff Training
- AU and Worker Training
- Bioassays
- Compliance Review
- Isotope Orders, AU Possession Limits, and the Database
- Dosimetry Program
- Incident Reports
- Irradiator Program Review
- Laser Program Review
- Licensing Status
- Radioisotope Security Checks
- Radiation Generating Equipment Inventory and Training
- Radiation Survey Meters
- Radiation Website
- Room Surveys
- Seal Source /Leak Test
- Shipping Papers
- Semi-Annual Mailings (air/sewer inventory)
- Valid RAM Application
- Waste Disposal Facilities (DOA990, Wolstein) & RSOF Laboratory

The Results of this audit are summarized in this report as follows.

ANCILLARY STAFF TRAINING

## ISOTOPE ORDERS, AU POSSESSION LIMITS, AND THE HELIX DATABASE

### RSC AUDIT COMMENT:

Dr. Collier audited 35 files to verify that the amount of radioactive material (RAM) ordered was within the possession limits of the AU and that all orders placed were in the Helix Database. Dr. Collier noted no deficiencies and all was in order.

### RSOF RESPONSE:

No response required.

## DOSIMETRY PROGRAM

### RSC AUDIT COMMENT:

An audit of Current Dose records held by the RSOF was performed to verify that AU laboratory workers were current in dose record and active radiation badges for the period July 1, 2013-June 30, 2014. Dr. Valadkhan audited 50 records and reported 11 individuals who were found to be in the active personnel files that had actually left the University. Individuals without badges were notified of the deficiency.

### RSOF RESPONSE

No response required.

## INCIDENT REPORTS

### RSC AUDIT COMMENT:

A review of monthly incident reports From July 1, 2013-June 30, 2014 was performed by Dr. Collier for verification and documentation of follow-up by the RSOF. During this period there were a total of 8 incidents reported. All incidents were effectively resolved in a timely manner.

### RSOF RESPONSE

No response required.

## IRRADIATOR INFORMATION REVIEW

An audit of the Irradiator Information Files was performed by Dr. Jankowsky to verify that the irradiators were audited by the RSOF within the past six months between the period of July 1, 2013-June 30, 2014, and that any compliance issues were appropriately followed up and pending issues corrected. Four Irradiators were active on campus and each file was up-to-date and compliant, two irradiators were in storage mode.

### RSOF RESPONSE

No response required.



### LASER PROGRAM REVIEW

The laser program was audited by Dr. Jankowsky for accuracy regarding laser inspections, inventory and status of personnel training in the period July 1, 2013-June 30, 2014. Fifty (50) files were audited. No deficiencies were noted for this period.

#### RSOF RESPONSE:

No response required.

### LICENSING STATUS

#### RSC AUDIT COMMENT:

An audit was conducted to verify the licensing status of all ODH licenses and registrations during the period July 1, 2013-June 30, 2014. Components of the audit include: Broadscope license, RGE license, Waste license, Radiation Manual, X-ray Manual, Laser Manual, Radiation Training, X-Ray Training, Radiation Online Training, UV online training and RSC guidelines. Dr. Schiemann reviewed all license programs and noted that new documentation was necessary for the RGE license. This document was completed on 7/25/2014 by the radiation safety office. All licenses are active and accurate at this time.

#### RSOF RESPONSE

No response required.

### RADIOISOTOPE SECURITY CHECKS

#### RSC AUDIT COMMENT:

Verification and documentation of radioisotope security checks were performed for the period July 1, 2013- June 30, 2014. Dr. Collier reports that 33 security checks were generated during this period. Unlocked RAM storage accounted for all of these security checks. All inm263(a)-263(iA)46T4(t)--4( )-2036were E A

### RADIATION SURVEY METERS

#### RSC AUDIT COMMENT:

Compliant calibration of survey meters was audited for the period July 1, 2013- June 30, 2014. Thirty-five (35) files were examined by Dr. McCormick who noted six (6) meters that were due for calibration.

#### RSOF RESPONSE:

The meters were calibrated promptly following the audit.

### EHS WEBPAGE (RADIATION SAFETY)

The website for the RSOF was audited to ensure proper operation, access and current links were operational for the period July 1, 2013- June 30, 2014. Dr. Devireddy reports that the Homepage, Training pages and all links as well as the Forms and Manuals pages were all operational.

#### RSOF RESPONSE

No response required.

### ROOM SURVEYS (ACTIVE/DECOMMISSION)

An audit was performed to validate active RAM use files and Decommissioned

RSOF RESPONSE:

No response required.

SEMI-ANNUAL MAILINGS (AIR/ SEWER INVENTORY)

RSC AUDIT COMMENT:

An annual audit of the air/sewer disposal inventory was performed for the period July 1, 2013- June 30, 2014. Thirty-five (35) files were reviewed by Dr. Valadkhan who noted no deficiencies.

RSOF RESPONSE:

No response required.

VALID RAM APPLICATION

RSC AUDIT COMMENT:

RAM applications were audited for the period July 1, 2013- June 30, 2014 to verify that the applications were complete and valid. Dr. McCormick audited fifty (50) files and reported no deficiencies. Nine (9) applicants were noted to be in Storage mode.

RSOF RESPONSE:

No response required.

WASTE DISPOSAL FACILITIES (DOA990/WOLSTEIN) & RSOF LABORATORY

RSC AUDIT COMMENT:

The waste disposal facilities (DOA990/Wolstein) and RSOF Laboratory were inspected to ensure safe operation and maintenance as required by RSOF for the period July 1, 2013- June 30, 2014. Dr. Valadkhan inspected the facilities and reported that all records of maintenance, housekeeping, records and waste storage and handling were all in compliance. Dr. Valadkhan noted that the rest room areas needed maintenance. The RSOF was alerted to this report.

RSOF RESPONSE:

Maintenance was contacted and the rest room cleaned.

SUMMARY

RSC AUDIT COMMENT:

No major problems exist in the RSOF program and the RSOF staff is functioning on a very competent level.

RSOF RESPONSE:

The RSOF thanks the RSC for its careful audit of safety activities over the past year. Deficiencies

uncovered during the audit were referred to the RSOF auditor for increased scrutiny during the coming year.

## **EHS INTERNAL AUDITS**

Three layers of audits are utilized by the RSOF on an ongoing basis to ensure that the Radiation Safety programs and procedures are working smoothly. In addition to audits conducted by the RSOF Staff and Radiation Safety Committee, the Assistant RSO conducts Quality Control reviews of all programs and records and assists with resolution. Full audit results of the program are available in the EHS Office.

Sealed Source	RAM Security Checks	Bioassays
Shipping Papers	Semi-Annual Mailings	Dosimetry
Valid RAM Applications	RGE Inventory/ Training	Survey Meters
Isotope Orders/ AU Possession Limits	Ancillary Training	Compliances
AU/ Worker Training	Licensing	Website Accuracy
Waste Disposal Facility	Incidents	Liaison Program
Room Surveys (Active/ Decommissioned)	Irradiator	Laser Program

## INTERNAL AUDITS

Update of RAM applications Audits of RAM applications revealed applications that were more than ten (10) years old. Recently, the decision was made to flag these applications for update to be consistent with newly agreed upon application requirements. AUs are now required to update protocols that are more than 10 years old and every 5 years thereafter. There are currently forty (40) applications that require updating. Fifteen (15) RAM Applications were updated this fiscal year. During 7/2012-6/2013, thirteen (13) RAM applications were updated. During 7/2011-6/2012, nine (9) RAM Applications were updated and from 7/2010-6/2011, twelve (12) RAM Applications were updated.

Corrections to the files were made promptly. In response to internal audit findings, Radiation Safety continues to improve its procedures and programs.

This report was prepared by Felice Thornton-Porter on 11/13/2014 and reviewed by Dr. David Sedwick. It covers fiscal years 7/1/2013-6/30/2014.

## APPENDIX

**AUTHORIZED USERS WITH STATUS CHANGE DURING FISCAL 2012-2013**

**RADIATION ACTIVE**

Tomoaki Ogino (9/17/2013)                      Jacek Skowronski (4/16/2014)                      Jennifer Dorth (5/14/2014)  
Yong Gao (6/19/2014)

**STORAGE MODE**

Nancy Oleinick (3/5/2014)                      Mary Barkley (5/15/2014)                      Monica Montano (4/8/2014)

**RADIATION INACTIVE**

Carole Liedtke (8/12/2013)                      Ruth Siegel (8/26/2013)                      Cheng-Kui Qu (12/16/2013)  
Guang Zhou (3/12/2014)                      Eric Andrulis (3/14/2014)                      Alexander Jamieson (5/29/2014)

**DEPARTED - NONE**

**X-RAY AUTHORIZED POSSESSOR LIST**

<u>AP NAME</u>	<u>CONTACT PERSON</u>
Amir Avishai	Wayne Jennings
Chris Dealwis	Tian Meijuan
Gary Chottiner	Gary Chottiner
Liming Dai	Enoch Nagelli
Jean Iannadrea	Susan Opsitnick
Hisashi Fujioka	Midori Hitomi
Edward Greenfield	Teresa Pizzuto
Arthur Heuer	Wayne Jennings
Mukesh Jain	Steve Schomisch
Lashanda Korley	LaShanda Korley
Zhenghong Lee	Chris Flask
Gerald Matisoff	Gerald Matisoff
John Protasiewicz	John Protasiewicz
Daniel Scherson	Nikola Matic
Kenneth Singer	Ina Martin
Derek Taylor	Heather Holdaway

**LASER USERS**

Rigoberto Advincula	Mary Barkley (Inactive)	Jesse Berezovsky
Clemens Burda	Paul Carey	Patty Conrad
Carlos Crespo	Liming Dai	Diana Driscoll
Jeffrey Duerk (Inactive)	Dominique Durand (Inactive)	Steven Eppell
Philip Feng	Roger French	Maryann Fitzmaurice (Inactive)
Jeffrey Garvin	Alex Huang	Yoshikazu Imanishi
Hatsuo Ishida	James Jacobberger	Eckhard Jankowsky (Inactive)
Jaikrishnan R. Kadambi	Kathleen Kash (Inactive)	Robert Kirsch
LaShanda Korley	Roger Marchant (Deceased)	Michael Martens (Inactive)
Heidi Martin (Inactive)	Minh Lam	Edward Medof (Inactive)
Claudia Mizutani	Nancy Oleinick	Rajesh Ramachandran
Andrew Rollins	Charles Rosenblatt	Shasta Sabo
Daniel Scherson	David Schwam	Alp Sehirlioglu
Jie Shan (left CWRU)	Kenneth D. Singer	Giuseppe Strangi
Benjamin Strowbridge		