

CASE WESTERN RESERVE UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL HEALTH & SAFETY (EHS)
RADIATION SAFETY
ANNUAL REPORT 2010-2011

W. David Sedwick, Director/ RSO
Felice T. Porter, Assistant Director/Assistant RSO
Report Editor and Departmental Auditor

TABLE OF CONTENTS

INTRODUCTION	3
SUMMARY	3
RADIATION SAFETY ACCOMPLISHMENTS FOR 2010-2011	3
RADIATION SAFETY GOALS FOR 2011-2012	4
OHIO DEPARTMENT OF HEALTH (ODH) LICENSE	5
RADIATION SAFETY PROGRAM-RESPONSIBLE PARTIES	7
ADMINISTRATIVE CONTROLS	10
RADIATION SAFETY OFFICE (RSOF)	13
RADIATION SAFETY PROGRAM	20
RADIATION SAFETY COMMITTEE AUDITS	34
APPENDIX	49
• Master Isotope List	I
• Authorized User (AU) Inventory List	II
• Sealed Sources	III
• Organizational Chart	VI

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 and Case Western Reserve University's State of Ohio (Nuclear Regulatory Commission Agreement State) Broadscope License. This 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, 2010 through June 30, 2011.

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 continues 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 ACCOMPLISHMENTS FOR 2010-2011

Over the past year, the Radiation Safety division of EHS continued to improve the effectiveness of the Radiation Safety Program. Notable new accomplishments included:

- The Radiation Safety Program generated in-house savings accrued from meter calibration, recycling, and decay-in-storage programs amounting to more than \$29,862 in 2010/2011 through its services to the research community at Case Western Reserve University.
- EHS will continue its efforts to improve both safety awareness and effective performance of its University programs. Success in these programs is measured in terms of reduced numbers of accidents and violations found during safety inspections throughout the University.
- Progress in updating old RAM Protocols for all Users.
- Participation in rebranding the department from the Department of Occupational & Environmental Safety (DOES) to Environmental Health and Safety (EHS).
- Creation of link to the UH Fluoroscopy program manual/training.
- Incorporation of the Laser Safety Program and the X-Ray Safety Program into the HP Assist database to improve compliance monitoring and administration of these new programs.
- Successful rebid both the Radioactive Waste and Dosimetry Program contracts.

Development of online ordering procedures with the SAIRC to improve efficiency and to ensure compliance in the program for use of short lived isotopes.

RADIATION SAFETY GOALS FOR 2011-2012

The continuing goal of the Radiation Safety Program is to position EHS for more effective interaction with the educational and research goals of the University through training and training development. A secondary goal is to increase the impact of Case Western Reserve University Safety Programs on the surrounding community through educational and programmatic interaction with local partners and emergency responders. Specific efforts will address:

- Begin to evaluate CSHEMA benchmarking to determine how EHS measures up relative to other peer institutions with respect to standard EHS benchmarks. Plan to participate in 2012-13.
- Continuation of efforts to define a new image for EHS including a new logo and dissemination of for new rebranding.
- Strategic planning for the department and implementation of PDP plans for staff in alignment with department goals.
- Continuation of integration and broader usage of HP ASSIST and launch web kiosk for services and training, share database with key partners to increase transparency of department and accuracy of data.
- The continued updating of old RAM Protocols. (greater than 10 years old)
- Research/develop NMR Safety Program
- Attendance of meetings off-campus by personnel to expose them to innovations in the outside safety communities.
- New presentations for Radiation Safety and Laser Safety training.
- Training of Radiation Safety in the generation of reports in HP Assist and broader use of the program to improve the Department's service efforts.
- Development of new isotope information sheets to aid users' quick development of facility through presentation of important facts about isotopes used on campus.
- Review of all waste handling procedures and development of more facile procedures for waste handling and cost savings.

OHIO DEPARTMENT OF HEALTH (ODH) LICENSE

Case Western Reserve University has one Ohio Department of Health (ODH) Broadscope license. The license covers possession and use of both nuclear accelerator-produced radioactive material (NARM) and naturally occurring radioactive material (NORM) for experimental purposes. It also provides for the licensed use of four (4) irradiators.

The Broadscope License inspection was last conducted by ODH on October 14-15, 2009. No issues of non-compliance requiring a written response were noted during this inspection.

The University has one ODH Radiation Generating Equipment (RGE) registration. The registration covers the receipt, possession, use, storage, and disposal of all radiation-generating sources including dental x-ray machines, x-ray diffraction units, fluoroscopy units, and electron microscopes. The Radiation-Generating Equipment (RGE) Inspection was last conducted by ODH on May 25-28, 2010. Minor issues of non-compliance after testing of the x-ray units by the inspectors were corrected at the time of the inspection. The University was not required to submit further corrective action; however documentation of minor corrective actions that were identified, but not immediately fixed, were made following the inspection and will be reviewed during the next inspection.

ODH LICENSE	EXPIRATION DATE	PURPOSE
011-011800-11	January 1, 2015	Broadscope License
09-M-06944-12	May 31, 2012	Radiation-Generating Equipment Registration

DECOMMISSIONING FUNDING PLAN

The Broadscope License and the Decommissioning Funding Plan became effective 2/25/2010. The University is required to maintain a Standby Letter of Credit to cover possible costs if the University's Broadscope License is required to undergo rapid decommissioning. The expiration date for the Standby Letter of Credit is 2/28/2012. Funds required for this letter of credit depend on the kind and amounts of radioactive materials maintained in active use or waste by the University. Experimental procedures using more sensitive methods increasingly require less radioactive materials. There were no significant changes in cost for the Decommissioning Funding. Therefore, following ODH guidelines, the cost estimate was increased by 16%. The Standby Letter of Credit carried by the University is now \$333,406, consistent with the above changes. This document covers all possible decommissioning costs for radioactive materials located at the University at the time of the last submission of the University Broadscope License to the State.

RADIOACTIVE MATERIAL USE AND STORAGE LOCATIONS

Radioactive material is located at the following facilities:

- Main campus of Case Western Reserve University, 10900 Euclid Avenue, Cleveland, OH
- University Hospitals (UH), 2065 Adelbert Road, Cleveland, OH
- Wolstein Research Building, 2103 Cornell Road, Cleveland, OH

Radioactive material is received and/or stored at the following sites:

- Shipping and Receiving, 2232 Circle Drive, Cleveland, OH
- Wolstein Research Building, 2103 Cornell Road, Cleveland, OH

PURPOSE FOR RADIOACTIVE MATERIAL (RAM) USE

The majority of isotope use at the University is for biomedical research. The most typical isotopes used are ^{14}C , ^3H , ^{125}I , ^{32}P , ^{33}P , and ^{35}S . Isotopes used in sealed sources contained within irradiators, scintillation counters, gamma counters, check sources, and calibration standards are most commonly ^{137}Cs , ^{133}Ba , and ^{241}Am . Six (6) licensed low to high activity radiation sources are currently used for biomedical and other research. These include an ^{241}Am -Be neutron source and four high dose irradiators that contain ^{60}Co or ^{137}Cs sources and one low dose irradiator charged with ^{192}Ir . Currently, two irradiators are active and two are out of service.

The number of Individual workers authorized to use irradiators are shown in the following table.

IRRADIATOR	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Total Workers	47	52	68	55	45	28	10	5	2
Total Irradiators	4	4	4	4	4	4	3	3	3

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 monitoring and enforcing compliance with the University's Radiation Safety Program as outlined in the University's 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 2010-2011 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. Anthony Berdis Dept. of Pharmacology HG Wood 276A Term Expires: 11/8/2013 Chairperson: 12/31/2007	Dr. Jeffery Collier Dept. of RNA Center HG Wood 113 Term Expires: 11/8/2013	Dr. Monica Montano Dept. of Pharmacology HG Wood 367 Term Expires: 9/1/2011
Colleen Croniger Dept. of Nutrition BRB 925 Term Expires: 5/1/2013	Dr. Lax Devireddy Dept. of Pathology Wolstein 6524 Term Expires: 11/8/2013	Dr. Thomas McCormick Dept. of Dermatology BRB 530 Term Expires: 9/1/2011
Dr. Zhenghong Lee Dept. of Radiation Oncology Bishop S109B Term Expires: 11/8/2013 Suspended: 5/2011	Dr. Saba Valadkhan Dept. of RNA Center Research Tower 100-8 Term Expires: 11/8/2013	Dr. Eckhard Jankowsky Dept. of Biochemistry HG Wood 447 Term Expires: 1/3/2014
Dr. W. David Sedwick Radiation Safety Officer (RSO) Dept. of Medicine EHS - Service Building, 1 st Floor		

EX-OFFICIO MEMBERS

Dr. Charles Hart EHS Executive Director EHS, Service Bldg., 1 st Fl.	Felice T. Porter Asst. Dir./Asst. RSO Quality Assurance Specialist EHS Service Bldg., 1 st Fl.
Bruce DeMeza Asst. RSO University Hospitals Case Medical Center Bishop S611	R. Michael Sramkoski Senior Research Associate & Laser Specialist Comprehensive Cancer Center WRB 3542
Richard Jamieson Vice President of Campus Svcs. Adelbert Hall 205	

SUPPORT STAFF

Shirley Mele Office Supervisor Service Bldg., 1 st Floor	Gwendolyn Cox-Johnson Department Assistant Service Bldg., 1 st Floor
---	---

The Radiation Safety Committee acts as an advisory and enforcement body to ensure that radioactive materials are safely used in accordance with ALARA (As Low As Reasonably Achievable) principles. The Committee conducts audits each trimester, which address programmatic compliance. The RSC also conducts an annual audit in which the entire program is reviewed. The audits ensure:

- Specific program components conform to the licensed program as described in the Case Western Reserve University Radiation Safety Manual and License.
- Accurate documentation for program conformance and license compliance is maintained.
- Adequate training is provided for all classes of workers.
- Oversight for RSOF activities is maintained through RSC familiarity with the daily function of the University Radiation Safety Program.

The Committee met on nine occasions during the 2010-2011 fiscal years to review applications for radioisotope use and act on other business. Two RSC meetings were cancelled. The minutes of the RSC meetings and Executive Committee actions are available in the RSOF, through the RSC, or through the University Administration.

APPLICATIONS	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
New AU	3	9	5	7	14	11	8	3	8
Additional Isotopes	5	5	1	7	7	6	10	2	13
Radioisotope use in Animals	3	5	2	5	6	5	7	4	4
Sealed Sources	1	1	1	1	1	6	1	1	2
AU Reactivation	0	0	0	0	0	1	0	1	0
Possession Limit Increase	1	0	0	0	1	0	1	0	0
AU Protocol Update	12	0	0	0	0	0	3	0	0
TOTAL APPROVALS	25	20	9	20	29	29	30	11	27

Major topics acted upon or discussed by the RSC:

- Radiation waste bid proposal submitted
- NRC proposal reviewed concerning radioactive materials security
- NRC inspected University Hospitals Radiation program
- Laser safety program policy states training should be conducted every two years
- Robin Elliott resigned from the Executive Director position due to family concerns 7/2010
- Radiation Quarterly and Annual Audits completed
- A 5-year process for review of AU protocols was approved and included in Radiation Safety Committee Guidelines
- RSC members whose terms were about to expire were approached agreed to renew their terms
- Quarterly audit packages sent to committee members
- Annual Report reviewed 10/2010
- New UH Pet Scanner installed in SAIRC 10/2010
- Reappointment letters sent to the President for signature and approval 11/2010
- Monthly Laser Safety Summary were instituted
- Annual Report sent to President Barbara Snyder 1/2011
- Reappointment letters were mailed to RSC members 1/2011
- New Environmental Health & Safety (EHS) Executive Director, Dr. Charles Chuck Hart was welcomed on 1/2011
- A Tabletop Emergency Response Exercise for the Senior Administration went well 1/2011
- Contact was established with the new VA Hospital Radiation Safety Officer, Ronald Leuenberger 1/2011

- Cost savings of \$13K for RAM waste disposal was achieved with implementation of management procedures 3/2011
- The Landauer Bid was completed 5/2011
- A Radiation Specialist resigned to return to Research the Medical School as a Research Assistant 5/2011.
- A new Radiation Specialist will be hired.
- Planning for Budget adjustments for 2012 fiscal year was completed
- Minor, Moderate, & Majors violations were reviewed and discussed 5/2011
- A Level 3 violation was issued with regard to an Authorized User for External Transfers and a RSC suspension was implemented for the AU 6/2011
- Annual audits completed 6/2011

SENIOR MANAGEMENT

The Radiation Safety Program monitors, inspects, and audits radiation materials, radiation generating equipment and source use by AUs and their personnel. Senior management oversight and support of radiation safety-related activities is ensured by attendance of the Vice President for Campus Services at all RSC meetings. The RSC conducts independent audits of the Radiation Safety Program. Radiation Safety Office (RSOF) staff immediately responds to audit findings. Audit findings and responses are reported to senior management and the Committee.

Richard Jamieson (Vice President of Campus Services) continues to provide direct administrative representation for Radiation Safety Programs, along with Dr. Charles Hart, Executive Director of Environmental Health & Safety.

RSOF AND AUTHORIZED USERS (AUs)

The AU and RSOF share responsibility for safety. The AU is directly responsible for safe use of radioactive materials in the laboratory. The Radiation Safety Office is responsible for ensuring that appropriate safety procedures are implemented and that AUs are fulfilling their responsibilities for monitoring safety during experiments carried out in their laboratories. Audits of laboratories are conducted by the RSOF to ensure compliance with Case Western Reserve University's license. The audit program includes routine unannounced inspections of each AU's laboratory.

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 move of radiation laboratories
- Unapproved disposal of radioactive materials
- Unidentified contamination
- Failure to respond to written notices from the Radiation Safety Office

Major Severity violations include the following:

- Falsification of records
- Unreported loss or theft of radioactive materials
- Unapproved transfer of radioactive materials

There were two major severity violations assessed for unapproved transfer of radioactive materials. One AU committed both major violations. Both violations involved ordering short-lived radioactive material that exceeded the AU's ordering limits without prior approval by the RSC and RSOF. The second violation by the AU occurred because the AU failed to inform an associate of the ordering suspension that was imposed following the first violation. Although no hazard was created by the violations, the RSO, RSOF, and the RSC all agreed that the combination of these two violations could not be programmatically tolerated. This AU's license was suspended by the RSC for a period of no less than six months and the AU is required to reapply following this period if the AU wants to continue association with the Radiation Safety Program.

Of the 37 moderate violations listed below, 30 were the result of unsecured RAM found during after-hours security checks and routine compliance reviews. Seven (7) were assessed to laboratories that had three or more minor violations during one compliance review by Radiation Safety during routine audits. Documented follow up and resolutions were completed for all major & moderate violations.

VIOLATIONS	10/11	09/10	08/09	07/08	06/07
Minor	64	53	103	83	57
Moderate	37	76	27	43	11
Major	2	0	0	0	1
Total	103	129	130	106	69

The Assistant RSO, the RSOF staff, and RSO have updated and revised most of the Departments manuals, training, licenses, certificates, and standard operating procedures in 2010-2011.

AU CATEGORIES:

RADIATION ACTIVE (RA)

AUs who actively use RAM are "Radiation Active". Laboratories of these AUs are inspected by 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.

AUs	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04
RA	87	87	91	92	112	124	116	123
RI	4	13	1	14	8	12	2	7
SM	16	3	4	5	6	4	9	8
D	2	3	6	8	12	11	12	12
Total in Program	103	90	95	97	118	128	125	131

MASTER ISOTOPE LIST

The master isotope (see APPENDIX) list shows the University's isotope inventory, the sum of the AUs' inventory (excluding sealed sources), and the sum of the AU Possession Limits, relative to NRC/ODH Registration Limit.

AU RADIOISOTOPE INVENTORY

The Radioisotope Inventory Report (see APPENDIX) lists researchers along with the amount of radioactive material each is authorized to use, each AU's possession limits, and the activity of isotopes on hand.

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)	Department Administrator (0.5)
Department Assistant (1)	2 nd Shift Specialist (1)
Student (1)	Analyst Programmer (1)
Executive Director (0.5)	

The new Executive Director position was filled by Dr. Charles (Chuck) Hart in December 2010. Sylvia Kertesy, Radiation Safety Specialist, resigned in May 2011 to return to laboratory research. The position was posted to be refilled. Charles Greathouse was upgraded to Analyst Programmer II for the Department. We no longer have the 2nd shift Specialist position.

Training and education are central to our Department's aim to develop diverse skills among our 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 2010-2011 included Radiation Safety Academy Online Refresher Training, FEMA Online NIMS Training, OSHA 30 Hour Online Training, Hazardous Materials Transportation Security Awareness Course, RCRA Hazardous Materials Manager 8-hour Refresher training, HAZWOPER 8-hour, DOT Safe Ground Transportation of Hazardous Materials, and the State of Ohio Licensed Lead Inspector and Risk Assessor Training.

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 up all departmental databases.

LIAISON PROGRAM

The Liaison Program requires RSOF personnel to visit University laboratories on a routine basis to offer safety advice and to answer safety questions. This program has helped to foster a service oriented relationship between the RSOF Staff and the research community and has improved follow up on inquiries and safety concerns. Staff members are assigned to various buildings and are responsible for maintaining contact with designated laboratories.

EMAIL HOT-LINE

Since implementing the 'hotline', the number of inquiries and safety concerns raised by Case Western Reserve University personnel has averaged fifteen (15) emails per day. This communication has led to swift response and follow-up of safety concerns reported by our user community.

To report concerns of unethical activity, employees may contact the Integrity Hotline and provide information anonymously. They may call 866-483-9367 or go to <https://www.caseintegrityhotline.com>. They are encouraged to give the date, time, location, and any other pertinent information concerning the incident.

TRAINING SESSIONS

It is the responsibility of the RSC to ensure that individuals using RAM are adequately trained to keep doses to personnel and releases to the environment "As Low As Reasonably Achievable" (ALARA). The RSC provides training for all personnel that use RAM or Radiation Generating Equipment (RGE)/X-Ray. Initial training must be completed before use of any radioactive materials or RGE/X-Ray equipment. Annual retraining is required for the continued use of RAM. Ancillary workers (non-radiation workers) who occasionally have contact with RAM are retrained annually. Personnel that are trained include:

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 under the supervision 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 uses an Irradiator under the supervision of an Irradiator User.

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.

TYPE	NEW CLASSES	NEW USERS	ONLINE RETRAINING
Radiation Safety	26	186	311
X-Ray	21	86	0
Laser	16	38	42
RTK (Right to Know)	58	146	0
Custodial Contractor	2	56	0
Plant Maintenance	2	59	0
ARC (Animal Resource Center)	2	67	0
Shipping	1	13	0
Protective Services	2	69	0
Custodial	3	57	0
Irradiator (site specific)	11	47	0

New isotope user training classes are offered at least three 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 which is offered on-line.

All non-laboratory personnel are required to attend Hazard Communication training, which now incorporates radiation safety training. ARC, Security, Shipping/ Receiving, and Custodial departments use a safety orientation DVD, allowing supervisors to train staff at shift changes, thereby greatly increasing training compliance. Employees who do not complete training are restricted from working in areas where radioactive materials are used.

TRAINING	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Radiation	186	279	223	240	297	284	284	283	322
Retraining	0	0	0	0	0	0	0	0	11
Online Retraining	311	215	418	430	695	724	775	793	754
X-Ray	86	52	97	96	64	51	74	45	84
Ancillary	146	345	403	382	402	413	356	448	540
Laser	38	48	66	41	56	31	116	0	0
Laser Online	42	35	28	15	10	11	0	0	0
Irradiator	47	52	56	10	14	50	0	0	0

FACILITIES AND EQUIPMENT

Case Western Reserve University administration and the RSC ensure that appropriate facilities, equipment, and trained personnel are available for the safe operation, storage, and disposal of licensed material. The RSO and Assistant RSO are responsible for overseeing the review of applications and inspection of all facilities, equipment, and personnel that use licensed material. Facilities that are available at Case Western Reserve University for the use of licensed material include:

AW Smith	Bingham	Biomedical Research
Bishop	Bolwell	DeGrace
Dental	Glennan	HG Wood
Lerner Tower	Kent Hale Smith	Med East/Robbins
Millis	Olin	Pathology
RBC	Rockefeller	Service
Wearn	West Quad (CCSB)	White
Wickenden	Wolstein Research	Wood Research Tower

LABORATORIES

There are approximately 300 laboratories on campus equipped to use licensed material and equipment. The laboratories typically include chemical safety hoods, survey meters, protective clothing, analytical detection and measurement equipment, waste receptacles, and decontamination supplies.

LABORATORY USE	# OF ROOMS
Radiation	196
X-Ray	36
Laser	68

Radiation Safety Office (RSOF)

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

Up-to-date hardware is crucial to ensure efficient and quick access to records in the RSOF. A Smart Board System augments the in-house training program, and allows our trainers to directly demonstrate the use of on-line database and training materials. It also provides direct access to library services and campus maps during staff meetings, and emergency incident exercises or responses.

The University no longer offers the Legato backup service. All EHS personal computers (PCs) are being backed up onto a terabyte array. The Carbonite backup service is currently used for two EHS Servers (EHS, onsite-server). The web server (Aurora) itself is backed up, and additionally the files are copied locally on magnetic storage and periodically backed up onto optical storage discs.

The following maintenance was accomplished this fiscal year:

Hardware Maintenance

- Repaired about 25 workstation hardware problems
- Purchased and set up 3 new computers (2 workstations, 1 netbook)
- Set up 5 existing computers for new users
- Repaired failed server
- Repaired approximately 15 other hardware issues (workstations, phones, printers)
- Fixed approximately 30 IT issues in the office

Software Maintenance

- Repaired about 200 workstation software problems
- Major data validation program, correcting about 3000 entries in the database
- Set up Laser Safety program in OnSite
- Began medical surveillance module in OnSite
- Website updates
- Corrected approximately 2000 entries for Lab Safety training
- Prototyped new training system in JavaScript/Articulate
- Fixed approximately 170 IT issues in the office
- Published first newsletter

The Department of Environmental Health & Safety has transitioned to the use of Employee ID number in lieu of Social Security Numbers in its training program since 2008.

RSOF Laboratory:

The RSOF is located in the Service Building on the 1st 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 analyzer and a detector for monitoring thyroid uptake of ¹²⁵I. The Department also has a multi-channel analyzer with a sodium iodide detector. These instruments are used for bioassays and

the quantification of air samples for EPA audits, as well as for identification of unknown isotopes found during radiation inspections. The RSOF laboratory also houses a chemical hood, survey meters, decontamination supplies, and essential analytical and calibration equipment.

Radioactive Waste Facilities:

Medical School Waste Facility (DOA990):

This facility has a separate office, and a process/storage room for radioactive material and disposal activities. This facility is maintained at negative pressure and has a filtered air exhaust system. It also has a waste compactor, waste shredder, chemical and walk-in hood, survey meters, liquid scintillation counter, air monitoring equipment, and emergency response equipment.

The storage area contains racks for the proper storage of solid and liquid waste. Waste streams consist of dry solid, bulk liquid, and liquid scintillation vials. Dry solid waste and the liquid scintillation vials are packed in standard 55-gallon drums. Liquid waste is stored in 5-gallon carboys and placed in spill trays to contain leakage. Radioactive animal carcasses are kept in a designated freezer in the ARC until they are disposed.

Wolstein Building Waste Facility:

This facility has a counting room (Rm. 1120) that contains a chemical hood, a liquid process/storage area (Rm. 1119) that contains a walk-in chemical hood, and solid process/storage area (Rm. 1118) for disposal activities. The liquid process/storage area and solid process/storage area are used for short-term storage only. All waste is transferred to the DOA990 facility for decay in storage and disposal. This area maintains negative pressure relative to surrounding building spaces.

One room (1120) in this Facility has been developed as a combined Chemical and Radioactive Materials Emergency Response Center. It contains spill supplies, a liquid scintillation counter, survey meters for both count and dose rates, and a computer that provides access to our Helix web database and MSDS in the event of radioactive/ chemical spills.

IODINATION EQUIPMENT

Special hoods, air pumps and activated charcoal-filter exhaust are placed in laboratories that conduct iodinations. Currently no laboratories are performing iodinations. All five iodination hoods are in storage. Their locations are as follows:

WRB 1119 - Radiation Waste Facility Storage (1)
DOA 990 – Storage (4)

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 instruments are sent to an appropriate vendor by the AU's laboratory. Instruments requiring 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) in DOA 990 is currently out of service. 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 to the AU's existing inventory, cannot exceed the AU's approved possession limit for that 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 clearance before delivery to the AUs' laboratories.

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 119 isotope transfers approved this year, for a total of 802 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. 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 complete the Bill of Lading since the package is carried to the laboratory and not transported in a vehicle. The AU or designee is required to survey all radioactive material packages upon receipt for contamination and evidence of damage or breakage.

Radioisotope use, for biomedical research, results in frequent movement of radioactive materials to and from the campus. The Broadscope License requires that shipments be surveyed within three hours of arrival. In the past year, 358 isotope shipments (totaling 662 mCi) were inspected and approved by the RSOF after receipt on the campus. A few shipments/transfers off campus were made by laboratories. The RSOF assisted these laboratories by making sure that paperwork was properly prepared and proper labeling was used. There were a total of three shipments off campus.

DISPOSAL OF RADIOACTIVE MATERIALS

Exclusive of decay of isotope in laboratories and minor inventory changes, isotopes were removed from laboratories by either 275 isotope waste pickups by RSOF staff (162 mCi) or by 59 AU-directed disposals into the sanitary sewers (11 mCi). The following table presents a breakdown by isotope of radioactive materials entering and leaving laboratories.

ISOTOPE	ORDERS		WASTE PICKUPS		SEWER DISPOSALS		TRANSFERS	
	#	mCi	#	mCi	#	mCi	#	mCi
¹¹ C	0	0	0	0	0	0	7	7.400
¹⁴ C	9	2.700	43	3.550	9	1.045	5	1.030
⁴⁵ Ca	0	0	2	0.024	0	0	0	0
³⁶ Cl	1	0.05	2	0.020	0	0	2	0.460
⁵⁷ Co	0	0	0	0	0	0	0	0
⁵¹ Cr	2	2.0	3	1.098	0	0	0	0
¹³⁷ Cs	0	0	1	0.114	0	0	0	0
¹⁸ F	0	0	0	0	0	0	67	684.728
⁵⁵ Fe	0	0	0	0	2	0.110	0	0
⁵⁹ Fe	3	3.0	8	2.047	3	0.501	0	0
³ H	34	29.802	90	15.657	20	4.659	12	24.107
¹²⁴ I	3	1.400	0	0	0	0	0	0
¹²⁵ I	3	0.02	8	0.065	2	0.022	2	0.156
¹¹¹ In	0	0	0	0	0	0	1	0.020
⁵⁴ Mn	0	0	0	0	0	0	0	0
⁶³ Ni	0	0	3	1.098	0	0	0	0
³² P	278	581.050	102	115.039	21	3.359	16	24.070
³³ P	11	3.500	1	0.003	0	0	0	0
⁸⁶ Rb	1	1.00	0	0	0	0	0	0
³⁵ S	13	37.500	12	22.940	2	1.030	0	0
^{99m} Tc	0	0	0	0	0	0	7	60.250
Total	358	662.022	275	161.655	59	10.726	119	802.221

RADIATION MATERIALS	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Orders	358	311	428	832	776	933	1036	1310	1594
mCi	662	655	714	1692	1212	1332	1428	1470	1570
Pickups	275	417	556	548	506	634	725	796	1064
mCi	162	187	218	355	383	304	503	327	61
Sewer Disposals	59	89	76	90	98	119	98	148	160
mCi	11	24	5	14	14	12	12	17	18
Transfers	119	84	98	33	240	124	66	31	0
mCi	802	426	324	40	1234	273	149	21	0

SEALED SOURCES

Case Western Reserve University's sealed source inventory contains 147 sealed sources. Of these, 138 sealed sources are required to be inventoried every six months. One (1) of the 147 sealed sources is a low-dose irradiator. Nine (9) sealed sources require six-month leak tests, as stated in our ODH license. Four (4) sources are high-level dose irradiators, and one (1) is used to irradiate material with neutrons. These 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 general summary reports for radioactive materials. This fiscal year, sixty-four (64) sealed sources were disposed and one (1) new source was received.

INVENTORY	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Sealed Sources	147	213	211	213	207	168	204	204	171
Exempt	138	203	201	190	188	154	183	186	158
Irradiator	4	4	5	4	4	4	3	3	3
Neutron	1	1	1	1	1	1	1	1	1

RADIATION SURVEY METER CALIBRATIONS

Case Western Reserve University's ODH Broadscope license requires annual calibration of 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 \$11,300 in cost saving over the fiscal year in lieu of using outside vendors.

CALIBRATION/ SERVICE	COST PER SERVICE	COST SAVINGS
121 meters	\$80/meter	\$9,680
0 pumps	\$70/pump	\$0
24 thyroid assays	\$55/assay	\$1,320
16 pre-filter changes	\$75/ set of 4/quarterly	\$300
	TOTAL COST SAVINGS	\$11,300

There are 140 survey meters on campus. The RSOF calibrated 121 of these meters in the last fiscal year. There were 15 meters removed from service. In service meter calibrations totaled 125. Certificates of calibration are kept in the RSOF for all meters in service at the University. Records for all meters include instrument efficiencies for isotopes used in laboratories.

The DOA pre-filters are changed every 90 days. One fan unit (#2) for the walk-in hood has been out of service for an extended period of time because a part was difficult to obtain. Currently, there are four filters that must be periodically changed for two units:

- Two single filter units for the chemical hood and decay area (located above the DOA office)
- One double filter unit for the walk-in hood (located in DOA Radiation Area)

No operational pumps for radioactive materials were calibrated for use in the iodination hoods.

CALIBRATION/ SERVICE	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Meter Calibration	121	142	172	170	157	188	233	245	250

METERS IN USE	TOTAL
Hi-Q	1
Inovision	1
Ludlum	89
RPI Mini Monitor	14
Technical	1
Victoreen	10
WB Johnson	13

METER CALIBRATION BY MONTH	TOTAL
7.2010	4
8.2010	7
9.2010	5
10.2010	5
11.2010	19
12.2010	8
1.2011	10
2.2011	14
3.2011	10
4.2011	12
5.2011	9
6.2011	18

RAM SECURITY

Radioactive materials and potentially hazardous chemicals must be secured against unauthorized access or removal when unattended. All refrigerators, freezers, or other storage units with RAM labels that are located in unsecured areas must either have a security lock to limit access to the refrigerator or freezer or must contain a secured and labeled lock box within the storage unit. Access to isotope inventory must also be controlled when no authorized individual is in the area and constant surveillance cannot be maintained. Security checks by the RSOF are conducted on a monthly basis after normal working hours to ensure that radioactive materials are properly secured. All buildings undergo radiation security inspections each month. Only minor violations of required security procedures were found. Involved AUs were notified, corrective actions recommended, and monitored at the next inspection.

RAM SECURITY CHECKS	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04
Violations	24	71	19	37	54	74	89	104

PERSONNEL MONITORING

Personal radiation dosimeters are issued through the RSOF to radiation workers and personnel who have the potential to receive a measurable radiation dose while working at the University. All laboratory workers, visitors to the laboratory, maintenance workers and contractors working in a laboratory are candidates for inclusion in the Dosimetry program. Other personnel may request dosimeters, which are provided by the RSOF. Radiation workers who are issued dosimeters must complete the New Radiation Worker Training Class and fill out an Occupational Exposure History Form. Dosimeters are to be returned promptly at the end of each cycle of use so that the RSOF can take timely action, consistent with implementation of ALARA, in the event any significant exposure to radiation is detected by the dosimeter.

During this year, the contract for dosimetry was in the process of being renewed with Landauer, Inc. which provides Radiation Monitoring Services. The dates of the contract are for 7/1/2011 to 6/31/2013 with two 1-year renewal options.

PREGNANT WORKER PROGRAM

Any radiation worker who is, or thinks she may be pregnant is advised to complete a Declaration of Pregnancy Form found on the EHS website [https:// case.edu/ehs/](https://case.edu/ehs/) under the 'Radiation Safety' link and send it to the RSOF. Counseling is provided and an additional dosimeter is issued to the worker that is read every month. This additional fetal dosimeter is worn to conservatively measure any dose to the developing baby. Two women 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 four 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 fluoroscopes. The four 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 to detect activities that might be dangerous to individual workers.

PERSONNEL MONITORING	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Pregnant Workers	2	1	1	2	2	6	6	13	15
Neutron	4	4	4	4	0	0	0	0	0
RGE/ X-Ray	28	45	103	70	38	60	201	160	180
Dental	34	28	28	28	28	28	28	28	28
General	448	518	698	665	705	905	1005	970	1030

Case Western Reserve University uses Luxel badges, which are considered to be state-of-the-art detection technology for personnel dosimetry. Luxel badges can measure minimum detectable limits of 1.0 mRem. ODH regulations require that all monitored workers be advised annually of their occupational dose exposure. All workers were sent a copy of their prior calendar year's dose report in 2011.

RADIATION GENERATING EQUIPMENT

Machines that produce ionizing radiation (RGE) require safety labeling using appropriate warning indicator systems augmented by testing for radiation leakage during operation. Analytical research units include electron microscopes, X-Ray diffraction and particle accelerators. There are also X-Ray units in use for health care & diagnostic research. Radiation-generating equipment is inventoried quarterly and surveyed annually for leakage.

Investigators in charge of RGE, not the RSOF, are required to provide site-specific training programs for workers using this equipment. The EHS provides general safety classes for individuals using RGE.

RADIATION-GENERATING UNITS (In Use)	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Health Care & Diagnostic Research	35	35	35	37	36	42	32	32	32
Analytical Research	38	38	38	36	39	40	48	51	51
Tubes Only	12	12	12	12	11	17	19	18	19
TOTAL	85	85	85	85	86	99	99	101	102

RADIATION-GENERATING UNITS (Not In Use)	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Analytical units In storage	15	15	15	18	19	23	21	23	23
Analytical units Disabled	4	4	4	1	2	3	7	5	7
Analytical units Out of Service	9	9	9	9	9	11	9	7	7
Diagnostic units Disposed	3	3	3	4	4	7	3	2	1
Diagnostic units Purchased	3	3	3	3	4	11	2	1	1

The ODH has changed the Radiation Generating Units classification. The table below reflects that change.

RADIATION GENERATING EQUIPMENT (IN USE)	10/11	09/10
Closed Beam Analytical	6	6
Computer Tomography	1	1
Electron Microscope/ Photoelectron Spectrometer	11	11
Enclosed System	4	4
Fluoroscopy	3	3
Hand-held Dental	1	1
Intraoral	27	27
Open Beam Analytical	1	1
Panoral	1	1
Particle Accelerator	1	1
RADIATION GENERATING EQUIPMENT (IN-OPERABLE)		
Closed Beam Analytical	3	3
Electron Microscope/ Photoelectron Spectrometer	2	2
Tube Only	26	26
TOTAL TUBES	87	87

RADIOACTIVE MATERIAL RELEASES

SEWER EXPOSURE CONTROL & MONITORING

State and Federal regulations permit Case Western Reserve University to dispose of low levels of radioactive materials into the sanitary sewers. The Northeast Ohio Regional Sewer District (NEORS) requires semiannual reports on radioactive material discharged to the sanitary sewer system. Case Western Reserve University's sewer releases were in compliance with both Federal and State regulations. The report for July through December 2010 was filed by January 31, 2011 and the report for January through June 2011 was filed by July 28, 2011. AUs in Storage Mode or using only sealed sources were exempt from completing this form. One hundred percent compliance with sewer disposal regulations was achieved for both reporting periods.

AIR EXPOSURE CONTROL & MONITORING

During the 2010 calendar year, radioactive material releases to the air were less than 10% of the maximum levels set by the EPA. Therefore, Case Western Reserve University had no reports to file, and the University was in compliance with the air effluent releases stipulated by the EPA Clean Air Act, the NRC, and the ODH.

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 radioiodine. There were no 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 2010-2011, there were no active iodination laboratories. The RSOF 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 more than 1.0 mCi of volatile radioactive iodine. The following must be completed prior to the procedure.

- Performance of a baseline bioassay for anyone involved in the procedure that does not have a baseline radioactive iodine bioassay on file.
- Arrangements for monitoring of effluent releases to the atmosphere during the first iodination procedure using a new protocol to measure and mitigate any release to the environment.

After an iodination procedure, individuals involved in the procedure must contact the RSOF and arrange for a bioassay to be completed by the end of the next business day. Bioassays were completed for the RSOF staff involved in radioactive waste handling. There were no iodination procedures performed this fiscal year. No workers exceeded 10% of the ODH limits. This chart highlights the sustained decrease in iodination procedures in University laboratories.

IODINATION PROCEDURES	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Total	0	0	0	0	6	6	7	11	20

¹²⁵ I BIOASSAYS	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
RSOF Staff	24	24	44	44	32	64	67	64	40
Additional	0	0	0	0	0	7	10	13	20
Total	24	24	44	44	32	71	77	77	60

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 incidents and eighteen (18) minor incidents documented over the past year.

INCIDENTS	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Major	0	0	0	1	2	0	1	1	5
Minor	18	17	20	6	7	0	4	8	5
TOTAL	18	17	20	7	9	0	5	9	10

DATE	INCIDENT	CONTAMINATION	ROOT CAUSE	FOLLOW UP
6/28/2011	Minor Incident	3H/14C Unauthorized move and transfer of isotopes.	The AU moved laboratory without contacting RSOF. AU also temporarily move RAM inventory to another AU's freezer with contacting RSOF.	Both AUs were contacted and reminded of relocation and decommissioning procedures. Approval was received via an email from the AU that was storing the RAM material. RSOF performed a decommissioning survey of the room and equipment of the AU that was relocating. No contamination was found.
6/6/2011	Minor Incident	3H inventory not properly accounted for in sewer	3H inventory unaccounted for due to poor sewer records in the laboratory.	AU submitted a letter to RSOF stating the inventory discrepancy. The involved quantity did not require ODH or NRC reporting.
6/1/2011	Minor Incident	3H unapproved package	3H package delivery to wrong location	Same supplier shipped to laboratory instead of Shipping/Receiving. This time RSOF responded directly to the company. Unopened package brought to Shipping/Receiving area by laboratory staff for proper check in by Radiation Safety. The company was contacted directly and given the correct address.
5/26/2011	Minor Incident	3H unapproved package	3H package delivery to wrong location	Supplier shipped to laboratory instead of Shipping/Receiving. Unopened package was brought to Shipping/Receiving area by laboratory staff for proper check in by Radiation Safety. Laboratory responded in a compliant manner.

5/26/2011	Minor Incident	32P accidental sewer disposal into non-RAM sink	Laboratory member mistakenly deposited RAM into non-RAM sink.	RSOF cleaned sink and no removable contamination was left. The sink was labeled for fixed 32P contamination and left for decay
5/2/2011	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm.	AU and worker were contacted concerning the alarm.
4/21/2011	Minor Incident	14C animal waste	14C animal waste was improperly placed in the ARC biohazard storage freezer.	RSOF moved the waste to the RAM animal freezer. Biohazard freezer was surveyed and no contamination was found.
3/28/2011	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm.	AU and worker were contacted concerning the alarm.
3/22/2011	Minor Incident	124I unapproved package	124I package delivery to wrong location	Same supplier shipped to laboratory instead of Shipping/Receiving. This time RSOF responded directly to the company. Unopened package brought to Shipping/Receiving area by laboratory staff for proper check in by Radiation Safety. The company was contacted directly and given the correct address.
2/15/2011	Minor Incident	124I approved package	124I package delivery to wrong location	Supplier shipped to laboratory instead of Shipping/Receiving. Unopened package was brought to Shipping/Receiving area by laboratory staff for proper check in by Radiation Safety. Laboratory responded in a compliant manner.
10/22/2010	Minor Incident	RAM Freezer Alarm	Failing RAM freezer with 45Ca	AU and worker were contacted concerning the alarm.
10/5/2010	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm.	AU and worker were contacted concerning the alarm.
9/22/2010	Minor Incident	Irradiator Unauthorized Entry	Security entered Irradiator room without escort.	Security was contacted and reminded about RSOF notice and escort before room entry.
9/17/2010	Minor Incident	14C/35S contamination	14C/35S filter contamination found in DOA 990 Radiation Waste Facility compactor.	Contaminated filter was disposed.
8/25/2010	Minor Incident	32P contamination	During a survey to decommission an area, several contaminated items were found.	The contaminated items were moved to another RAM location for decay and the room was decommissioned.
8/24/2010	Minor Incident	3H samples found in old freezer	Old 3H samples were found in an old -80 freezer during a cleanout.	3H samples were picked up; activity was determined, and properly disposed.
8/9/2010	Minor Incident	Irradiator Unauthorized Entry	Security entered Irradiator room without	Security was contacted and reminded about

			escort.	RSOF notice and escort before room entry.
7/10/2010	Minor Incident	Irradiator Intrusion Alarm	Power lost for 2 hours and Irradiators needed to be checked.	Irradiators were secure and the power was on.

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:

- Radioactive Material Ordering
- Radioactive Waste Segregation
- Radon Gas: How to Minimize Your Risks
- Radiation Exposure: How Much Is Too Much?
- Inactive AU Status, Absence from Laboratory
- Meet our new Executive Director!
- X-Rays and Infants; Fukushima's Wake

LASER SAFETY PROGRAM

The Laser Safety Program and related training has progressed well since its inception in September 2004. A standard operating procedure has been incorporated into the Physical Safety Manual that is provided to all laser users.

There are a total of 99 lasers on the campus for 34 Laser PIs in 12 buildings. There are currently 166 active users of lasers. The lasers of greatest concern are those labeled Class 3B and Class 4. There are 47 Class 4 lasers, 25 Class 3B lasers, and 14 lasers in the other classes of 1, 2, and 3A. There are 13 class 3B/4 enclosed laser systems that are considered eye-safe under normal use thus decreasing the hazard to the user. Nineteen (19) audits were performed during this fiscal year. Some lasers are in storage. However, a new confocal microscope system was received and inventoried this year.

The New User Laser Safety PowerPoint presentation has been implemented. Online Laser retrain is being updated and will be incorporated into the HP Assist database. The Laser user list and inventory was transferred to the new database. Users and inventory are updated as audits are performed. A Laser Safety Awareness training will be considered for users of enclosed laser systems (confocal microscopes, IR spectrometers, flow cytometers, etc.) and those that may be exposed to class 1, 2, & 3R lasers.

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

The RSOF requires at least three weeks' notice to decommission laboratories. An orchestrated effort between the RSOF, the Safety Services division of EHS, Facilities Services, and the AU facilitates these operations. There were 28 clearances required for 56 pieces of equipment. A total of 12 relocations and 2 terminations were completed over the past year.

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.

³²P 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 in the laboratory by minimizing the use of extraneous paper products. Short-lived non-sewer (Hazardous waste) is held for decay, resurveyed after ten half-lives, and disposed by Chemical Analytics, a commercial hazardous waste disposal company. ³⁵S and ¹²⁵I are no longer held for decay, but are shipped along with the long-lived solid waste. Long-lived solid waste (greater than 60 day half-life) and scintillation vials are disposed by ADCO Services, a commercial radioactive waste hauler.

Non-hazardous aqueous waste is no longer held for decay. This waste is picked up from laboratories by the RSOF staff and immediate sewer disposal is carried out in the Radioactive Waste Facility since the isotope activities are significantly below our established regulatory limits as per OAC 3701:1-38-12 Appendix C. A sewer disposal log is kept in the EHS offices. Total sewer disposals are reported semi-annually to the Northeast Ohio Regional Sewer District.

COLLECTION & DISPOSAL OF ANIMAL REMAINS AND BIOHAZARDOUS WASTE

The RSOF maintains two -20°C freezer for storage of radioactive animal remains and waste. One is located at the Animal Resource Center (ARC) and the other in Wolstein 1118. Radioactive wastes are bagged and labeled in yellow bags in the same manner as dry solid waste. All waste placed in the freezer must be logged on the animal disposal sheet on the cold room door. A log sheet of animals disposed in this manner is also kept for inventory purposes by the laboratories generating the waste.

Any item that has come in contact with an etiologic agent is considered biohazardous. Etiologic agents include bacteria, viruses, and parasites and must be disinfected or decayed to background before disposal. Infected animal waste is placed in the ARC (BRB B05A) for disposal by the RSOF. Radioactive animal waste includes cage bedding, carcasses, viscera, excrement, serum, blood or other animal tissue containing radioactive materials. All waste is tagged. Additional information regarding etiological agents is placed on the tag. All animal waste is disposed by the RSOF.

WASTE GENERATED IN JULY 1, 2010 - JUNE 30, 2011

	GENERATED 7/1/2010- 6/30/2011	DISPOSED: HAZ. WASTE SVCS.	DISPOSED: SEWER	DISPOSED: CHEMICAL SAFETY	DISPOSED: ADCO	IN STORAGE AS OF 6/30/2011
Short-Lived Dry	25	24 *	0	0	0	31
Long-Lived Dry	11	0	0	0	6	5
Scintillation Vials	7	0	0	0	7	0
Animals	0.25	0	0	0	0	0.25
Long-Lived Sewer	11.5	0	11.5	0	0	0
Long-Lived Non-Sewer	91	0	0	0	36	60
Short-Lived Sewer	21.5	0	21.5	0	0	0
Short-Lived Non-Sewer	3	0	0	0	0	3

All values in the dry waste, vial, and animal categories denote the number of 55-gallon drums. All values for the liquid waste categories are in gallons. The single asterisk (*) denotes the number of drums generated prior to July 1, 2010, kept for decay in storage, and disposed during the period of July 1, 2010–June 30, 2011. During this fiscal year, all long-lived hazardous aqueous waste was disposed.

ADCO animal waste cost = \$24.5/lb. for 10 pound barrel = \$245 per 10 pound barrel
ADCO dry waste cost = \$605 per 55-gallon drum

The cost of disposal for one drum of biomedical waste at Hazardous Waste Services (Stericycle) is \$42 per drum. There were 24 drums of dry waste and a quarter of a 32-gallon drum of animal waste surveyed and disposed during 2010-2011 fiscal year at a cost of \$1019. Without the decay in storage program, it would cost \$605 to send one 55-gallon drum of decay in storage (DIS) dry waste and it would cost \$245 per 10 lb. drum of animal waste through ADCO services. Therefore, in the absence of decay in storage, the cost to dispose of the waste

drums through ADCO would have been \$14,581.25. Thus, the indirect savings to researchers due to the decay in storage program was \$13,562.25.

WASTE GENERATION	10/11	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Short-Lived Dry	25	87	95	91	85	72	66	63	66
Long-Lived Dry	11	25	50	35	20	25	28	31	26
Scintillation Vials	7	12	30	25	30	47	44	45	39
Animals	0.25	0	1	2	4	3	2	1	3
Long-Lived Sewer	11.5	60	50	38	35	46	55	60	50
Long-Lived Non-Sewer	91	120	80	20	5	15	5	0	0
Short-Lived Sewer	21.5	65	50	140	135	125	115	80	76
Short-Lived Non-Sewer	3	10	20	25	30	20	35	75	85

During this year, the contract for radioactive waste disposal was renewed with ADCO Services, which provides disposal of all long-lived dry materials, scintillation vials, & animal wastes. The dates of the contract are for 11/1/2010 to 6/30/2013 with two 1-year renewal options.

RECYCLING PROGRAM

In the past fiscal year, the RSOF obtained laboratory equipment, in very good condition, from AU's who have either left the university or ceased to use RAM. The equipment includes radiation waste containers (lead and Lucite), shielding (lead and Lucite), and survey meters. This equipment is offered to AU's if and when their funds do not allow them to buy new radioactive materials handling equipment. This cost-saving recycling program resulted in re-use of equipment that saved AUs & EHS more than \$5,000 during 2010-2011 in lieu of waste disposal.

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 2010 and between April and June 2011. This effort resulted in the review of more than 170 files, in the program areas listed above.

RSC TRI-ANNUAL AUDITS FOR 2010-2011

RSC AUDIT COMMENT:

In October 2010 the Radiation Safety Committee Members, conducted a tri-annual audit of the following components of the Radiation Safety Office:

- Survey Meters
- EHS Webpage (Radiation Safety)
- Semi-Annual Mailing
- Bioassays
- Shipping Papers
- Active/Decommissioning Surveys

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

Ten (10) files were randomly audited. One deficiency (RSOF 68093) was noted.

RSOF RESPONSE

The survey meter in question is the RSOF Loaner meter and is currently on loan to one of the Authorized Users (Lou). The survey meter is listed in Helix under the Authorized User as a loaner meter.

EHS WEBPAGE (RADIATION SAFETY)

Ten (10) links on the Radiation Safety Office Web Page were reviewed for being up-to-date for training, forms, and information related to safety. No deficiencies were reported.

RSOF RESPONSE

No response required.

SEMI-ANNUAL MAILINGS

Fifteen (15) AU files were randomly audited for semi-annual mailings. Three deficiencies were reported in which no semi-annual mailings were provided.

RSOF RESPONSE

The noted Authorized Users were notified and the semi-annual mailings were submitted.

BIOASSAY

No deficiencies were reported.

RSOF RESPONSE

No response required.

SHIPPING PAPERS

Nine (9) files were examined for accuracy in shipping papers over the past quarter. Two (2) deficiencies were noted, specifically involving a lack of documentation in the Helix database.

RSOF RESPONSE

Both deficiencies (wrong building and date) were corrected in Helix database.

ACTIVE/DECOMMISSIONING SURVEY

Ten (10) files were randomly audited for active laboratories. No deficiencies were noted. In addition, ten (10) files were audited for decommissioned laboratories. No deficiencies were noted.

RSOF RESPONSE

No response required.

RSC AUDIT COMMENT:

In March 2011 the Radiation Safety Committee Members, conducted a tri-annual audit of the following components of the Radiation Safety Office:

- AU & Worker Training
- Compliance Review
- Correspondence between Isotope Orders, AU Possession Limits, & the Helix Database
- Dosimetry
- Incident Reports
- Irradiator Program Review
- Laser Program Review
- Licensing Status
- Radiation Generating Equipment Program Review
- Security Checks
- Sealed Sources
- Valid RAM Applications
- Waste Disposal Facilities (DOA990/Wolstein) & RSOF Laboratory

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.

AU & WORKER TRAINING

Three (3) files were examined to verify the training dates of AU and workers during the past three months. All AU workers were found to be overdue for training.

RSOF RESPONSE

This deficiency involved three out of twenty-eight workers in the three AU's laboratories. These AU's and their workers were contacted, training submitted, and Helix database updated.

COMPLIANCE REVIEW

Ten (10) files were examined to verify that AU laboratories were audited within the last three months and that any non-compliant issues were appropriately followed up. No deficiencies were reported.

RSOF RESPONSE

No response required.

CORRESPONDENCE BETWEEN ISOTOPE ORDERS, AU POSSESSION LIMITS, & THE HELIX DATABASE

Ten (10) files were randomly audited to verify that the amount of RAM ordered is within AU possession limits and that the orders are in the Helix database. The audit of these files indicates that all information is complete and no deficiencies were reported.

RSOF RESPONSE

No response required.

DOSIMETRY

Ten (10) files were randomly examined to verify that AU laboratories possessed current dose records for the past quarter. No deficiencies were reported.

RSOF RESPONSE

No response required.

INCIDENTS

A total of twelve (12) incidents were reported for the current quarter. No deficiencies were denoted.

RSOF RESPONSE:

No response required.

IRRADIATOR PROGRAM REVIEW

All four (4) irradiators were found to be compliant with respect to matching of the user log with the user list in addition to compliance with quarterly audits. Ten (10) files were randomly examined. No deficiencies were found in the training status of these individuals.

RSOF RESPONSE

No response required.

LASER PROGRAM REVIEW

Ten (10) files were audited for accuracy regarding laser inspections, inventory, and current training. Five (5) files were found to be deficient regarding lack of training.

RSOF RESPONSE

This deficiency involved five out of sixty-six workers in the five AU's laboratories. A follow-up was done for each deficient worker. Three workers have left the University, two were retrained and the database was updated.

LICENSING

An audit was conducted to verify the status of the radiation licensing status of the Radiation Safety Office. Components of this audit include the following: ODH Broadscope License, ODH RGE License, Review of ODH inspection, Radiation Safety Committee memberships, Radiation Safety Guidelines, and Radiation Safety space and equipment. No deficiencies were noted in any of these files.

RADIATION GENERATING EQUIPMENT PROGRAM REVIEW

Ten (10) files were examined for inventory status and last survey date of equipment over the last quarter. Four (4) files were found to be deficient with respect to overdue reviews.

RSOF RESPONSE

Information for the three files with deficient records had not yet been filed and but were in the process of being recorded by the EHS X-Ray Specialist. One AU file folder was incorrectly labeled. The AU has been inactive since 2007 and the unit has been inoperable since 2007. The file has been corrected.

SECURITY CHECKS

Ten (10) security checks over the past quarter were randomly audited. No deficiencies were noted in these files.

RSOF RESPONSE

No response required.

SEALED SOURCES

Of nine (9) files that were randomly audited, one file was found to have a deficiency. In particular, this deficiency indicated that Lerner B213 (SAIRC #946) did not have a lead test for the current quarter.

RSOF RESPONSE

The SAIRC was contacted and the source was leak tested. The leak test is filed and the database updated.

VALID RAM APPLICATION

Ten (10) files were randomly audited. Four (4) files were found to be deficient, particularly with respect to deficiencies in updates in personnel and one in which Form 6 is missing.

RSOF RESPONSE

A current Form 6 was placed in each RAM Application for each Authorized User. The workers were contacted, training submitted, and Helix database updated.

WASTE DISPOSAL FACILITIES (DOA990/WOLSTEIN) & RSOF LABORATORY

The Waste Disposal Facilities and Laboratories of the RSOF were inspected to ensure safe operation and adequacy of amenities as required by programs of the RSOF during the current quarter. All records of the Facilities Maintenance and General Housekeeping, Record Maintenance, and Waste Storage and Handling were audited and found to be compliant, adequate, orderly, and secure.

RSC AUDIT COMMENT:

The RSC conducted a third trimester audit during May 2011. Each audit consisted of randomly selecting five (5) to twenty (20) files in the past year to ensure items were up-to-date, accurate, and matched the database. The following components of the Radiation Safety Office were audited:

- Survey Meters
- EHS Webpage (Radiation Safety)
- Semi-Annual Mailing
- Bioassays
- Shipping Papers
- Active/Decommissioning Surveys

SURVEY METERS

Ten (10) AU files were randomly audited. One meter was noted as being overdue for calibration.

RSOF RESPONSE

The overdue meter was calibrated.

EHS WEBPAGE (RADIATION SAFETY)

Ten (10) links on the Radiation Safety Office Web Page were reviewed again for being up-to-date for training, forms, and information related to safety. No deficiencies were reported.

RSOF RESPONSE

No response required.

SEMI-ANNUAL MAILING

Ten (10) AU files were randomly audited for semi-annual mailings. No deficiencies were reported.

RSOF RESPONSE

No response required.

BIOASSAYS

No deficiencies were reported.

RSOF RESPONSE

No response required.

SHIPPING PAPERS

Three (3) files were examined for accuracy in shipping papers over the past quarter. One deficiency was noted. The deficiency involves no records of transfer in the Helix database.

RSOF RESPONSE

The February 2011 order was entered into the database and the AU was notified about the discrepancy.

ACTIVE/DECOMMISSIONING SURVEY

Ten (10) AU files were randomly audited for semi-annual mailings. No deficiencies were reported.

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 Helix 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 2011. 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 Helix 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
- Water Disposal Facilities (DOA990, Wolstein) & RSOF Laboratory

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

ANCILLARY STAFF TRAINING

RSC AUDIT COMMENT:

An annual audit was conducted to verify the training status on ancillary personnel encompassing the following segments of this program: Animal Resource Center, Shipping/Receiving, Custodial, Security, and Plant Services. Ancillary staff workers were surveyed from July 1, 2010 through June 30, 2011. Of fifty (50) files examined, no deficiencies were noted.

RSOF RESPONSE:

No response required.

AU AND WORKER TRAINING

RSC AUDIT COMMENT:

Fifty (50) files were examined to verify the training dates of AU and workers during the period of July 1, 2010 through June 30, 2011. Two (2) deficiencies were noted. One was lacking training information and the second involved a PI name not on file.

RSOF RESPONSE:

The workers were contacted, training submitted, and Helix database updated.

BIOASSAYS

RSC AUDIT COMMENT:

Audits were conducted to verify completion of bioassays for laboratories using >10 mCi of ^3H and/or 1 mCi ^{125}I during the period of July 1, 2010 through June 30, 2011. No ^{125}I shipments were received during this period. No ^3H shipments over 10 mCi were received.

RSOF RESPONSE

No response required.

COMPLIANCE REVIEW

RSC AUDIT COMMENT:

Fifty (50) files were examined to verify that AU laboratories were audited within the last six months and that any non-compliant issues were appropriately followed up. Examination of these files indicate that only three (3) files were compliant and that the other forty-seven (47) were outstanding for various deficiencies ranging from delinquent room surveys and survey meters to lack of retraining.

RSOF RESPONSE

Most compliance reviews have various minor deficiencies that are corrected during and after the review. These deficiencies include past due training, past due meter calibration, as well as other incomplete room surveys. Laboratories very rarely have repeat deficiencies. All noted deficiencies are usually corrected in a timely fashion and are noted at the next compliance review.

ISOTOPE ORDERS, AU POSSESSION LIMITS, AND THE HELIX DATABASE

RSC AUDIT COMMENT:

Fifty (50) files were examined to verify that the amount of RAM ordered is within AU possession limits and that the orders are in the Helix database. The audit of these files indicates that all information is complete and no deficiencies were reported.

RSOF RESPONSE:

No response required.

DOSIMETRY PROGRAM

RSC AUDIT COMMENT:

Fifty (50) files were randomly examined to verify that AU laboratories possessed current dose records for the past year (July 1, 2010 and June 30, 2011). Eleven (11) files were found to be deficient as no badges were found for these individuals.

RSOF RESPONSE

'Badge Not Required' is defined as a person that is not required to have a badge. That is why there was no dose history in the file.

INCIDENT REPORTS

RSC AUDIT COMMENT:

During the period of July 1, 2010 and June 30, 2011, monthly incident reports were reviewed for verification and documentation of follow-up by the RSOF. During this time, there were a total of seventeen (17) incidents that were reported. All incidents were effectively resolved in a timely manner.

RSOF RESPONSE

No response required.

IRRADIATOR INFORMATION REVIEW

Irradiator information files were examined to verify that the irradiators were audited by the RSOF within the last six months, and that non-compliance issues were appropriately followed up and pending issues resolved. Of the four (4) listed irradiators, only two (2) were active during the past year. Other files were up-to-date and compliant.

RSOF RESPONSE

One worker was removed from the Irradiator worker list due to inactive use of the equipment and the other worker was contacted and retrained promptly.

LASER PROGRAM REVIEW

Information was reviewed for accuracy regarding laser inspections, inventory, and current training. Twenty-seven (27) files were audited. Only three (3) were found to be in full compliance. The other twenty-four (24) audits have several deficiencies ranging from a lack of inventory notes/files to numerous incidents of overdue inspection and training. An overall lack of compliance was noted in this program's annual audit from 2010-2011.

RSOF RESPONSE:

The files for the Laser Program have been placed in a central filing location. Each Laser Researcher has a file that includes Inventory, Worker list, & Inspection reports. Each Laser researcher has been contacted to update their inventory and ensure that workers are current in training. It should be noted that this is a new program that is still maturing in its implementation. Laser inspections are in progress, which now involve more aggressive review and follow-up actions.

LICENSING STATUS

RSC AUDIT COMMENT:

An annual audit was conducted to verify the status of the radiation licensing status of the radiation safety office. Components of this audit include the following: Broadscope License, RGE License, Waste License, Radiation Manual, X-ray Manual, Radiation Training, X-Ray training, Radiation Online Retraining, and RSC Guidelines. All licenses are active and accurate.

RSOF RESPONSE

No response required.

RADIOISOTOPE SECURITY CHECKS

RSC AUDIT COMMENT:

During the period of July 1, 2010 and June 30, 2011, reports were reviewed for verification and documentation of radioisotope security checks. During this period, a total of sixteen (16) security checks were generated. All incidents have been resolved in an efficient and timely manner.

RSOF RESPONSE:

No response required.

RADIATION GENERATING EQUIPMENT INVENTORY AND TRAINING

RSC AUDIT COMMENT:

Thirty-two (32) files were examined for inventory status and last survey date of equipment during the period of July 1, 2010 and June 30, 2011. No deficiencies were found in any of the files examined.

RSOF RESPONSE:

No response required.

RADIATION SURVEY METERS

RSC AUDIT COMMENT:

Fifty (50) files were examined to verify that survey meters were compliant for calibration dates within the last twelve months. Seven (7) meters are past due for calibration.

RSOF RESPONSE:

The meters were calibrated, calibrations filed, and database updated.

EHS WEBPAGE (RADIATION SAFETY)

An audit was performed to verify the status of all Radiation Web Site links as being operational, accessible, and current. All links were functional although a few web pages did not provide information regarding the last time they were updated.

RSOF RESPONSE

No response required.

ROOM SURVEYS (ACTIVE/DECOMMISSION)

Audits were performed to validate active RAM use files and decommissioned room files to verify that the laboratory was surveyed within the last six months as well as follow up on non-compliance issues. Of fifty (50) files examined, no deficiencies were noted.

RSOF RESPONSE

No response required.

SEALED SOURCE LEAK TEST

RSC AUDIT COMMENT:

Thirty-three (33) files were randomly screened during the last twelve months for verification that the sealed source had been leak tested. No deficiencies were reported for files examined during the period from July 1, 2010 and June 30, 2011.

RSOF RESPONSE:

No response required.

SHIPPING PAPERS

RSC AUDIT COMMENTS:

Thirty-six (36) files were randomly screened during the last twelve months for verification that the sealed source had been leak tested. No deficiencies were noted.

RSOF RESPONSE:

No response required.

SEMI-ANNUAL MAILINGS (AIR/ SEWER INVENTORY)

RSC AUDIT COMMENT:

Fifty (50) files were examined to verify receipt of semi-annual mailings during the period of July 1, 2010 and June 30, 2011. One deficiency was noted (AU was not on file).

RSOF RESPONSE:

The missing file had been misfiled. The file was found and filed correctly.

VALID RAM APPLICATION

RSC AUDIT COMMENT:

Thirty-three (33) files were randomly audited to verify that they were valid, complete and current, during the period of July 1, 2010 and June 30, 2011. Eight (8) files were found to be deficient, particularly with respect to required updates on Form 7.

RSOF RESPONSE:

The RSOF is in the midst of updating all applications that are older than five years including the eight files that were noted.

WASTE DISPOSAL FACILITIES (DOA990/WOLSTEIN) & RSOF LABORATORY

RSC AUDIT COMMENT:

The Waste Disposal facilities and Laboratories of the RSOF were inspected to ensure safe operation and adequacy of amenities as required by programs of the RSOF during the period of July 1, 2010 and June 30, 2011. All records of the Facilities Maintenance and General Housekeeping, Record Maintenance, and Waste Storage and Handling were audited and found to be compliant, adequate, orderly, and secure.

RSOF RESPONSE:

No response required.

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 Department's Quality Control Specialist reviews all programs and Departmental records on a periodic basis and assists with resolving compliance issues in the RSOF.

Sealed Source
Shipping Papers
Valid RAM Applications
Isotope Orders/ AU Possession Limits
AU/ Worker Training

RAM Security Checks
Semi-Annual Mailings
RGE Inventory/ Training
Ancillary Training
Licensing

Bioassays
Dosimetry
Survey Meters
Compliances
Website Accuracy

Waste Disposal Facility
Room Surveys (Active/ Decommissioned)

Incidents
Irradiator

Liaison Program
Laser Program

The EHS audits have resulted in administrative modifications over the past year to improve record compliance and RSOF response to safety issues in AU's laboratories. Full audit results of this program are available in the EHS office. Radiation Safety Internal Audits were conducted either monthly or quarterly.

INTERNAL AUDITS

This year, in response to audit finding, the RSOF has implemented changes to its procedures and programs. The RSOF's audit of applications for use of radioactive materials revealed that numerous applications should be updated to be consistent with existing application requirements. AUs are now required to update protocols that are more than 10 years old and every 5 years thereafter.

Internal audit of the following Radiation Safety Programs were conducted during this fiscal year. In response to internal audit findings, Radiation Safety continues to improve its procedures and programs.

This report was prepared by Felice Thornton-Porter on 9/2/2011 and covers fiscal years 7/1/2010-6/30/2011.

APPENDIX

AUTHORIZED USERS

RADIATION ACTIVE

Donald Anthony, Sr.	7/21/2010	Willem Henry Boom	4/15/2011
Pieter DeHaseth	9/3/2010	Richard Hanson	3//2011
Joseph Lamanna	11/2/2010	Carole Liedtke	3/15/2011
Sanford Markowitz	6/15/2011	John Mieyal	4/28/2011
Nancy Oleinick	11/8/2010	Richard Hanson	3/2/2011
Jeffrey Collier	4/28/2011	Derek Taylor	2/3/2011
William Schiemann	7/28/2010	John David Prologo	8/9/2010
Donny Licatalosi	11/29/2010	Liem Nguyen	1/26/2011
Yanming Wang	6/15/2011		

STORAGE MODE

Stanton Gerson	6/16/2011	Jonatha Gott	9/8/2010
Mark Jackson	9/8/2010	Ruth Ann Keri	4/22/2011
Shunishi Murakami	8/27/2010	Robert Petersen	9/29/2010
Menachem Shoham	12/1/2010	Guang Zhou	11/10/2010

RADIATION INACTIVE

Guangbin Luo	9/17/2010	David McPheeters	5/12/2011
Edward Medof	12/13/2010	Ronald Conlon	10/7/2010

DEPARTED

Jeffrey Blumer	9/20/2010	Edward Stavnezer	4/29/2011
----------------	-----------	------------------	-----------

X-RAY AUTHORIZED POSSESSOR LIST

<u>AP CODE</u>	<u>AP NAME</u>	<u>CONTACT PERSON</u>
AVI	Amir Avishai	Amir Avishai
CD	Chris Dealwis	Chris Dealwis
CHO	Gary Chottiner	Gary Chottiner
DC	Sally Baden	Melody Long
FUJ	Hisashi Fujioka	Midori Hitomi
GRE	Edward Greenfield	Teresa Pizzuto
HAR	Ralph Harvey	Ralph Harvey
HIL	Lashanda Korley	Deepak Langhe
JAI	Mukesh Jain	Yingjie Cui
JEN	Wayne Jennings	Wayne Jennings
LAG	Peter Lagerlof	Peter Lagerlof
LEE	Zhenghong Lee	Chris Flask
MAC	Alan McIlwain	Alan McIlwain
MAT	Gerald Matisoff	Gerald Matisoff
OLI	Nancy Oleinick	John Mulvihill
PRO	John Protasiewicz	John Protasiewicz
MUZ	Raymond Muzic	Chris Flask
SCH	Daniel Scherson	Daniel Scherson

LASER USERS

Mary Barkley
Paul Carey
Kevin Cooper (Inactive)
David Dean
Steven Eppell
LaShanda Korley (Inactive)
Yoshikazu Imanishi
James Jacobberger
Jaikrishnan R. Kadambi
Kathleen Kash
Jack Koenig (Active-Exempt)
Claudia Mizutani (Active-Exempt)
Andrew Rollins
Shasta Sabo (Active-Exempt)
W. David Sedwick (Inactive)
Kenneth D. Singer
Benjamin Strowbridge (Active-Exempt)

Clemens Burda
Patty Conrad (Active-Exempt)
Corbin Covault (Inactive)
Diana Driscoll (Active-Exempt)
Maryann Fitzmaurice (Inactive)
Alex Huang (Active-Exempt)
Hatsuo Ishida
Alexander Jamieson
Yasuhiro Kamotani
Melissa Knothe Tate (Active-Exempt)
Roger Marchant
Sayed Qutubuddin (Inactive)
Charles Rosenblatt
David Schwam
Jie Shan
Rajesh Ramachandran (Active-Exempt)
Dustin Tyler

Master Isotope List

Isotope	1/2 Life (hours)	Sum of Pl Inv	Sum Pl Limits	NRC/ODH Limit
Al26	6,486,840,000.00	0.0000	0.0001	300 mCi
Am241	4,012,080.00	0.0000	0.0000	10 mCi
Ba133	93,732.00	0.0000	0.0000	300 mCi
Bi207	262,800.00	0.0000	0.0000	300 mCi
Bi210	195,348.00	0.0000	0.0000	300 mCi
C11	0.33	0.0000	0.0000	300 mCi
C14	50,194,800.00	42.2581	200.0000	300 mCi
Ca45	3,904.80	0.1436	265.1700	2,000 mCi
Cd109	11,300.40	0.0000	21.0000	300 mCi
Ce141	780.72	0.0000	0.1000	300 mCi
Cf252	23,117.64	0.0000	0.0000	300 mCi
Cl36	2,636,760,000.00	0.0000	0.0000	10 mCi
Co56	1,855.20	1.1300	4.7000	300 mCi
Co57	6,408.00	0.0000	0.0000	300 mCi
Co60	46,165.08	0.1192	3.0000	300 mCi
Cr51	667.20	0.0000	0.0000	300 mCi
Cs134	18,396.00	0.0001	23.0000	500 mCi
Cs137	262,800.00	0.0000	0.0000	300 mCi
Eu152	113,880.00	3.0403	10.0000	300 mCi
Eu154	68,328.00	0.0000	0.0000	300 mCi
F18	1.87	0.0000	0.0000	300 mCi
Fe55	23,652.00	0.0000	180.0000	300 mCi
Fe59	1,080.00	7.2200	19.0000	300 mCi
Ga68	1.10	0.2742	11.0000	300 mCi
Gd153	5,664.00	0.0000	0.0000	300 mCi
Ge68	6,888.00	0.0000	0.0000	300 mCi
H3	108,010.80	0.0000	0.0000	300 mCi
Ir23	13.00	227.4903	1085.5000	20,000 mCi
Ir24	100.80	0.0000	20.0000	300 mCi
Ir25	1,432.80	0.0000	2.0000	300 mCi
Ir29	14,016,000,000.00	0.1439	98.5450	2,000 mCi
Ir31	193.56	0.0000	0.0000	300 mCi
In111	67.20	0.0000	20.0000	300 mCi
Ir192	1,783.00	0.0000	0.0000	300 mCi
Kr85	94,608.00	0.0000	0.0000	300 mCi
Mg28	21.30	0.0000	0.0000	300 mCi
Mn54	7,500.00	0.2513	1.0000	300 mCi
MXD	68,328.00	0.0025	3.1000	300 mCi
MXD2	4,012,080.00	0.0000	3.5000	10 mCi
MXD3	4,012,080.00	0.0000	1.0000	10 mCi
N13	0.17	0.0000	0.0000	10 mCi
Na22	22,776.52	0.0000	0.0000	300 mCi
		0.3054	5.5000	300 mCi

Master Isotope List

Isotope	1/2 Life (hours)	Sum of Pl Inv	Sum Pl Limits	NRC/ODH Limit
Nb94	100,000,000.00	0.0000	0.0000	300 mCi
Ni63	1,051,200.00	10.8469	20.0000	300 mCi
O15	0.03	0.0000	0.0000	300 mCi
P32	342.96	43.9366	628.5000	4,000 mCi
P33	605.00	0.4122	60.7500	300 mCi
Pb210	1,954,818.00	0.0005	1.0000	300 mCi
Pm147	22,977.48	0.0000	0.0000	300 mCi
Po208	25,404.00	0.0000	0.0000	300 mCi
Pr210	3,321.60	0.0000	0.0000	300 mCi
Pr239	210,809,400.00	0.0000	0.0000	300 mCi
Ra224	87.84	0.0000	0.0000	10 mCi
Ra226	14,016,000.00	0.0003	0.0060	10 mCi
Ra228	50,370.00	0.0000	0.0003	10 mCi
Rb86	447.84	0.0026	7.0000	300 mCi
Re188	16.98	0.0000	0.0000	300 mCi
Rn222	91.68	0.0000	0.0000	10 mCi
Ru106	8,836.80	0.0000	0.0000	300 mCi
S35	2,098.56	23.6444	565.3000	4,500 mCi
Si32	876,600.00	0.0000	0.0000	300 mCi
Sn119m	5,880.00	0.0000	0.0000	300 mCi
Sn121m	481,800.00	0.0000	0.0000	300 mCi
Sr85	1,536.00	0.0000	0.0000	300 mCi
Sr90	255,091.00	0.0000	5.0000	300 mCi
Tc99	1,865,880,000.00	0.0000	0.0000	1,000 mCi
Tc99m	6.02	0.0000	0.0000	300 mCi
Ti230	674,520,000.00	0.0000	40.0000	300 mCi
Ti204	33,112.80	0.0000	0.0000	10 mCi
Ti44	8,766,000.00	0.0000	0.0000	300 mCi
Tl201	73.00	0.0000	0.0000	300 mCi
Y90	64.10	0.0000	0.0000	300 mCi
Zn65	5,832.00	0.0450	11.0000	300 mCi

PI Rad Summary Listing and Post Screen

Page 1

PI Rad Summary Listing and Post Screen

Page 2

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date	PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
794	Abbott, Derek	P32	10.0000	0.00000	10/11/2011	803	Cooke, Kenneth	P32	0.5000	0.00000	10/11/2011
939	Alagramam, Kumar	P32	2.0000	0.00000	10/11/2011	803	Cooke, Kenneth	H3	10.0000	2.39403	10/11/2011
782	Andrulis, Erik D.	P32	10.0000	0.00000	10/11/2011	197	Cotton, Calvin	C14	1.5000	0.72240	10/11/2011
782	Andrulis, Erik D.	C14	10.0000	0.00000	10/11/2011	197	Cotton, Calvin	C136	1.5000	0.23000	10/11/2011
782	Andrulis, Erik D.	H3	10.0000	0.00000	10/11/2011	197	Cotton, Calvin	Na22	1.5000	0.00942	10/11/2011
782	Andrulis, Erik D.	S35	10.0000	0.00000	10/11/2011	197	Cotton, Calvin	I125	6.0000	0.00000	10/11/2011
5	Anthony Sr., Donald D.	C14	5.0000	1.25850	10/11/2011	197	Cotton, Calvin	S35	3.0000	0.00000	10/11/2011
5	Anthony Sr., Donald D.	H3	4.0000	3.67035	10/11/2011	197	Cotton, Calvin	RB66	2.0000	0.00000	10/11/2011
5	Anthony Sr., Donald D.	P32	1.0000	0.00000	10/11/2011	950	Croniger, Colleen	H3	4.0000	0.44909	10/11/2011
700	Arts, Eric	P32	5.0000	2.59590	10/11/2011	950	Croniger, Colleen	P32	4.0000	0.00000	10/11/2011
779	Barkley, Mary	P32	5.0000	0.00000	10/11/2011	950	Croniger, Colleen	C14	2.0000	1.04987	10/11/2011
779	Barkley, Mary	P33	2.0000	0.00000	10/11/2011	744	Danielpour, David	H3	15.0000	0.00000	10/11/2011
779	Barkley, Mary	C14	5.0000	0.49988	10/11/2011	744	Danielpour, David	P32	2.0000	0.00000	10/11/2011
779	Barkley, Mary	H3	3.0000	1.19595	10/11/2011	744	Danielpour, David	S35	4.0000	0.00000	10/11/2011
749	Berdis, Anthony	P32	2.0000	0.28759	10/11/2011	801	Dealwis, Chris	C14	5.0000	0.32753	10/11/2011
749	Berdis, Anthony	H3	3.0000	0.00000	10/11/2011	801	Dealwis, Chris	H3	5.0000	0.84166	10/11/2011
957	Bernstein, Helene	P32	2.0000	0.00007	10/11/2011	537	DeBoer, Piet	P32	100.0000	0.00000	10/11/2011
957	Bernstein, Helene	Cx51	2.0000	0.00014	10/11/2011	537	DeBoer, Piet	S35	100.0000	0.00000	10/11/2011
14	Boom, Willem Henry	H3	10.0000	6.75909	10/11/2011	537	DeBoer, Piet	H3	100.0000	0.00000	10/11/2011
802	Boron, Walter	S35	3.0000	2.24989	10/11/2011	537	DeBoer, Piet	C14	10.0000	0.48983	10/11/2011
802	Boron, Walter	C14	5.0000	0.15000	10/11/2011	31	DeKaseth, Pieter L.	P32	10.0000	0.00015	10/11/2011
802	Boron, Walter	C136	0.2000	8.63685	10/11/2011	791	Devireddy, Lax	P32	5.0000	7.10572	10/11/2011
802	Boron, Walter	H3	20.0000	0.00000	10/11/2011	791	Devireddy, Lax	Fe55	15.0000	0.00000	10/11/2011
802	Boron, Walter	P32	2.0000	0.00000	10/11/2011	791	Devireddy, Lax	C14	10.0000	0.04997	10/11/2011
802	Boron, Walter	Ca45	4.0000	9.09891	10/11/2011	34	Distelhorst, Clark	H3	20.0000	0.23853	10/11/2011
286	Carlin, Cathleen	H3	10.0000	0.00000	10/11/2011	34	Distelhorst, Clark	S35	10.0000	0.00000	10/11/2011
286	Carlin, Cathleen	I125	15.0000	0.00000	10/11/2011	34	Distelhorst, Clark	P32	10.0000	0.00000	10/11/2011
286	Carlin, Cathleen	P32	10.0000	0.00000	10/11/2011	34	Distelhorst, Clark	Ca45	5.0000	0.00000	10/11/2011
286	Carlin, Cathleen	S35	20.0000	11.13002	10/11/2011	34	Distelhorst, Clark	C14	1.0000	0.04997	10/11/2011
797	Chandler, Margaret	H3	8.0000	4.55304	10/11/2011	42	Distelhorst, Clark	C14	5.0000	1.27770	10/11/2011
797	Chandler, Margaret	C14	8.0000	4.19943	10/11/2011	42	Ernsberger, Paul	H3	2.0000	0.00000	10/11/2011
797	Chandler, Margaret	H3	200.0000	88.85006	10/11/2011	42	Ernsberger, Paul	I125	2.0000	0.00000	10/11/2011
947	Cobb, Brian	S35	10.0000	0.46158	10/11/2011	42	Ernsberger, Paul	P32	2.0000	0.00000	10/11/2011
952	Coller, Jeff	P32	50.0000	15.19579	10/11/2011	49	Gerken, Thomas A.	C14	10.0000	0.00230	10/11/2011
952	Coller, Jeff	CR51	10.0000	0.00000	10/11/2011	49	Gerken, Thomas A.	H3	35.0000	1.00280	10/11/2011
803	Cooke, Kenneth					49	Gerken, Thomas A.	S35	10.0000	0.00000	10/11/2011

II.

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
49	Gerken, Thomas A.	P33	0.7500	0.00000	10/11/2011
50	Gerson, Stanton L.	H3	50.0000	4.60194	10/11/2011
50	Gerson, Stanton L.	P32	10.0000	0.00000	10/11/2011
50	Gerson, Stanton L.	S35	5.0000	0.00000	10/11/2011
50	Gerson, Stanton L.	C14	1.0000	0.00000	10/11/2011
50	Gerson, Stanton L.	P33	0.7500	0.00000	10/11/2011
439	Gott, Jonatha M. (SM	P32	20.0000	0.00905	10/11/2011
439	Gott, Jonatha M. (SM	S35	10.0000	0.00000	10/11/2011
439	Gott, Jonatha M. (SM	P33	10.0000		10/11/2011
284	Greenfield, Edward	P32	3.0000	0.00000	10/11/2011
284	Greenfield, Edward	S35	10.0000	0.00000	10/11/2011
284	Greenfield, Edward	I125	3.0000	0.00000	10/11/2011
284	Greenfield, Edward	H3	5.0000	0.00000	10/11/2011
55	Hanson, Richard	P32	1.0000	0.00000	10/11/2011
55	Hanson, Richard	C14	2.0000	1.86437	10/11/2011
653	Harris, Michael	P32	25.0000	9.58727	10/11/2011
653	Harris, Michael	S35	5.0000	0.00000	10/11/2011
653	Harris, Michael	P33	4.0000	0.34119	10/11/2011
57	Harte, Peter J.	P32	10.0000	0.00000	10/11/2011
57	Harte, Peter J.	S35	5.0000	0.00000	10/11/2011
57	Harte, Peter J.	H3	25.0000	0.00000	10/11/2011
57	Harte, Peter J.	C14	1.0000	0.00999	10/11/2011
941	Harter, Marian	P32	2.0000	0.00000	10/11/2011
941	Harter, Marian	H3	50.0000		10/11/2011
941	Harter, Marian	C14	0.0200		10/11/2011
941	Harter, Marian	S35	2.0000		10/11/2011
504	Hatzoglou, Maria	P32	13.0000	4.16931	10/11/2011
504	Hatzoglou, Maria	S35	20.0000	11.46911	10/11/2011
504	Hatzoglou, Maria	C14	2.0000	0.13090	10/11/2011
504	Hatzoglou, Maria	H3	20.0000	0.17670	10/11/2011
786	Hoppel, Charles	C14	25.0000	12.93495	10/11/2011
786	Hoppel, Charles	H3	25.0000	0.87503	10/11/2011
809	Jackson, Mark	P32	2.0000	0.00000	10/11/2011
787	Jain, Mukesh	P32	10.0000	0.07436	10/11/2011
787	Jain, Mukesh	H3	10.0000	4.32494	10/11/2011
787	Jain, Mukesh	S35	20.0000	0.26317	10/11/2011

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
236	Jamieson, Alexander	NA22	1.0000	0.19804	10/11/2011
768	Jankowsky, Eckhard	P32	12.0000	3.26752	10/11/2011
804	Jin, Ge	I125	0.0200	0.00287	10/11/2011
804	Jin, Ge	S35	15.0000		10/11/2011
804	Jin, Ge	P32	2.0000	0.00000	10/11/2011
804	Jin, Ge	P33	5.0000	0.00000	10/11/2011
772	Karn, Jonathan	S35	10.0000	0.00000	10/11/2011
772	Karn, Jonathan	P32	10.0000	1.61786	10/11/2011
772	Karn, Jonathan	H3	1.0000		10/11/2011
601	Keri, Ruth Ann	P32	5.0000	0.00000	10/11/2011
601	Keri, Ruth Ann	H3	5.0000	0.00000	10/11/2011
601	Keri, Ruth Ann	C14	5.0000	0.00000	10/11/2011
601	Keri, Ruth Ann	S35	8.0000	0.00025	10/11/2011
601	Keri, Ruth Ann	I125	0.0250	0.00000	10/11/2011
956	Kong, Qingzhong	F18	5.0000		10/11/2011
92	Lamanna, Joseph	H3	2.0000	0.37299	10/11/2011
92	Lamanna, Joseph	C14	2.0000	0.93997	10/11/2011
735	Lee, Irene	H3	2.0000		10/11/2011
735	Lee, Irene	P32	3.0000	0.12203	10/11/2011
735	Lee, Irene	S35	2.5000	0.00000	10/11/2011
788	Letterio, John	H3	10.0000	4.00585	10/11/2011
625	Levine, Alan D.	H3	10.0000	4.90088	10/11/2011
625	Levine, Alan D.	P32	1.0000		10/11/2011
625	Levine, Alan D.	S35	5.0000		10/11/2011
961	Licatalosi, Donny	P32	20.0000	0.17950	10/11/2011
105	Liedtke, Carole M.	C136	2.0000	0.49999	10/11/2011
105	Liedtke, Carole M.	P32	2.0000	0.00000	10/11/2011
105	Liedtke, Carole M.	Rb86	2.0000	0.00262	10/11/2011
752	Lou, Hua	P32	4.0000	0.41217	10/11/2011
752	Lou, Hua	P33	3.0000	0.00000	10/11/2011
752	Lou, Hua	S35	15.0000	0.00000	10/11/2011
752	Lou, Hua	H3	0.5000	0.00000	10/11/2011
752	Lou, Hua				10/11/2011
739	MacDonald, Paul N.	S35	20.0000	0.00000	10/11/2011
739	MacDonald, Paul N.	I125	2.0000	0.00000	10/11/2011
739	MacDonald, Paul N.	P32	12.0000	0.00000	10/11/2011

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
739	MacDonald, Paul N.	H3	10.0000	0.00000	10/11/2011
739	MacDonald, Paul N.	Cl4	10.0000		10/11/2011
111	Maguire, Michael E.	Cl4	2.0000	0.00000	10/11/2011
111	Maguire, Michael E.	Ca45	2.0000	0.00000	10/11/2011
111	Maguire, Michael E.	H3	10.0000	0.66048	10/11/2011
111	Maguire, Michael E.	I125	2.0000	0.00000	10/11/2011
111	Maguire, Michael E.	Mg28	1.0000	0.00000	10/11/2011
111	Maguire, Michael E.	Mn54	3.0000	0.25130	10/11/2011
111	Maguire, Michael E.	Ni63	20.0000	10.84689	10/11/2011
111	Maguire, Michael E.	P32	15.0000	0.00000	10/11/2011
111	Maguire, Michael E.	Rb86	2.0000	0.00000	10/11/2011
111	Maguire, Michael E.	S35	15.0000	0.00000	10/11/2011
111	Maguire, Michael E.	Co57	2.0000	0.11920	10/11/2011
111	Maguire, Michael E.	P33	2.0000	0.00000	10/11/2011
111	Maguire, Michael E.	FE55	4.0000	0.11323	10/11/2011
111	Maguire, Michael E.	ZN65	5.0000	0.04503	10/11/2011
799	Manor, Danny	P32	12.0000		10/11/2011
799	Manor, Danny	H3	6.0000	0.13472	10/11/2011
799	Manor, Danny	Cl4	9.0000	0.38898	10/11/2011
799	Manor, Danny	S35	12.0000		10/11/2011
115	Markowitz, Sanford	Cl4	20.0000	0.54974	10/11/2011
115	Markowitz, Sanford	H3	40.0000	14.28859	10/11/2011
115	Markowitz, Sanford	P32	4.0000	0.01171	10/11/2011
115	Markowitz, Sanford	P33	4.0000	0.06679	10/11/2011
326	Matisoff, Gerald	FE59	1.0000		10/11/2011
326	Matisoff, Gerald	CS137	10.0000	3.04034	10/11/2011
326	Matisoff, Gerald	ZN65	1.0000		10/11/2011
326	Matisoff, Gerald	HG203	1.0000		10/11/2011
326	Matisoff, Gerald	CR51	1.0000		10/11/2011
326	Matisoff, Gerald	MN54	0.1000		10/11/2011
326	Matisoff, Gerald	CD109	0.1000	0.00000	10/11/2011
326	Matisoff, Gerald	NA22	1.0000	0.09798	10/11/2011
326	Matisoff, Gerald	Ra226	0.0060	0.00035	10/11/2011
326	Matisoff, Gerald	Ra228	0.0003		10/11/2011
326	Matisoff, Gerald	MXD	3.5000	0.00247	10/11/2011
326	Matisoff, Gerald	Pb210	1.0000	0.00052	10/11/2011

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
326	Matisoff, Gerald	MXD2	1.0000	0.00000	10/11/2011
326	Matisoff, Gerald	PO208	0.0000	0.00000	10/11/2011
743	McCormick, Thomas	P32	1.0000	0.00000	10/11/2011
743	McCormick, Thomas	P33	1.0000	0.00000	10/11/2011
743	McCormick, Thomas	CR51	10.0000		10/11/2011
743	McCormick, Thomas	H3	15.0000	5.74248	10/11/2011
810	McGuffin-Cawley,	AL26	0.0001	0.00005	10/11/2011
123	Merrick, William	Cl4	10.0000	0.97973	10/11/2011
123	Merrick, William	H3	15.0000	0.15176	10/11/2011
123	Merrick, William	P32	10.0000	0.00000	10/11/2011
123	Merrick, William	S35	10.0000	0.08661	10/11/2011
125	Mieyal, John J.	Cl4	0.0500	0.15650	10/11/2011
125	Mieyal, John J.	S35	0.3000	0.00000	10/11/2011
125	Mieyal, John J.	H3	4.0000	1.91055	10/11/2011
808	Miss Hal's & Mom	P33	5.0000		10/11/2011
128	Monnier, Vincent M.	Cl4	30.0000	0.09996	10/11/2011
128	Monnier, Vincent M.	H3	10.0000	0.04821	10/11/2011
128	Monnier, Vincent M.	I125	15.0000	0.00000	10/11/2011
128	Monnier, Vincent M.	P32	10.0000	0.00000	10/11/2011
128	Monnier, Vincent M.	S35	10.0000	0.00000	10/11/2011
726	Montano, Monica M.	Cl4	0.5000	0.24969	10/11/2011
726	Montano, Monica M.	H3	0.5000		10/11/2011
726	Montano, Monica M.	I125	0.5000		10/11/2011
726	Montano, Monica M.	P32	10.0000	0.00000	10/11/2011
726	Montano, Monica M.	S35	2.0000	0.23142	10/11/2011
942	Murakami, Shunichi	P32	2.0000		10/11/2011
942	Murakami, Shunichi	S35	3.0000	0.00000	10/11/2011
694	Muzic, Raymond Jr.	F18	50.0000	0.00000	10/11/2011
694	Muzic, Raymond Jr.	H3	5.0000	2.20715	10/11/2011
694	Muzic, Raymond Jr.	Cl4	1.0000	0.01660	10/11/2011
694	Muzic, Raymond Jr.	Cl1	50.0000		10/11/2011
953	Nguyen, Liem D.	P32	4.0000	0.00000	10/11/2011
953	Nguyen, Liem D.	H3	5.0000	0.00000	10/11/2011
953	Nguyen, Liem D.	H3	10.0000	0.00000	10/11/2011
135	Nilsen, Timothy W.	H3	10.0000	0.00000	10/11/2011
135	Nilsen, Timothy W.	P32	50.0000	0.49386	10/11/2011

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date	PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
135	Nilsen, Timothy W.	S35	30.0000	0.00111	10/11/2011	113	RSOF	I123	20.0000		10/11/2011
796	Noy, Noa	S35	1.0000		10/11/2011	113	RSOF	H3	20.0000	11.15385	10/11/2011
796	Noy, Noa	P32	2.0000	0.00000	10/11/2011	113	RSOF	I131	20.0000		10/11/2011
796	Noy, Noa	H3	1.0000	0.36285	10/11/2011	759	Salomon, Robert	C14	1.0000	0.30924	10/11/2011
796	Noy, Noa	C14	1.0000		10/11/2011	759	Salomon, Robert	H3	50.0000	0.13673	10/11/2011
138	Oleinick, Nancy L.	C14	5.0000	1.28786	10/11/2011	959	Schiemann, William P.	H3	10.0000	3.57091	10/11/2011
138	Oleinick, Nancy L.	H3	25.0000	4.34724	10/11/2011	959	Schiemann, William P.	P32	1.0000		10/11/2011
944	Palczewski, Krysztof	P32	5.0000	0.29230	10/11/2011	959	Schiemann, William P.	125I	0.0100		10/11/2011
944	Palczewski, Krysztof	S35	5.0000	0.00000	10/11/2011	789	Schmaier, Alvin H.	C14	2.0000	0.03723	10/11/2011
944	Palczewski, Krysztof	CA45	5.0000		10/11/2011	600	Shoham, Menachem	H3	0.5000	0.19365	10/11/2011
944	Palczewski, Krysztof	P33	5.0000	0.00426	10/11/2011	170	Siegel, Ruth E.	H3	5.0000	0.16210	10/11/2011
944	Palczewski, Krysztof	H3	25.0000	1.04623	10/11/2011	170	Siegel, Ruth E.	I125	2.0000	0.00000	10/11/2011
944	Palczewski, Krysztof	C14	1.0000	0.04998	10/11/2011	170	Siegel, Ruth E.	P32	3.0000	0.00000	10/11/2011
442	Petersen, Robert B.	P32	5.0000	0.00000	10/11/2011	170	Siegel, Ruth E.	S35	10.0000	0.00000	10/11/2011
442	Petersen, Robert B.	S35	40.0000	0.00000	10/11/2011	170	Siegel, Ruth E.	P33	3.0000	0.00000	10/11/2011
442	Petersen, Robert B.	P33	5.0000	0.00000	10/11/2011	579	Singh, Neena	C14	5.0000	0.09994	10/11/2011
442	Petersen, Robert B.	C14	0.1000	0.00000	10/11/2011	579	Singh, Neena	S35	50.0000	0.00000	10/11/2011
806	Pikuleva, Irina A.	H3	10.0000	2.11957	10/11/2011	579	Singh, Neena	H3	10.0000	0.41595	10/11/2011
806	Pikuleva, Irina A.	C14	10.0000		10/11/2011	579	Singh, Neena	P32	10.0000		10/11/2011
960	Prologo, J. David	F18	25.0000		10/11/2011	579	Singh, Neena	I125	10.0000		10/11/2011
960	Prologo, J. David	I124	2.0000		10/11/2011	579	Singh, Neena	FE59	10.0000	0.27421	10/11/2011
948	Qu, Cheng-Kui	P32	1.0000	0.00000	10/11/2011	579	Singh, Neena	FE52	2.0000		10/11/2011
940	Romani, Andrea	H3	30.0000	0.83268	10/11/2011	958	Taylor, Derek	P32	10.0000	0.97137	10/11/2011
940	Romani, Andrea	C14	10.0000	4.86919	10/11/2011	958	Taylor, Derek	S35	5.0000		10/11/2011
940	Romani, Andrea	I125	5.0000	0.00000	10/11/2011	958	Taylor, Derek	H3	2.0000		10/11/2011
940	Romani, Andrea	NA22	2.0000		10/11/2011	958	Taylor, Derek	C14	2.0000		10/11/2011
940	Romani, Andrea	CA45	5.0000	0.14360	10/11/2011	780	Valadkhan, Saba	P32	35.0000	4.15019	10/11/2011
940	Romani, Andrea	P32	10.0000	0.00000	10/11/2011	780	Valadkhan, Saba	P33	0.2500		10/11/2011
940	Romani, Andrea	CL36	1.0000	0.25000	10/11/2011	793	Wang, Yanming	C11	150.0000	0.00000	10/11/2011
940	Romani, Andrea	SR85	5.0000		10/11/2011	793	Wang, Yanming	F18	100.0000	0.00000	10/11/2011
940	Romani, Andrea	RB66	1.0000		10/11/2011	793	Wang, Yanming	I125	20.0000	0.00000	10/11/2011
940	Romani, Andrea	S35	20.0000		10/11/2011	793	Wang, Yanming	H3	20.0000	13.72568	10/11/2011
113	RSOF	CO57	1.0000	0.00000	10/11/2011	793	Wang, Yanming				10/11/2011
113	RSOF	C14	1.0000	3.46175	10/11/2011	740	Weiss, Michael A. (SM)	P33	10.0000	0.00000	10/11/2011
113	RSOF	H3	12.0000	11.15385	10/11/2011	740	Weiss, Michael A. (SM)	ZN65	5.0000		10/11/2011
113	RSOF	C14	10.0000	3.46175	10/11/2011	740	Weiss, Michael A. (SM)	I125	0.1600	0.00000	10/11/2011

PI Rad Summary Listing and Post Screen

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
740	Weiss, Michael A. (SM)	H3	1.0000		10/11/2011
740	Weiss, Michael A. (SM)	S35	1.0000		10/11/2011
954	Welford, Scott	P32	2.0000		10/11/2011
954	Welford, Scott	H3	1.0000		10/11/2011
778	Whittaker, Jonathan	I125	0.9000	0.14186	10/11/2011
716	Wilson-Delfosse, Amy	I125	5.0000	0.00000	10/11/2011
716	Wilson-Delfosse, Amy	P32	10.0000	0.00876	10/11/2011
716	Wilson-Delfosse, Amy	S35	10.0000	0.00000	10/11/2011
716	Wilson-Delfosse, Amy	H3	20.0000	0.00000	10/11/2011
811	Zhang, Youwei	P32	1.0000	0.00000	10/11/2011
784	Zhou, Guang	S35	6.0000	0.00094	10/11/2011
784	Zhou, Guang	P32	2.0000		10/11/2011

Sealed Sources

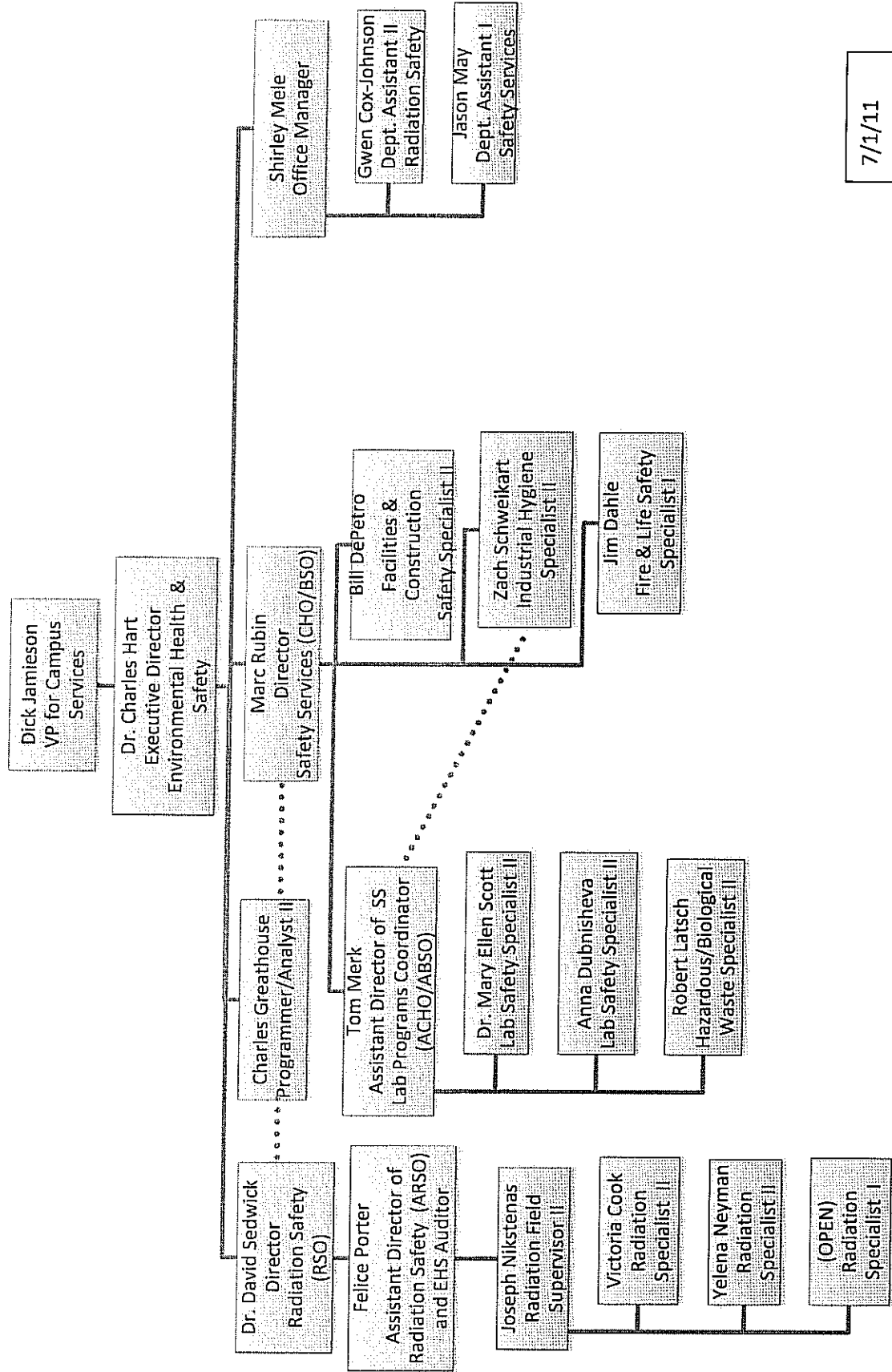
	PI Name	Location	Isotope	Emits	Current Activity	
326	Matisoff, Gerald	A.W. SMITH 211E	Am241	Alpha	9.68e-4	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Am241	Alpha	9.84e-2	mCi
665	Akerib, Daniel S.	Rockefeller 314	Am241	Alpha	6.70e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314G	Am241B	Alpha		mCi
14	Boom, Willem	BRB 1014	Ba133	Gamma	6.05e-3	mCi
113	RSOF	Dental (DOA) 990	Ba133	Gamma	1.36e-2	mCi
113	RSOF	Service Bldg. Rad	Ba133	Gamma	1.84e-3	mCi
113	RSOF	Service Bldg. Rad	Ba133	Gamma	1.26e-4	mCi
113	RSOF	Wolstein 1120	Ba133	Gamma	1.13e-2	mCi
113	RSOF	Service Bldg. RAD	Ba133	Gamma	1.31e-2	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Ba133	Gamma	2.44e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Ba133	Gamma	3.42e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Ba133	Gamma	1.06e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Ba133	Gamma	7.43e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Ba133	Gamma	1.06e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Ba133	Gamma	5.48e-4	mCi
694	Muzic, Raymond	Wearn 419	Ba133	Gamma	6.25e-3	mCi
793	Wang, Yanming	Bolwell 2663	Ba133	Gamma	6.31e-3	mCi
793	Wang, Yanming	Wearn S39	Ba133	Gamma	1.74e-2	mCi
936	Shutt, Tom	Rockefeller 118	Ba133	Gamma	5.81e-3	mCi
942	Murakami,	BRB 310	Ba133	Gamma	7.54e-3	mCi
950	Croniger, Colleen	BRB 925	Ba133	Gamma	6.05e-3	mCi
236	Jamieson,	Kent Hale Smith 205	Bi207	Beta	5.79e-3	mCi
113	RSOF	Service Bldg. Rad	Bi210	Beta	8.50e-6	mCi
113	RSOF	Service Bldg. Rad	C14	Beta	1.44e-4	mCi
113	RSOF	Service Bldg. Rad	Cd109	Gamma	3.36e-8	mCi
113	RSOF	Service Bldg. Rad	Cd109	Gamma	4.70e-5	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Cd109	Gamma	2.05e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cd109	Gamma	6.76e-6	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cd109	gamma	3.72e-5	mCi
936	Shutt, Tom	Rockefeller 118	Cf252	Alpha	3.93e-3	mCi

	PI Name	Location	Isotope	Emits	Current Activity	
665	Akerib, Daniel S.	Rockefeller 314B	Co57	Gamma	1.49e-7	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co57	gamma	3.01e-6	mCi
694	Muzic, Raymond	Lerner Tower B213	Co57	Gamma	3.89e-2	mCi
694	Muzic, Raymond	Lerner Tower B216	Co57	Gamma	1.49e-1	mCi
694	Muzic, Raymond	Lerner Tower B206	Co57	Gamma	3.53e+0	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	4.17e-5	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	5.92e-4	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	5.92e-4	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	5.92e-4	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	9.44e-3	mCi
113	RSOF	Service Bldg. Rad	Co60	Gamma	3.63e-4	mCi
113	RSOF	Service Bldg. Rad	Co60	Gamma	2.68e-3	mCi
236	Jamieson,	Kent Hale Smith 205	Co60	Gamma	4.02e-4	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Co60	Gamma	5.68e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	3.89e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	3.89e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	4.70e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	6.73e-5	mCi
665	Akerib, Daniel S.	Rockefeller 16	Co60	Gamma	9.96e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	2.94e-4	mCi
694	Muzic, Raymond	Lerner Tower B216	Co60	Beta/Gam	3.84e-3	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Cs134	Gamma	6.74e-6	mCi
772	Karn, Jonathan	Wood Research	Cs137	Beta/Gam	8.10e-4	mCi
940	Romani, Andrea	Robbins 540	Cs137	Beta/Gam	2.53e-2	mCi
49	Gerken, Thomas	BRB 809 Hallway	Cs137	Beta/Gam	2.07e-2	mCi
50	Gerson, Stanton	Wolstein 2210	Cs137	Beta/Gam	5.51e-4	mCi
50	Gerson, Stanton	Wolstein 2517	Cs137	Beta/Gam	2.53e-2	mCi
113	RSOF	Mac Donald 8019	Cs137	Beta/Gam	1.87e-2	mCi
113	RSOF	Wood Research	Cs137	Beta/Gam	2.49e-2	mCi
113	RSOF	Pathology 301	Cs137	Beta/Gam	2.55e-2	mCi

	PI Name	Location	Isotope	Emits	Current Activity	
115	Markowitz,	Wolstein 3113	Cs137	Beta/Gam	2.48e-2	mCi
135	Nilsen, Timothy	Wood 128	Cs137	Beta/gam	2.62e-2	mCi
135	Nilsen, Timothy	Wood 123	Cs137	beta/gam	2.62e-2	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Cs137	Beta/Gam	4.99e-4	mCi
439	Gott, Jonatha M.	Wood 109	Cs137	Beta/Gam	5.76e-4	mCi
653	Harris, Michael	Wood Research	Cs137	Beta/Gam	5.81e-4	mCi
653	Harris, Michael	Wood 103	Cs137	Beta/Gam	5.89e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	2.98e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	3.81e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	3.70e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.83e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.83e-3	mCi
665	Akerib, Daniel S.	Rockefeller 118	Cs137	Beta/Gam	5.83e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.83e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.83e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.83e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	2.79e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	7.49e-1	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	8.05e-4	mCi
694	Muzic, Raymond	Lerner Tower B216	Cs137	Beta/Gam	5.96e-2	mCi
694	Muzic, Raymond	Bishop S611	Cs137	Beta/Gam	8.34e-4	mCi
740	Weiss, Michael	Wood 439	Cs137	Beta/Gam	2.94e-2	mCi
743	McCormick,	BRB 550	Cs137	Beta/Gam	2.52e-2	mCi
752	Lou, Hua	BRB 749 Hallway	Cs137	Beta/Gam	2.62e-2	mCi
759	Salomon, Robert	MILLIS 211A	Cs137	Beta/Gam	2.55e-2	mCi
772	Karn, Jonathan	Wood Research	Cs137	Beta/Gam	2.58e-2	mCi
786	Hoppel, Charles	Wood 148	Cs137	Beta/Gam	8.78e-4	mCi
786	Hoppel, Charles	Wood 148	Cs137	Beta/Gam	2.92e-2	mCi
801	Dealwis, Chris	Wood Research	Cs137	Beta/Gam	2.72e-2	mCi
944	Palczewski,	Wood 322	Cs137	Beta/Gam	2.65e-2	mCi
665	Akerib, Daniel S.	Rockefeller 16	Fe55	Gamma	1.20e-1	mCi

	PI Name	Location	Isotope	Emits	Current Activity	
951	Sankaran, Mohan	A.W. SMITH 230C	Kr85	Beta/Gam	1.36e+0	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Mixed	Gamma		mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Mixed	Gamma		mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mixed	Beta/Gam		mCi
113	RSOF	Service Bldg. Rad	Mn54	Gamma	6.20e-11	mCi
113	RSOF	Service Bldg. Rad	Mn54	Gamma	1.36e-15	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mn54	Gamma	5.38e-7	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mn54	gamma	6.55e-6	mCi
113	RSOF	Service Bldg. Rad	Na22	Gamma	1.69e-5	mCi
113	RSOF	Service Bldg. Rad	Na22	Gamma	6.43e-4	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Na22	Gamma	2.99e-6	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Na22	Gamma	1.39e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Na22	Gamma	1.39e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Na22	Gamma	8.38e-5	mCi
694	Muzic, Raymond	Lerner Tower B206	Na22	Gamma	7.58e-3	mCi
694	Muzic, Raymond	Lerner Tower B206	Na22	Gamma	7.58e-3	mCi
936	Shutt, Tom	Rockefeller 118	Na22	Gamma	1.91e-3	mCi
113	RSOF	Service Bldg. Rad	Ni63	beta	1.30e-5	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Pb210	Alpha	9.35e-5	mCi
113	RSOF	Service Bldg. Rad	Pm147	Beta	2.57e-7	mCi
326	Matisoff, Gerald	A.W. SMITH 211A	Po210	Alpha	4.91e-22	mCi
951	Sankaran, Mohan	A.W. SMITH 230	Po210	alpha	8.71e-1	mCi
113	RSOF	Service Bldg. Rad	Pu239	Alpha	5.99e-6	mCi
936	Shutt, Tom	Rockefeller 118	Rb83	Gamma		mCi
113	RSOF	Service Bldg. Rad	Si32	Beta	5.08e-5	mCi
113	RSOF	Service Bldg. Rad	Str90	Beta	1.19e-5	mCi
113	RSOF	Service Bldg. Rad	Tc99	Beta	4.10e-5	mCi
113	RSOF	Service Bldg. Rad	Th230	Alpha	7.00e-6	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Ti204	Beta	1.47e-4	mCi
236	Jamieson,	Kent Hale Smith 205	Ti44	Gamma	1.95e-3	mCi

Environmental Health & Safety Organizational Chart



7/1/11