

**CASE WESTERN RESERVE UNIVERSITY
DEPARTMENT OF OCCUPATIONAL &
ENVIRONMENTAL SAFETY (DOES)
RADIATION SAFETY
ANNUAL REPORT 2009-2010**

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

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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 Occupational & Environmental Safety (DOES) at Case Western Reserve University. Its contents cover the period from July 1, 2009 through June 30, 2010.

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 2009-2010

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

- Through its services to the research community at Case Western Reserve University, the Radiation Safety Program generated in-house savings accrued from meter calibration, recycling, and decay in storage programs amounting to more than \$53,826 in 2009/2010.
- DOES will continue to strive to improve both safety awareness and safety performance for the University as a whole. Success in these programs will be measured in terms of reduced numbers of accidents and violations found during safety inspections throughout the University.
 - Completed major SOP and manuals rewrites.
- Began updating old RAM Protocols.
- Began entering general training data into HP Assist.
- Had a successful Tri-annual ODH Radiation Generating Inspection - 5/2010
- Successfully renewed the university's Annual Low-Level Radioactive Waste (LLRW) Report – 4/2010 with no submission problems.
- Rebid Radioactive waste program contractor arrangements..
- Completed OSHA 30 Hour Online Outreach Training – Staff (10)
- Attended Essentials of Hazardous Materials Management Course – Staff (1)
- Attended Council on Ionizing Radiation Measurements/Standards (CIRMS 2009) – Staff (2)
- The Google Calendar instituted to schedule all meetings.
- New Radiation Waste Pickup Form was revised and implemented.

- New Retraining presentations for Laboratory Workers, and AUs, Ancillary Radiation workers and Lasers Users were placed online

RADIATION SAFETY GOALS FOR 2010-2011

The continuing goal of the Radiation Safety Program is to position DOES 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:

- Complete CSHEMA benchmarking to determine how DOES measures up relative to other peer institutions on standard EHS benchmarks.
- Rebranding the department and rename it to Environmental Health and Safety effective 7/1/2010, and beginning efforts to define a new image along with new logo for new rebranding.
- Complete strategic plan for the department and implement PDP plans for staff in alignment with department goals.
- Complete integration of HPASSIST and launch web kiosk for services and training, share database with key partners to increase transparency of department and accuracy of data.
- Augment Fluoroscopy program manual/training.
- Continue update of old RAM Protocols. (greater than 10 years old)
- Research/develop NMR Safety Program
- Personnel will be encouraged to attend meetings off-campus to expose themselves to innovations in the outside safety communities.
- Both the Laser Safety Program and the X-Ray Safety Program will be a focus of developmental efforts and will be incorporated into the HP Assist database to improve compliance monitoring and administration of these new programs.
- Both the Radiation Safety and Laser Safety training presentations will be changed to a new training template.

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.

During this year, all Broadscope License Materials were revised and submitted to the ODH for review. The Broadscope License inspection was conducted by ODH on October 14-15, 2010. No issues of non-compliance requiring a written response were noted during this inspection.

Items of note included:

1. **Deficiency in WRB facility alarm function** – The first entry to the facility did not trigger the alarm. The second entry triggered the alarm and security responded.

Committee response – Discussion with the Vice President of Campus Services concluded that Biometrics Security System would be installed to prevent confusion of the electronic sensing circuit when an individual lingers in the doorway upon entering the facility. This solution mechanism will be implemented in all security alarm doors at critical security locations.

2. **Borrowed badge to enter Lerner Facility** – The ODH Inspector noted that the individual did not use his badge when entering the facility and did not have on a laboratory coat.

Committee response – To avoid ID exchange and ensure only approved individuals can enter these facilities, all security facilities will be converted to Biometrics Security systems. Exchange of IDs is against University guidelines but was not listed as a specific violation and is not aggressively enforced. The Facility Manager has assured the Committee that until the new security systems are in place. These procedures will be more closely scrutinized. Wearing proper laboratory attire when entering the facility will be emphasized.

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 conducted by ODH on May 25-28, 2010. The following violations were noted during the inspection:

1. **Registration Not Accurate – Level 3** – The Department was not notified of a required amendment to your registration. This deficiency was corrected at the time of the inspection. – No further action was necessary on the part of your facility
2. **Analytical Unit Caution Sign Not Available – Level 3** – An analytical unit did not have a readily discernible sign bearing the radiation symbol and the words 'CAUTION – THIS EQUIPMENT PRODUCES RADIATION WHEN ENERGIZED,' or words having a similar intent, near any switch or control that directly energizes the unit. Caution labels were provided at the time of inspection. No further action was needed.
3. **Safety Device Checks (Diffraction Units) – Level 3** – Proper operation of safety devices, such as interlocks, lights, and labels, were not checked at least every six months, and/or performed by qualified individuals, and/or documented and available for inspection to include any corrective actions taken.

Response – The operator has put a log on the machine that has all previous performed safety checks documented. The log will be reviewed during the quarterly inventory by X-Ray Safety Specialist.

4. **Technique Chart Not Available (Admitting Bay 7, GE Unit) – Level 3** – A technique chart was not available at the control panel that specifies patient's body part and size, or age in the case of pediatrics,

speed and size of the film used. Specifically, each dental intraoral unit needs to have a technique chart reflecting the techniques used specific to each unit.

Response – The Technique Chart for Admitting Bay 7, GE Unit was updated to address all available settings.

5. **Technique Chart Not Available (Pedo DOA 34E, Keystone Unit) – Level 3** – A technique chart was not available at the control panel that specifies patient's body part and size, or age in the case of pediatrics, speed and size of the film used.

Response – The Technique Chart for Pedo DOA 34E was updated to address all available settings.

6. **Tests for Cabinet X-Ray Systems (Wearn 519, Faxatron Unit) – Level 3** – Evidence was not available showing that applicable tests for proper operation of high radiation area control devices, interlocks, warning lights, and labels have been conducted every three months for all cabinet X-Ray systems designed to exclude the admittance of individuals. Records demonstrating compliance must be examined.

Response – The operator will perform and document applicable tests. The documentation will be reviewed during the quarterly inventory by a X-Ray Safety Specialist.

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. 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 to cover 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 stored at the following sites:

- Shipping and Receiving, 2232 Circle Drive, Cleveland, OH
- Cedar Avenue Service Center, 10620 Cedar Avenue, 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 a ^{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	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Total Workers	52	68	55	45	28	10	5	2
Total Irradiators	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 2009-2010 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: 1/1/2011 Chairperson: 12/31/2007	Dr. Jeffery Coller Dept. of RNA Center HG Wood 113 Term Expires: 10/1/2010	Dr. Monica Montano Dept. of Pharmacology HG Wood 367 Term Expires: 9/1/2011
Dr. James Bruzik Dept. of RNA Molecular Biology/Biochemistry HG Wood 103 Term Expires: 9/1/2011 Resigned 1/2010	Dr. Lax Devireddy Dept. of Pathology Wolstein 6524 Term Expires: 10/1/2010	Dr. Thomas McCormick Dept. of Dermatology BRB 530 Term Expires: 9/1/2011
Dr. Zhenghong Lee Dept. of Radiation Oncology Bishop S109B Term Expires: 9/1/2010	Dr. Saba Valadkhan Dept. of RNA Center Research Tower 100-8 Term Expires: 11/1/2010	Dr. Eckhard Jankowsky Dept. of Biochemistry HG Wood 447 Term Expires: 1/1/2011
Dr. W. David Sedwick Radiation Safety Officer (RSO) Dept. of Medicine DOES - Service Building, 1 st Floor	Colleen Croniger Dept. of Nutrition BRB 925 Term Expires: 5/1/2013	

EX-OFFICIO MEMBERS

Richard Jamieson Vice President of Campus Svcs. Adelbert Hall 205	Felice T. Porter Asst. Dir/Asst. RSO – 4/2009 Quality Assurance Specialist DOES Service Building, 1 st Floor
Bruce DeMeza Asst. RSO University Hospitals Case Medical Center Bishop S611	R. Michael Sramkoski Senior Research Associate & Laser Specialist Comprehensive Cancer Center WRB 3542

SUPPORT STAFF

Shirley Mele Office Supervisor Service Building, 1 st Floor	Gwendolyn Cox-Johnson Department Assistant Service Building, 1 st Floor
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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 seven occasions during the 2009-2010 fiscal year to review applications for radioisotope use and act on other business. Four 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	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
New AU	9	5	7	14	11	8	3	8
Additional Isotopes	5	1	7	7	6	10	2	13
Radioisotope use in Animals	5	2	5	6	5	7	4	4
Sealed Sources	1	1	1	1	6	1	1	2
AU Reactivation	0	0	0	0	1	0	1	0
Possession Limit Increase	0	0	0	1	0	1	0	0
AU Protocol Update	0	0	0	0	0	3	0	0
TOTAL APPROVALS	20	9	20	29	29	30	11	27

Major topics acted upon or discussed by the RSC:

- Introduced Dr. Ahmad Hitami, the new Radiation Safety Officer for University Hospital's Radiology Department.
- Laser Safety Program Summary presented by Joseph Nikstenas, Operations Supervisor
- Richard Jamieson commented that Felice Porter was doing a great job as Interim Assistant RSO thanked her for her commitment.
- Anthony Berdis thanked the RSC for a smooth Annual Audit.
- Presentation of Annual Report
- The RSC Bioassay audit discontinued since no iodinations performed.
- Quarterly were audits distributed to committee members.
- New ODH five-year License submit was reviewed before submission.
- Preliminary results of ODH Triannual Inspection were presented
- Identify badge use in secured RAM locations was discussed and recommendations made.
- Access to AU records/protocols – Policy was developed on who should be granted access to AU records and under what circumstances such access should be approved?
- For one case of a security violation involving eating in the laboratory and additionally not wearing a laboratory coat. The PI was given special notification.
- Irradiator access declined due to Security rewiring the facility
- An Emergency Tabletop Exercise scheduled for 1/7/2010 involving Upper Administration and the University President and Provost went well.
- A new Biometrics Security system is in the funding stage.
- Developing policy for sharing AU Radioactive Materials Use records
- James Bruzik is converted to Inactive Status and resigned from the RSC in 1/2010
- Update on laboratories found to be in non-compliance regarding eating/drinking and lack of PPE
- A non-human use RAM Application was updated to include RAM use records sharing statement for the Chairman to sign.
- A Biometric Technology System purchased and installed for critical areas (BSL3 and Irradiator access).

- Quarterly audits were distributed and completed by RSC members.
- Older RAM applications (1989-present) under review for revision and update
- A new annual Bio-Safety Information Form discussed
- UH reported on its annual ODH inspection
- A new DOES Executive Director, Robin Elliott, started part time 4/1/2010 but was forced due to personal reasons to withdraw from accepting the final position..
- A new RSC member, Colleen Croniger was welcomed to the RSC.
- Safety violations and fines for Johns Hopkins and University of California were discussed to inform the RSC on how critical safety issues can arise and be avoided.
- RSC Annual Audits were accomplished.

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 access for Radiation Safety Programs.

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
- Improper RAM use and storage
- Improper laboratory environment/general safety

Moderate Severity violations include the following:

- Food/cosmetics in laboratory
- RAM unsecured
- RAM in unauthorized areas
- Unapproved move
- Unapproved disposal
- Unidentified contamination
- Failure to respond to written notice

Major Severity violations include the following:

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

There were no major severity violations found. Of the 76 moderate violations listed below, 67 were the result of unsecured RAM found during after-hours security checks and routine compliance reviews. Four (4) were food and drink violations and five (5) were assessed to laboratories that had three or more minor violations during one compliance review by the Radiation Safety staff during its routine audits. Documented follow up and resolutions were completed for all major & moderate violations.

VIOLATIONS	09/10	08/09	07/08	06/07
Minor	53	103	83	57
Moderate	76	27	43	11
Major	0	0	0	1
Total	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 2009-2010.

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 ACTIVE & RADIATION GENERATING EQUIPMENT/ X-RAY (RX)

These AUs actively use RAM and X-Ray equipment.

RADIATION GENERATING EQUIPMENT/ X-RAY (X)

These AUs actively use X-Ray equipment only.

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	09/10	08/09	07/08	06/07	05/06	04/05	03/04
RA	87	91	92	112	124	116	123
RX	0	0	0	0	2	3	1
X	0	23	22	22	23	27	27
RI	13	1	14	8	12	2	7
SM	3	4	5	6	4	9	8
D	3	6	8	12	11	12	12

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 (1)
Specialist Positions (4)	Department Administrator (1)
Department Assistant (1)	2 nd Shift Specialist (1)
Student (1)	Analyst Programmer (1)
Executive Director (1)	

The new Executive Director position was filled by Robin Elliott in April 2010. Due to personal reasons, she resigned the position in June 2010.

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 2009-2010 included OSHA 30 Hour Outreach Training, 2010 Essentials of Hazardous Materials Management Course, 2009 Integers Conference, 18th Annual Council on Ionizing Radiation Measurements and Standards (CIRMS) 2009 Conference, Radiation Safety Officer with DOT Certification Course, DOT & NRC Requirements for Shipping and Receiving Radioactive Materials Course, 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 Radiation Safety Staff is responsible for maintaining the DOES 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 ten 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 RSOE 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 that 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	29	279	215
X-Ray	20	52	0
Laser	11	48	35
RTK (Right to Know)	28	50	0
Custodial Contractor	4	34	0
Plant Maintenance	5	66	0
ARC (Animal Research Center)	4	57	0
Shipping	3	13	0
Protective Services	16	51	0
Custodial	3	114	0
Irradiator (site specific)	15	52	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 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	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Radiation	279	223	240	297	284	284	283	322
Retraining	0	0	0	0	0	0	0	11
Online Retraining	215	418	430	695	724	775	793	754
X-Ray	52	97	96	64	51	74	45	84
Ancillary	345	403	382	402	413	356	448	540
Laser	48	66	41	56	31	116	0	0
Laser Online	35	28	15	10	11	0	0	0
Irradiator	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 (old Mt. Sinai)	White
Wickenden	Wolstein Research	Wood Research Tower

LABORATORIES

There are approximately 285 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	181
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 DOES personal computers (PCs) are being backed up onto a terabyte array. The Carbonite backup service is currently used for two DOES Servers (does, 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 40 workstation hardware problems
- Purchased and set up 9 new computers (7 workstations, 2 netbooks)
- Set up 1 existing computer

Software Maintenance

- Repaired about 500 workstation software problems
- Released updated DOES website
- Work toward Onsite web module

The Department of Occupational and Environmental 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 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 recommissioning 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 DOES 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 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 84 isotope transfers approved this year, for a total of 426 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. 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, 315 isotope shipments (totaling 655 mCi) were inspected and approved by the RSOF after receipt on the campus.

DISPOSAL OF RADIOACTIVE MATERIALS

Excluding decay of isotope in laboratories and minor inventory changes, isotopes were removed from laboratories either by 417 isotope waste pickups by RSOF staff (187 mCi) or by 89 AU-directed disposals into the sanitary sewers (24 mCi). The following table presents a tabulated breakdown by isotope of radioactive materials entering and leaving laboratories.

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

ISOTOPE	ORDERS		WASTE PICKUPS		SEWER DISPOSALS		TRANSFERS	
	#	mCi	#	mCi	#	mCi	#	mCi
¹¹ C	0	0	0	0	0	0	18	17.780
¹⁴ C	14	18.526	82	21.082	17	1.516	7	1.505
⁴⁵ Ca	2	2.00	6	0.118	2	0.054	0	0
³⁶ Cl	0	0	7	0.109	1	0.003	0	0
⁵⁷ Co	0	0	0	0	0	0	0	0
¹³⁷ Cs	0	0	2	0.028	2	0.028	0	0
¹⁸ F	0	0	0	0	0	0	32	382.780
⁵⁵ Fe	1	10.0	2	1.015	1	0.015	0	0
⁵⁹ Fe	3	3.0	13	1.455	1	0.001	2	0.40
³ H	22	58.701	144	75.504	24	3.358	5	1.519
¹²⁵ I	3	0.015	4	0.072	4	0.072	6	0.344
⁵⁴ Mn	1	1.00	3	0.160	0	0	0	0
⁶³ Ni	1	5.0	17	5.608	0	0	0	0
³² P	236	513.55	113	72.598	33	19.392	10	5.714
³³ P	15	3.85	6	0.265	3	0.041	0	0
⁸⁶ Rb	0	0	3	0	0	0	0	0
³⁵ S	13	39.0	15	8.570	1	0.010	0	0
^{99M} Tc	0	0	0	0	0	0	4	16.000
Total	311	654.642	417	186.584	89	24.49	84	426.042

SEALED SOURCES

Case Western Reserve University's sealed source inventory contains 213 sealed sources. Of these, 203 sealed sources are required to be inventoried every six months. One (1) of the 213 sealed sources is a low-dose irradiator. Six (6) 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, two (2) sealed sources were disposed.

INVENTORY	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Sealed Sources	213	211	213	207	168	204	204	171
Exempt	203	201	190	188	154	183	186	158
Irradiator	4	5	4	4	4	3	3	3
Neutron	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 DOES provided in-house services that generated \$15,996 in cost saving over the fiscal year in lieu of using outside vendors.

CALIBRATION/ SERVICE	COST PER SERVICE	COST SAVINGS
142 meters	\$78/meter	\$11,076
0 pumps	\$70/pump	\$0
24 thyroid assays	\$55/assay	\$1,320
12 pre-filter changes	\$75/ filter change/quarterly	\$3,600
	TOTAL COST SAVINGS	\$15,996

There are 195 survey meters on campus. The RSOF calibrated 142 of these meters in the last fiscal year. There were 55 meters removed from service. In service meter calibrations totaled 140. 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 prefilters are changed every 90 days. One fan unit (#2) for the walk-in hood has been out of service more than one year since it needs repair. Currently, there are four filters that are 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	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Meter Calibration	142	172	170	157	188	233	245	250

METERS IN USE	TOTAL
Bicron	0
Dosimetry	1
Hi-Q	1
Inovision	1
Ludlum	100
RPI Mini Monitor	14
Technical	1
Victoreen	10
WB Johnson	17

METER CALIBRATION BY MONTH	TOTAL
7.2009	5
8.2009	7
9.2009	3
10.2009	6
11.2009	21
12.2009	6
1.2010	11
2.2010	18

3.2010	11
4.2010	10
5.2010	11
6.2010	27

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.

RAM SECURITY CHECKS	09/10	08/09	07/08	06/07	05/06	04/05	03/04
Violations	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.

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 DOES website <https://www.case.edu/finadmin/does/> under the 'Radiation Safety' link and send it to 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. One woman declared her 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	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Pregnant Workers	1	1	2	2	6	6	13	15
Neutron	4	4	4	0	0	0	0	0
RGE/ X-Ray	45	103	70	38	60	201	160	180
Dental	28	28	28	28	28	28	28	28
General	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 2010.

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 DOES provides general safety classes for individuals using RGE.

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

RADIATION-GENERATING UNITS (Not In Use)	08/09	07/08	06/07	05/06	04/05	03/04	02/03
Analytical units In storage	15	18	19	23	21	23	23
Analytical units Disabled	4	1	2	3	7	5	7
Analytical units Out of Service	9	9	9	11	9	7	7
Diagnostic units Disposed	3	4	4	7	3	2	1
Diagnostic units Purchased	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)	09/10
Closed Beam Analytical	6
Computer Tomography	1
Electron Microscope/ Photoelectron Spectrometer	11
Enclosed System	4
Fluoroscopy	3
Hand-held Dental	1
Intraoral	27
Open Beam Analytical	1
Panoral	1
Particle Accelerator	1
RADIATION GENERATING EQUIPMENT (IN-OPERABLE)	
Closed Beam Analytical	3
Electron Microscope/ Photoelectron Spectrometer	2
Tube Only	26
TOTAL TUBES	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 2009 was filed by January 29, 2010 and the report for January through June 2010 was filed by July 29, 2010. 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 2009 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 2009-2010, there were no active iodination laboratories. The RSO maintains an inventory of five iodination hoods to be deployed when needed. A bioassay is required when more than 1 mCi of radioactive iodine is used in volatile form. The RSOF must be notified prior to:

- Handling 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 decrease in iodination procedures in University laboratories.

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

¹²⁵ I BIOASSAYS	09/10	08/09	07/08	06/07	05/06	04/05	03/04	02/03
RSOF Staff	24	44	44	32	64	67	64	40
Additional	0	0	0	0	7	10	13	20
Total	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 seventeen (17) minor incidents documented over the past year.

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

DATE	INCIDENT	CONTAMINATION	ROOT CAUSE	FOLLOW UP
2/20/2010	Minor Incident	DOA 990 Alarm	The DOA Door Alarm was purposely set off to test the security system.	The Officer responded to the area within 5 minutes of the alarm. Also verified that security had notified DOES of the alarm.
2/19/2010	Minor Incident	DOA 990 Alarm	The DOA Door Alarm was accidentally set off and quickly disabled by a Radiation staff member. Security did not respond. Security stated that the alarm had not registered and no one was dispatched.	The Radiation staff member notified Security. It was discussed that the security alarm would be purposely to make sure it was working properly.
2/11/2010	Minor Incident	³² P use with PPE infraction & unidentified contamination	³² P contamination found on freezer handle while performing routine survey. Laboratory worker came to laboratory wearing open-toed sandals.	The AU was contacted and the laboratory member corrected both infractions while RSOF was present.
1/15/2010	Minor Incident	³² P improper shielding	During a routine survey of a laboratory high emissions were found near ³² P loaded gels that were improperly shielded and no one was present. The survey meter was 6 feet from the high emissions area.	The AU was contacted and the gels were shielded on all sides by the laboratory member to decrease the emissions to background.
12/7/2009	Minor Incident	Irradiator Access Decline	Irradiator workers were unable to access the room to irradiate mice. Irradiator Manager & Access Services were contacted.	Security was in the process of rewiring the room and the service was temporarily down
12/3/2009	Minor Incident	Fire Alarm	The fire alarm in the WRB Radiation Waste Room went off.	RSOF and security responded to the alarm. They found no activated alarm in the room. The WRB fire system control panel in the basement indicated a dirty detector in the room. The system was successfully reset.
11/6/2009	Minor Incident	Food in Laboratory	While picking up radioactive waste, a coke bottle was found in the trash can.	The AU was contacted and the bottle was removed from the laboratory and recycled.
10/23/2009	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm.	AU and worker were contacted concerning the alarm.
10/15/2009	Minor Incident	Irradiator Intrusion Alarm	ODH inspector purposely set off the alarm to check Security arrival time.	System was reset.
10/14/2009	Minor Incident	SAIRC Misuse of ID badge for entry to RAM area	Laboratory worker borrowed another UH worker's badge since his was misplaced. This was noted by ODH inspector as a security problem.	The AU was contacted immediately. Discussions were held with the CASE Radiation Safety Committee and representatives from UH.
10/14/2009	Minor Incident	Irradiator Alarm Test	ODH Inspection Alarm Test	Discussions were held with Security to correct alarm trigger and

				response time.
10/13/2009	Minor Incident	Contamination and Improper Shielding	During an inspection it was noticed that a bench chair and gel clips were contaminated.	The AU was contacted. The RSOF staff decontaminated the bench chair. The gel clips had fixed contamination and were placed in a Lucite box for decay.
9/27/2009	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm.	AU and worker were contacted concerning the alarm.
9/18/2009	Minor Incident	Unauthorized RAM room move	DOES was not informed of a move from one laboratory location to another with set up for RAM use.	The AU was contacted and informed of DOES requirements for laboratory relocations.
8/25/2009	Minor Incident	Missing RAM equipment	DOES was not informed that a Liquid Scintillation Counter was moved from one location to another.	The AU was contacted immediately. Discussions were held with the Medical School Facilities explaining the need to contact the RSOF before any RAM labeled equipment is moved.
8/5/2009	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm by keeping the door open too long	AU and worker were contacted concerning the alarm.
8/3/2009	Minor Incident	Irradiator Intrusion Alarm	Irradiator worker accidentally set off alarm by keeping the door open too long	AU and worker were contacted and instructed concerning the alarm.

DOES WEB SITE & NEWSLETTER

The updated DOES home web site (<https://www.case.edu/finadmin/does/>) provides integrated web-based access to DOES 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 DOES 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:

- Security of Radioactive Materials
- Handling Radioactive Materials Packages
- Radioactive Material Incident Response/Reporting-Reminders

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 135 active users of lasers. The lasers of greatest concern are those labeled Class 3B

and Class 4. The laser inventory was updated and new signs were posted. There are 50 Class 4 lasers, 16 Class 3B lasers, and 20 lasers in the other classes of 1, 2, and 3A. There are 13 class 3B/4 laser enclosed systems. They are completely enclosed therefore decreasing the hazard to the user.

Some of the systems were put in storage. A new laser system was added to the inventory this year. Twenty-one (21) audits were performed which reviewed personnel & inventory.

Both the Laser Safety PowerPoint presentation for new users and the online Laser retrain are being updated. They will also be incorporated with the HP Assist database. The Laser user list and inventory will be transferred to the new database. Laser Policy discussion will occur with the ad-hoc RSC member to determine Laser system exemptions and specific training requirements and frequency.

ULTRA VIOLET (UV) SAFETY PROGRAM

With increased use of UV equipment on campus, a program has been implemented. A UV safety PowerPoint presentation has been put on the DOES website. UV users are being identified through inspection 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 DOES, Facilities Services, and the AU facilitates these operations. There were 10 clearances required for 17 pieces of equipment. A total of 16 relocations and 3 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, and dry solid waste.

³²P solid waste is held for decay (equal to or less than 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. Reducing the volume of waste to be disposed remains a continuing aim of the waste program. ³⁵S and ¹²⁵I are no longer held for decay, but are shipped along with the long-term solid waste. 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. Currently, only the outside of the bag is surveyed, followed by immediate disposal to simplify handling by staff and provide 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. Short-lived non-sewer (chemical waste) is held for decay, resurveyed after ten half lives, and

disposed by Chemical Analytics, a commercial hazardous waste disposal company. Long-lived solid waste (at least 10 half lives) 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 DOES offices. Total sewer disposals are reported semi-annually to the Northeast Ohio Regional Sewer District.

COLLECTION & DISPOSAL OF ANIMAL REMAINS AND BIOHAZARDOUS WASTE

The Animal Resource Center (ARC) maintains a -20°C freezer for storage of radioactive animal remains and waste. 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.

RECYCLING PROGRAM

In the past fiscal year, the RSOF obtained laboratory equipment 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 & DOES more than \$10,000 during 2009-2010 in lieu of waste disposal.

WASTE GENERATED IN JULY 1, 2009 - JUNE 30, 2010

	GENERATED 7/1/2009- 6/30/2010	DISPOSED: HAZ. WASTE SVCS.	DISPOSED: SEWER	DISPOSED: SAFETY	DISPOSED: ADCO	IN STORAGE AS OF 6/30/2010
Short-Lived Dry	87	46 *	0	0	8	27
Long-Lived Dry	25	0	0	0	25	0
Scintillation Vials	12	0	0	0	12	0
Animals	0	0	0	0	0	0
Long-Lived Sewer	60	0	60	0	0	0
Long-Lived Non-Sewer	120	0	0	0	0	120
Short-Lived Sewer	65	0	65	0	0	0
Short-Lived Non-Sewer	10	0	0	10	0	0

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, 2009, kept for decay in storage, and disposed during the period of July 1, 2009–June 30, 2010. 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 is \$40 per drum. There were 46 drums of dry waste and no 32-gallon drums of animal waste surveyed and disposed during 2009-2010 fiscal year at a cost of \$1,840. 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 \$27,830. Thus, the indirect savings to researchers due to the decay in storage program was \$25,390.

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

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 2009 and between April and June 2010. This effort resulted in the review of more than 170 files, in the program areas listed above.

RSC TRI-ANNUAL AUDITS FOR 2009-2010

RSC AUDIT COMMENT:

In October 2009 the Radiation Safety Committee Members, conducted a tri-annual audit of the following components of the Radiation Safety Office:

- Ancillary staff training
- Sealed Sources
- Valid RAM Applications
- RGE Inventory/ RGE Training
- Isotope Orders/ AU Possession Limits
- Waste Facilities
- Irradiator Program

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.

ANCILLARY STAFF TRAINING

Ten (10) files were examined and two (2) deficiencies were found. Both deficiencies involve personnel that are not listed in the database.

RSOF RESPONSE

The database was corrected and the status of one worker was changed from radiation use to ancillary radiation use. The other worker has left the university.

SEALED SOURCES

Of ten (10) files examined, no deficiencies were identified.

RSOF RESPONSE

No response required.

VALID RAM APPLICATIONS

Ten (10) files examined and three (3) deficiencies were found. Two deficiencies involve personnel that need to be retrained. The third deficiency involves an established PI whose retraining is overdue.

RSOF RESPONSE

All three deficiencies were corrected by ensuring that the personnel were retrained.

RGE INVENTORY/ RGE TRAINING

No deficiencies were reported.

RSOF RESPONSE

No response required.

ISOTOPE ORDERS / ISOTOPE POSSESSION LIMIT

No deficiencies were reported in ten (10) files randomly audited.

RSOF RESPONSE

No response required.

WASTE FACILITIES

No deficiencies were reported.

RSOF RESPONSE

No response required.

IRRADIATOR PROGRAM

No deficiencies were reported.

RSOF RESPONSE

No response required.

RSC AUDIT COMMENT:

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

- Radiation Survey Meters
- DOES Website Accuracy (Radiation Safety)
- Semi-Annual Mailing
- Bioassays
- Shipping Papers
- Active/Decommissioned 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 for survey meters were randomly evaluated. No deficiencies were reported.

RSOF RESPONSE

No response required.

DOES 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 MAILING

Ten (10) AU files were randomly audited for semi-annual mailings. One (1) deficiency was reported in which the Semi-Annual Mailing form from the first six (6) months was missing from the researchers file.

RSOF RESPONSE

The file was searched.

BIOASSAYS

No deficiencies were reported.

RSOF RESPONSE

No response required.

SHIPPING PAPERS

RSC AUDIT COMMENTS:

Seven (7) files were examined for accuracy in shipping papers over the past quarter. No deficiencies were noted.

RSOF RESPONSE:

No response required.

ROOM SURVEYS (ACTIVE/DECOMMISSION)

This audit was apparently not performed as no information was provided on the form.

RSOF RESPONSE

No response required.

RSC AUDIT COMMENT:

The RSC conducted a third trimester audit during June 2010. 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:

- Dosimetry
- RGE Program
- Security Checks

- Licenses
- Isotope Possession Limits
- Irradiator Program
- AU/Worker Training
- Valid RAM Applications
- Laser Program
- Waste Facilities
- Ancillary Support Staff Training
- Incidents

DOSIMETRY

Ten (10) files were randomly examined. No deficiencies were found.

RSOF RESPONSE

No response required.

RGE PROGRAM

Ten (10) files were randomly examined. No deficiencies were found.

RSOF RESPONSE

No response required.

SECURITY CHECKS

No deficiencies were found in any of the ten (10) files audited.

RSOF RESPONSE

No response required.

LICENSES

All licenses are current and latest inspections were recently performed without incidence.

RSOF RESPONSE

No response required.

ISOTOPE POSSESSION LIMITS

No deficiencies were reported in ten (10) files that were randomly audited.

RSOF RESPONSE

No response required.

IRRADIATOR PROGRAM

Ten (10) files were randomly audited. Of these, there were six (6) individuals that had deficiencies with respect to training.

RSOF RESPONSE

All personnel have been trained and their files are current.

AU/WORKER TRAINING

Ten (10) files were randomly audited. Of these, one (1) individual had deficiencies with respect to training.

RSOF RESPONSE

The individual has been trained.

VALID RAM APPLICATIONS

Ten (10) files were randomly audited and deficiencies were noted on all ten (10) files. Most of these deficiencies result from a lack of documentation indicating that the rooms were inspected.

RSOF RESPONSE

Rooms that will be used for inspection are required during the application process. When an additional room is needed for research, the researcher must send the updated map to the RSOF. The updated maps were received and placed in the application file.

LASER PROGRAM

Ten (10) files were randomly audited and deficiencies were noted on all ten (10) files. Deficiencies ranged from an inability to locate files associated with the PI to follow-ups denoted for worker training.

RSOF RESPONSE

The Laser Program information will soon be placed on the HP Assist database along with all worker-training information. Also the program files for inventory and training will be located in the central filing area for better access to program and training information.

WASTE FACILITIES

Two deficiencies were noted. First, the WRB 1120 facility had weekly surveys but no monthly surveys. The second deficiency involves a lack of records for Stericycle.

RSOF RESPONSE

The Wolstein 1120 is an office that has been surveyed monthly. All files were complete and current. All Stericycle waste files were in the waste file and were complete and current.

SUPPORT STAFF TRAINING

Ten (10) AU files were randomly audited and all were found to be compliant.

RSOF RESPONSE

No response required.

INCIDENT PROGRAM

No deficiencies were reported.

RSOF RESPONSE

No response required.

SEALED SOURCES

Of ten (10) files examined, no deficiencies were identified.

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 2010. 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
- Laser Program
- Licensing Status
- Irradiator Program
- 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, 2009 through June 30, 2010. Of fifty (50) files examined, no deficiencies were noted.

RSOF RESPONSE:

No response required.

AU AND WORKER TRAINING

RSC AUDIT COMMENT:

Fifteen (15) files were examined to verify the training dates of AU and workers during the period of July 1, 2009 through June 30, 2010. All fifteen (15) files were found to be overdue for training.

RSOF RESPONSE:

All overdue personnel were contacted directly and required to attend Radiation Safety Training in person. Ordering privileges were withheld for the researcher whose training was four months overdue until retraining was complete. Retraining is now complete for all noted.

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, 2009 through June 30, 2010. No ^{125}I shipments were received during this period. Three (3) ^3H shipments over 10 mCi were received, and each audit was accurate.

RSOF RESPONSE

The three (3) ^3H shipments over 10 mCi that were received came in as 2-5mCi vials; therefore, a ^3H bioassay was not 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 ten (10) files were compliant and that the other forty (40) were outstanding for various deficiencies ranging from delinquent room surveys and survey meters to lack of retraining.

RSOF RESPONSE

All areas of non-compliance have been corrected.

ISOTOPE ORDERS, AU POSSESSION LIMITS, AND THE HELIX DATABASE

RSC AUDIT COMMENT:

Thirty-three (33) 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, 2009 and June 30, 2010). Thirty (30) files could not be found in the electronic database.

RSOF RESPONSE

We are in the midst of transferring database from the Helix database to the new HP Assist database. Several personnel were missing from Helix and were entered into the system. Six of the workers are X-Ray workers and are in the X-Ray database. All remaining dosimetry files will be reviewed and checked against the database to ensure that they have been correctly placed in the new system..

INCIDENT REPORTS

RSC AUDIT COMMENT:

During the period of July 1, 2009 and June 30, 2010, monthly incident reports were reviewed for verification and documentation of follow-up by the RSOF. During this time, there were a total of fourteen (14) incidents reported. No deficiencies were denoted.

RSOF RESPONSE

No response required.

LASER PROGRAM REVIEW

Information was reviewed for accuracy regarding laser inspections, inventory, and current training. Thirty (30) files were audited. Numerous deficiencies were found. First, inventory notes could not be assessed. Secondly, it was noted that there are no control/inventory files for several PI's in the database. Finally, there were numerous incidents of overdue inspection and training.

RSC RESPONSE:

The Laser Program Inventory is a new system that is still being improved by the RSOF. Training will be transferred to the HP Assist database. All information will then be filed in the central filing area for Laser inventory and worker training.

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.

IRRADIATOR INFORMATION REVIEW

RSC AUDIT COMMENT:

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. All other files were up-to-date and compliant.

RSOF RESPONSE

No response required.

ISOTOPE SECURITY CHECKS

RSC AUDIT COMMENT:

During the period of July 1, 2009 and June 30, 2010, reports were reviewed for verification and documentation of radioisotope security checks. During this period, a total of thirty-one (31) security checks were generated. There were nineteen (19) episodes of unsecured RAM. Eighteen (18) incidences were resolved in a timely fashion. One (1) incident involving an 'inventory issue' is ongoing.

RSOF RESPONSE:

The inventory issue was resolved.

RADIATION GENERATING EQUIPMENT INVENTORY AND TRAINING

RSC AUDIT COMMENT:

Forty-five (45) files were examined for inventory status and last survey date of equipment during the period of July 1, 2009 and June 30, 2010. 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. Fourteen (14) meters are past due for calibration. Files could not be found for two (2) survey meters.

RSOB RESPONSE:

Most of the past due meters were recalibrated. One past due meter was taken out of service until calibrated. The two missing files were for meters where the researcher is now inactive or has left the University.

DOES WEBPAGE (RADIATION SAFETY)

An audit was performed to verify the status of all Radiation Website 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.

RSOB 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.

RSOB 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, 2009 and June 30, 2010.

RSOB RESPONSE:

No response required.

SHIPPING PAPERS

RSC AUDIT COMMENTS:

Thirty-three (33) shipping papers were randomly audited to ensure that they were adequately completed for the transfer of RAM material from site to site during the period of July 1, 2009 and

June 30, 2010. Of all files examined, one (1) file was denoted as exceptional for not being in the database as direct pick-up.

RSOF RESPONSE:

The package was entered into the database as a transfer.

SEMI-ANNUAL MAILINGS (AIR/ SEWER INVENTORY)

RSC AUDIT COMMENT:

Fifty (50) files were examined to verify receipt of semi-annual mailings from the last twelve months. All files were complete during the period of July 1, 2009 and June 30, 2010.

RSOF RESPONSE:

No response required.

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, 2009 and June 30, 2010. Fourteen (14) files were found to be deficient, particularly with respect to differences noted between rooms on Form 1 and inventories.

RSOF RESPONSE:

Old applications are in the midst of being updated with committee review. There have also been several recent moves caused by renovations which have accounted for the differences.

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, 2009 and June 30, 2010. 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.

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

The DOES 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 DOES 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 will be 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.

Prepared by Felice Thornton-Porter on 10/5/2010.

APPENDIX

AUTHORIZED USERS

RADIATION ACTIVE

Neena Singh	9/8/2009	Hua Lou	1/12/2010
Zhenghong Lee	9/14/2009	Saba Valadkhan	4/29/2010
Lax Devireddy	2/12/2010	Krzysztof Palczewski	12/8/2009
Jeff Coller	4/14/2010	Liem Nguyen	1/7/2010
Scott Welford	2/3/2010	Qingzhong Kong	2/23/2010
Helene Bernstein	5/13/2010	Derrick Taylor	3/5/2010

STORAGE MODE

Pamela Davis	1/22/2010	Clark Distelhorst	2/1/2010
Peter Harte	12/15/2009		

RADIATION INACTIVE

James Bruzik	11/9/2009	Evan Deneris	10/1/2009
Hung-Ying Kao	12/22/2009	Faramarz Ismail-Beigi	8/4/2009
Mary Laughlin	5/27/2010	Helen Salz	6/16/2010
Peter Scacheri	3/29/2010	Nora Singer	10/1/2009
Martin Snider	2/3/2010	Zahra Toossi	8/28/2009
Yu-Chung Yang	8/13/2009	Lan Zhou	2/3/2010
Richard Zigmund	2/11/2010		

DEPARTED

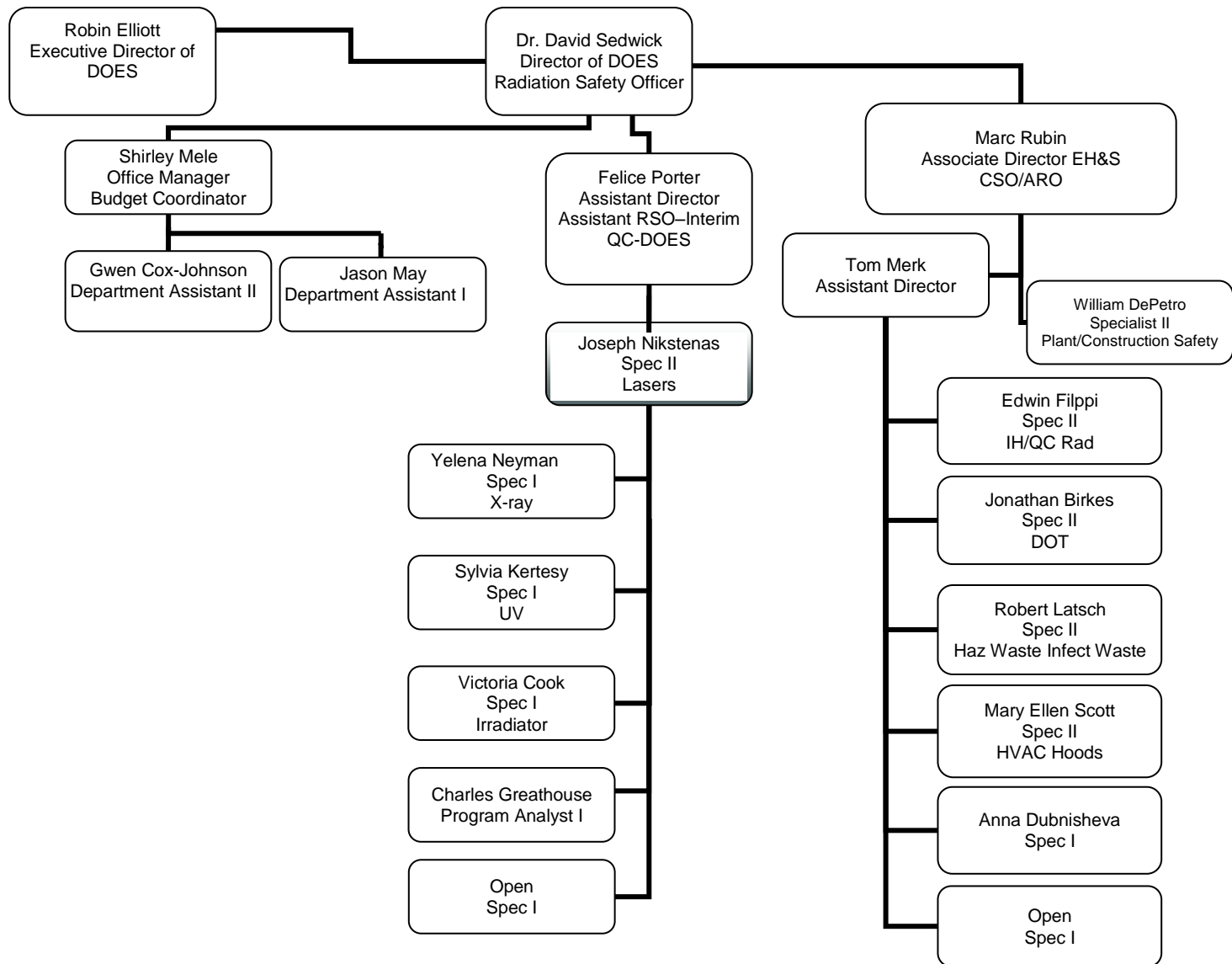
Kevin Bunting	4/16/2010	Mark Caprara	11/23/2009
Keith McCrae	2/11/2010		

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	Anne Hiltner	Deepak Langhe
JAI	Mukesh Jain	Yingjie Cui
JEN	Wayne Jennings	Wayne Jennings
LAG	Peter Lagerlof	Peter Lagerlof
LEE	Zhenghong Lee	Chris Flask
MAC	Alan Mcllwain	Alan Mcllwain
PRO	John Protasiewicz	John Protasiewicz
SAIRC	Raymond Muzic	Chris Flask
SCH	Daniel Scherson	Daniel Scherson
SHO	Menachem Shoham	Menachem Shoham

LASER USERS

Mary Barkley	Clemens Burda	Paul Carey
Patty Conrad (Active-Exempt)	Kevin Cooper (Inactive)	Corbin Covault (Inactive)
David Dean	Diana Driscoll (Active-Exempt)	Steven Eppell
Maryann Fitzmaurice	Stefan Herlitze (Departed)	Anne Hiltner (Inactive)
Alex Huang	Yoshikazu Imanishi	Hatsuo Ishida
James Jacobberger	Alexander Jamieson	Jaikrishnan R. Kadambi
Yasuhiro Kamotani	Kathleen Kash	Melissa Knothe Tate (Active-Exempt)
Jack Koenig (Active-Exempt)	Roger Marchant	Claudia Mizutani
Sayed Qutubuddin (Inactive)	Andy Resnick (Departed)	Andrew Rollins
Charles Rosenblatt	Shasta Sabo (Active-Exempt)	David Schwam
W. David Sedwick (Inactive)	Jie Shan	Kenneth D. Singer
Corey Smith	Benjamin Strowbridge (Active-Exempt)	Chih Jen Sung (Departed)
Dustin Tyler	Christoph Weder (Departed)	



Master Isotope List

Isotope	1/2 Life (hours)	Sum of PI Inv	Sum PI 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	110.0000	300 mCi
C14	50,194,800.00	49.8732	324.1200	2,000 mCi
Ca45	3,904.80	0.6916	25.0000	300 mCi
Cd109	11,300.40	0.0000	0.1000	300 mCi
Ce141	780.72	0.0000	0.0000	300 mCi
Cf252	23,117.64	0.0000	0.0000	10 mCi
Cl36	2,636,760,000.00	1.5600	5.7000	300 mCi
Co56	1,855.20	0.0000	0.0000	300 mCi
Co57	6,408.00	0.3107	3.0000	300 mCi
Co60	46,165.08	0.0000	0.0000	300 mCi
Cr51	667.20	0.2355	58.0000	500 mCi
Cs137	262,800.00	3.2278	10.0000	300 mCi
Eu152	113,880.00	0.0000	0.0000	300 mCi
Eu154	68,328.00	0.0000	0.0000	300 mCi
F18	1.87	0.0000	192.0000	300 mCi
Fe55	23,652.00	9.4800	19.0000	300 mCi
Fe59	1,080.00	0.6249	31.0000	300 mCi
Ga68	1.10	0.0000	0.0000	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	241.6892	3862.5000	20,000 mCi
I123	13.00	0.0000	30.0000	300 mCi
I124	100.80	0.0000	10.0000	300 mCi
I125	1,432.80	0.0860	158.0450	2,000 mCi
I129	14,016,000,000.00	0.0000	0.0000	300 mCi
I131	193.56	0.0000	30.0000	300 mCi
In111	67.20	0.0000	30.0000	300 mCi
Ir192	1,783.00	0.0000	0.0000	300mCi
Kr85	94,608.00	0.0000	0.0000	300mCi
Mg28	21.30	0.0000	1.0000	300 mCi
Mn54	7,500.00	0.5697	3.1000	300 mCi
MXD	68,328.00	0.0027	3.5000	10 mCi
MXD2	4,012,080.00	0.0000	1.0000	10 mCi
MXD3	4,012,080.00	0.0000	0.0000	10 mCi
N13	0.17	0.0000	60.0000	300 mCi
Na22	22,776.52	0.2746	7.5000	300 mCi
Nb94	100,000,000.00	0.0000	0.0000	300 mCi

Master Isotope List

Isotope	1/2 Life (hours)	Sum of PI Inv	Sum PI Limits	NRC/ODH Limit
Ni63	1,051,200.00	11.9535	20.0000	300 mCi
O15	0.03	0.0000	60.0000	300 mCi
P32	342.96	43.4269	667.0000	4,000 mCi
P33	605.00	0.6965	75.7500	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
Po210	3,321.60	0.0000	0.0000	300 mCi
Pu239	210,809,400.00	0.0000	0.0000	10 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	0.0000	12.0000	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	9.9333	659.5000	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	5.0000	300 mCi
Sr90	255,091.00	0.0000	0.0000	1,000 mCi
Tc99	1,865,880,000.00	0.0000	0.0000	300 mCi
Tc99m	6.02	0.0000	80.0000	300 mCi
Th230	674,520,000.00	0.0000	0.0000	10 mCi
Ti44	8,766,000.00	0.0000	0.0000	300 mCi
Ti201	73.00	0.0000	0.0000	300 mCi
Y90	64.10	0.0000	0.0000	300 mCi
Zn65	5,832.00	0.1290	11.0000	300 mCi

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
5	Anthony Sr., Donald D.	C14	5.0000	1.25865	10/7/2010
5	Anthony Sr., Donald D.	H3	1.0000	3.88499	10/7/2010
5	Anthony Sr., Donald D.	P32	1.0000	0.00000	10/7/2010
14	Boom, Willem Henry	Cr51	10.0000	0.00000	10/7/2010
14	Boom, Willem Henry	H3	20.0000	2.59760	10/7/2010
14	Boom, Willem Henry	P32	12.0000	0.00000	10/7/2010
14	Boom, Willem Henry	C14	50.0000	0.00000	10/7/2010
29	Davis, Pamela B.	C14	1.0000	0.00000	10/7/2010
29	Davis, Pamela B.	Ca45	4.0000		10/7/2010
29	Davis, Pamela B.	Cr51	5.0000	0.00000	10/7/2010
29	Davis, Pamela B.	H3	20.0000	0.00000	10/7/2010
29	Davis, Pamela B.	I125	3.0000	0.00000	10/7/2010
29	Davis, Pamela B.	P32	10.0000	0.00000	10/7/2010
29	Davis, Pamela B.	S35	10.0000	0.00000	10/7/2010
29	Davis, Pamela B.	CL36	1.0000	0.70000	10/7/2010
29	Davis, Pamela B.	P33	4.0000	0.00000	10/7/2010
29	Davis, Pamela B.	RB86	5.0000	0.00000	10/7/2010
31	DeHaseth, Pieter	P32	10.0000	0.00000	10/7/2010
34	Distelhorst, Clark	H3	20.0000	0.25248	10/7/2010
34	Distelhorst, Clark	S35	10.0000	0.00000	10/7/2010
34	Distelhorst, Clark	P32	10.0000	0.00000	10/7/2010
34	Distelhorst, Clark	Ca45	5.0000	0.00000	10/7/2010
34	Distelhorst, Clark	C14	1.0000	0.04997	10/7/2010
42	Ernsberger, Paul	C14	5.0000		10/7/2010
42	Ernsberger, Paul	H3	10.0000	1.35242	10/7/2010
42	Ernsberger, Paul	I125	2.0000	0.00000	10/7/2010
42	Ernsberger, Paul	P32	2.0000	0.00000	10/7/2010
49	Gerken, Thomas A.	C14	2.0000	0.00650	10/7/2010
49	Gerken, Thomas A.	H3	20.0000	0.58551	10/7/2010
49	Gerken, Thomas A.	S35	10.0000	0.00000	10/7/2010
49	Gerken, Thomas A.	P33	0.7500	0.00000	10/7/2010
50	Gerson, Stanton L.	H3	50.0000	4.87095	10/7/2010
50	Gerson, Stanton L.	P32	10.0000	0.00000	10/7/2010
50	Gerson, Stanton L.	S35	5.0000	0.00000	10/7/2010
50	Gerson, Stanton L.	C14	1.0000	0.00000	10/7/2010
50	Gerson, Stanton L.	P33	0.7500	0.00000	10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
55	Hanson, Richard	H3	25.0000	15.31527	10/7/2010
55	Hanson, Richard	I125	0.5000	0.00000	10/7/2010
55	Hanson, Richard	P32	10.0000	0.12139	10/7/2010
55	Hanson, Richard	C14	4.0000	1.50840	10/7/2010
55	Hanson, Richard	S35	5.0000	0.00000	10/7/2010
57	Harte, Peter J.	P32	10.0000	0.00000	10/7/2010
57	Harte, Peter J.	S35	5.0000	0.00000	10/7/2010
57	Harte, Peter J.	H3	25.0000	0.00000	10/7/2010
57	Harte, Peter J.	C14	1.0000	0.00999	10/7/2010
80	Kazura, James W.	H3	15.0000	0.00000	10/7/2010
80	Kazura, James W.	I125	5.0000	0.00000	10/7/2010
80	Kazura, James W.	P32	5.0000	0.00000	10/7/2010
80	Kazura, James W.	S35	15.0000	0.00000	10/7/2010
80	Kazura, James W.	CR51	10.0000	0.00000	10/7/2010
92	Lamanna, Joseph	C14	10.0000	1.74795	10/7/2010
92	Lamanna, Joseph	H3	10.0000	1.00879	10/7/2010
92	Lamanna, Joseph	P32	5.0000	0.00000	10/7/2010
92	Lamanna, Joseph	S35	5.0000		10/7/2010
105	Liedtke, Carole M.	C14	10.0000	0.89694	10/7/2010
105	Liedtke, Carole M.	CL36	2.0000	0.49999	10/7/2010
105	Liedtke, Carole M.	H3	25.0000	0.00000	10/7/2010
105	Liedtke, Carole M.	I125	1.0000	0.00000	10/7/2010
105	Liedtke, Carole M.	Na22	2.0000	0.00000	10/7/2010
105	Liedtke, Carole M.	P32	10.0000	0.00000	10/7/2010
105	Liedtke, Carole M.	Rb86	2.0000	0.00000	10/7/2010
111	Maguire, Michael E.	C14	2.0000	0.00000	10/7/2010
111	Maguire, Michael E.	Ca45	2.0000	0.00000	10/7/2010
111	Maguire, Michael E.	H3	10.0000	0.69910	10/7/2010
111	Maguire, Michael E.	I125	2.0000	0.00000	10/7/2010
111	Maguire, Michael E.	Mg28	1.0000	0.00000	10/7/2010
111	Maguire, Michael E.	Mn54	3.0000	0.56971	10/7/2010
111	Maguire, Michael E.	Ni63	20.0000	11.95355	10/7/2010
111	Maguire, Michael E.	P32	15.0000	0.00000	10/7/2010
111	Maguire, Michael E.	Rb86	2.0000	0.00000	10/7/2010
111	Maguire, Michael E.	S35	15.0000	0.00000	10/7/2010
111	Maguire, Michael E.	Co57	2.0000	0.31068	10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
111	Maguire, Michael E.	P33	2.0000	0.00000	10/7/2010
111	Maguire, Michael E.	FE55	4.0000	0.14679	10/7/2010
111	Maguire, Michael E.	ZN65	5.0000	0.12900	10/7/2010
113	RSOF	CO57	1.0000	0.00000	10/7/2010
115	Markowitz, Sanford	C14	10.0000	0.54981	10/7/2010
115	Markowitz, Sanford	H3	30.0000	15.12416	10/7/2010
115	Markowitz, Sanford	I125	10.0000		10/7/2010
115	Markowitz, Sanford	P32	21.0000	0.00233	10/7/2010
115	Markowitz, Sanford	S35	20.0000	0.00000	10/7/2010
115	Markowitz, Sanford	P33	5.0000	0.00051	10/7/2010
121	Medof, Edward	C14	5.0000	0.00998	10/7/2010
121	Medof, Edward	Cr51	10.0000	0.00000	10/7/2010
121	Medof, Edward	H3	50.0000	11.86992	10/7/2010
121	Medof, Edward	I125	15.0000	0.00000	10/7/2010
121	Medof, Edward	P32	6.0000	0.00000	10/7/2010
121	Medof, Edward	S35	15.0000	0.00000	10/7/2010
121	Medof, Edward	P33	5.0000	0.00000	10/7/2010
123	Merrick, William	C14	10.0000	0.99985	10/7/2010
123	Merrick, William	H3	15.0000	0.16064	10/7/2010
123	Merrick, William	P32	10.0000	0.00021	10/7/2010
123	Merrick, William	S35	10.0000	1.61402	10/7/2010
125	Mieyal, John J.	C14	4.0000	0.24857	10/7/2010
125	Mieyal, John J.	S35	10.0000	0.00000	10/7/2010
125	Mieyal, John J.	H3	4.0000	2.08828	10/7/2010
128	Monnier, Vincent M.	C14	30.0000	0.09997	10/7/2010
128	Monnier, Vincent M.	H3	10.0000	0.04940	10/7/2010
128	Monnier, Vincent M.	I125	15.0000	0.00000	10/7/2010
128	Monnier, Vincent M.	P32	10.0000	0.00000	10/7/2010
128	Monnier, Vincent M.	S35	10.0000	0.00000	10/7/2010
135	Nilsen, Timothy W.	H3	10.0000	0.00000	10/7/2010
135	Nilsen, Timothy W.	P32	50.0000	0.48241	10/7/2010
135	Nilsen, Timothy W.	S35	30.0000	0.02438	10/7/2010
138	Oleinick, Nancy L.	C14	7.0000	1.28801	10/7/2010
138	Oleinick, Nancy L.	H3	10.0000	4.57426	10/7/2010
138	Oleinick, Nancy L.	I125	10.0000	0.00000	10/7/2010
138	Oleinick, Nancy L.	P32	2.5000	0.00000	10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
138	Oleinick, Nancy L.	S35	10.0000	0.00000	10/7/2010
138	Oleinick, Nancy L.	F18	2.0000		10/7/2010
170	Siegel, Ruth E.	H3	5.0000	0.17158	10/7/2010
170	Siegel, Ruth E.	I125	2.0000	0.00000	10/7/2010
170	Siegel, Ruth E.	P32	3.0000	0.00000	10/7/2010
170	Siegel, Ruth E.	S35	10.0000	0.00000	10/7/2010
170	Siegel, Ruth E.	P33	3.0000	0.00000	10/7/2010
197	Cotton, Calvin	C14	1.5000	0.72249	10/7/2010
197	Cotton, Calvin	Cl36	1.5000	0.00000	10/7/2010
197	Cotton, Calvin	Na22	1.5000	0.01233	10/7/2010
197	Cotton, Calvin	I125	6.0000	0.00000	10/7/2010
197	Cotton, Calvin	S35	3.0000	0.00000	10/7/2010
197	Cotton, Calvin	Rb86	2.0000	0.00000	10/7/2010
236	Jamieson, Alexander	NA22	1.0000	0.25930	10/7/2010
284	Greenfield, Edward	P32	3.0000	0.00000	10/7/2010
284	Greenfield, Edward	S35	10.0000	0.00000	10/7/2010
284	Greenfield, Edward	I125	3.0000	0.00000	10/7/2010
284	Greenfield, Edward	H3	5.0000	0.00000	10/7/2010
286	Carlin, Cathleen	H3	20.0000	4.41339	10/7/2010
286	Carlin, Cathleen	I125	10.0000	0.00000	10/7/2010
286	Carlin, Cathleen	P32	10.0000	0.00000	10/7/2010
286	Carlin, Cathleen	S35	20.0000	1.69131	10/7/2010
326	Matisoff, Gerald	FE59	1.0000		10/7/2010
326	Matisoff, Gerald	CS137	10.0000	3.22777	10/7/2010
326	Matisoff, Gerald	ZN65	1.0000		10/7/2010
326	Matisoff, Gerald	HG203	1.0000		10/7/2010
326	Matisoff, Gerald	CR51	1.0000		10/7/2010
326	Matisoff, Gerald	MN54	0.1000		10/7/2010
326	Matisoff, Gerald	CD109	0.1000	0.00002	10/7/2010
326	Matisoff, Gerald	NA22	1.0000	0.00295	10/7/2010
326	Matisoff, Gerald	Ra226	0.0060	0.00035	10/7/2010
326	Matisoff, Gerald	Ra228	0.0003		10/7/2010
326	Matisoff, Gerald	MXD	3.5000	0.00270	10/7/2010
326	Matisoff, Gerald	Pb210	1.0000	0.00052	10/7/2010
326	Matisoff, Gerald	MXD2	1.0000	0.00000	10/7/2010
326	Matisoff, Gerald	PO208	0.0000	0.00000	10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
439	Gott, Jonatha M. (SM	P32	20.0000	0.00000	10/7/2010
439	Gott, Jonatha M. (SM	S35	10.0000	0.00000	10/7/2010
439	Gott, Jonatha M. (SM	P33	10.0000		10/7/2010
442	Petersen, Robert	P32	5.0000	0.00000	10/7/2010
442	Petersen, Robert	S35	40.0000	0.00000	10/7/2010
442	Petersen, Robert	P33	5.0000	0.00000	10/7/2010
442	Petersen, Robert	C14	0.1000	0.00000	10/7/2010
504	Hatzoglou, Maria	P32	13.0000	0.55289	10/7/2010
504	Hatzoglou, Maria	S35	20.0000	1.84404	10/7/2010
504	Hatzoglou, Maria	C14	2.0000	0.13091	10/7/2010
504	Hatzoglou, Maria	H3	20.0000	0.18703	10/7/2010
526	McPheeters, David	P32	6.0000	0.00000	10/7/2010
537	DeBoer, Piet	P32	100.0000	0.00000	10/7/2010
537	DeBoer, Piet	S35	100.0000	0.00000	10/7/2010
537	DeBoer, Piet	H3	100.0000		10/7/2010
537	DeBoer, Piet	C14	10.0000		10/7/2010
571	Conlon, Ronald	P33	3.0000	0.00000	10/7/2010
571	Conlon, Ronald	H3	1.0000	0.03742	10/7/2010
571	Conlon, Ronald	P32	3.0000	0.00000	10/7/2010
571	Conlon, Ronald	S35	3.0000		10/7/2010
579	Singh, Neena	C14	5.0000	0.09995	10/7/2010
579	Singh, Neena	S35	50.0000	0.00000	10/7/2010
579	Singh, Neena	H3	10.0000	0.44017	10/7/2010
579	Singh, Neena	P32	10.0000	-0.00000	10/7/2010
579	Singh, Neena	I125	10.0000		10/7/2010
579	Singh, Neena	FE59	10.0000	0.62350	10/7/2010
579	Singh, Neena	FE52	2.0000		10/7/2010
601	Keri, Ruth Ann	P32	5.0000	0.00000	10/7/2010
601	Keri, Ruth Ann	H3	5.0000	0.00000	10/7/2010
601	Keri, Ruth Ann	C14	5.0000	0.00000	10/7/2010
601	Keri, Ruth Ann	S35	8.0000	0.00465	10/7/2010
601	Keri, Ruth Ann	I125	0.0250	0.00093	10/7/2010
625	Levine, Alan D.	H3	10.0000	9.71671	10/7/2010
625	Levine, Alan D.	P32	1.0000		10/7/2010
625	Levine, Alan D.	S35	5.0000		10/7/2010
653	Harris, Michael	P32	25.0000	13.86254	10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
653	Harris, Michael	S35	5.0000	0.00000	10/7/2010
653	Harris, Michael	P33	4.0000	0.00000	10/7/2010
694	Muzic, Raymond Jr.	F18	50.0000	0.00000	10/7/2010
694	Muzic, Raymond Jr.	H3	5.0000	1.28302	10/7/2010
694	Muzic, Raymond Jr.	C14	1.0000	0.01660	10/7/2010
700	Arts, Eric	P32	5.0000	2.44653	10/7/2010
700	Arts, Eric	S35	1.5000	0.00000	10/7/2010
700	Arts, Eric	H3	3.0000	0.00000	10/7/2010
700	Arts, Eric	P33	2.0000	0.00000	10/7/2010
716	Wilson-Delfosse, Amy	I125	5.0000	0.00000	10/7/2010
716	Wilson-Delfosse, Amy	P32	10.0000	0.00000	10/7/2010
716	Wilson-Delfosse, Amy	S35	10.0000	0.00000	10/7/2010
716	Wilson-Delfosse, Amy	H3	20.0000	0.00000	10/7/2010
726	Montano, Monica M.	C14	0.5000	0.24972	10/7/2010
726	Montano, Monica M.	H3	0.5000		10/7/2010
726	Montano, Monica M.	I125	0.5000		10/7/2010
726	Montano, Monica M.	P32	10.0000	0.00000	10/7/2010
726	Montano, Monica M.	S35	2.0000	0.41667	10/7/2010
735	Lee, Irene	H3	2.0000		10/7/2010
735	Lee, Irene	P32	3.0000	0.16295	10/7/2010
735	Lee, Irene	S35	2.5000	0.00000	10/7/2010
739	MacDonald, Paul N.	S35	20.0000	0.00000	10/7/2010
739	MacDonald, Paul N.	I125	2.0000	0.00000	10/7/2010
739	MacDonald, Paul N.	P32	12.0000	0.00104	10/7/2010
739	MacDonald, Paul N.	H3	10.0000	0.00000	10/7/2010
739	MacDonald, Paul N.	C14	10.0000		10/7/2010
740	Weiss, Michael A.	P33	10.0000	0.00000	10/7/2010
740	Weiss, Michael A.	ZN65	5.0000		10/7/2010
740	Weiss, Michael A.	I125	0.1000	0.00000	10/7/2010
740	Weiss, Michael A.	H3	1.0000		10/7/2010
740	Weiss, Michael A.	S35	1.0000		10/7/2010
743	McCormick, Thomas	P32	1.0000	0.00000	10/7/2010
743	McCormick, Thomas	P33	1.0000	0.00000	10/7/2010
743	McCormick, Thomas	CR51	10.0000		10/7/2010
743	McCormick, Thomas	H3	15.0000	4.36103	10/7/2010
744	Danielpour, David	H3	15.0000		10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
744	Danielpour, David	P32	2.0000	0.03064	10/7/2010
744	Danielpour, David	S35	4.0000	0.00000	10/7/2010
749	Berdis, Anthony	P32	2.0000	0.39463	10/7/2010
749	Berdis, Anthony	H3	3.0000	0.00000	10/7/2010
752	Lou, Hua	P32	4.0000	1.29418	10/7/2010
752	Lou, Hua	P33	3.0000	0.00000	10/7/2010
752	Lou, Hua	S35	15.0000	3.81956	10/7/2010
752	Lou, Hua	H3	0.5000		10/7/2010
759	Salomon, Robert	C14	1.0000	0.30927	10/7/2010
759	Salomon, Robert	H3	2725.0000	0.14473	10/7/2010
768	Jankowsky, Eckhard	P32	12.0000	5.29822	10/7/2010
772	Karn, Jonathan	S35	10.0000	0.00000	10/7/2010
772	Karn, Jonathan	P32	10.0000	0.06963	10/7/2010
772	Karn, Jonathan	H3	1.0000		10/7/2010
773	Lee, Zhenghong	I125	10.0000	0.00000	10/7/2010
773	Lee, Zhenghong	I123	20.0000	0.00000	10/7/2010
773	Lee, Zhenghong	I131	20.0000	0.00000	10/7/2010
773	Lee, Zhenghong	TC99M	20.0000	0.00000	10/7/2010
773	Lee, Zhenghong	F18	50.0000	0.00000	10/7/2010
773	Lee, Zhenghong	C14	20.0000	11.34417	10/7/2010
773	Lee, Zhenghong	H3	20.0000	6.48691	10/7/2010
773	Lee, Zhenghong	IN111	10.0000	0.00000	10/7/2010
773	Lee, Zhenghong	TI201	10.0000		10/7/2010
773	Lee, Zhenghong	C11	50.0000		10/7/2010
773	Lee, Zhenghong	FE52	20.0000		10/7/2010
773	Lee, Zhenghong	FE59	20.0000	0.00138	10/7/2010
778	Whittaker, Jonathan	I125	0.9000	0.08216	10/7/2010
779	Barkley, Mary	P32	5.0000		10/7/2010
779	Barkley, Mary	P33	2.0000	0.00000	10/7/2010
779	Barkley, Mary	C14	5.0000	0.49994	10/7/2010
780	Valadkhan, Saba	P32	35.0000	9.87727	10/7/2010
780	Valadkhan, Saba	P33	0.2500		10/7/2010
782	Andrulis, Erik D.	P32	10.0000	0.01674	10/7/2010
782	Andrulis, Erik D.	C14	10.0000		10/7/2010
782	Andrulis, Erik D.	H3	10.0000		10/7/2010
782	Andrulis, Erik D.	S35	10.0000		10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
784	Zhou, Guang	S35	6.0000	0.01755	10/7/2010
784	Zhou, Guang	P32	2.0000		10/7/2010
786	Hoppel, Charles	C14	25.0000	12.86988	10/7/2010
786	Hoppel, Charles	H3	25.0000	0.85458	10/7/2010
787	Jain, Mukesh	P32	10.0000	0.00000	10/7/2010
787	Jain, Mukesh	H3	10.0000	2.05458	10/7/2010
787	Jain, Mukesh	S35	20.0000	0.33906	10/7/2010
788	Letterio, John	H3	10.0000	0.70297	10/7/2010
789	Schmaier, Alvin H.	C14	2.0000	0.08308	10/7/2010
791	Devireddy, Lax	P32	5.0000	0.00000	10/7/2010
791	Devireddy, Lax	Fe55	15.0000	9.33320	10/7/2010
791	Devireddy, Lax	C14	1.0000		10/7/2010
793	Wang, Yanming	H3	20.0000	10.29192	10/7/2010
793	Wang, Yanming	I125	20.0000	0.00020	10/7/2010
794	Abbott, Derek	P32	10.0000	0.03260	10/7/2010
796	Noy, Noa	S35	1.0000		10/7/2010
796	Noy, Noa	P32	2.0000	0.00000	10/7/2010
796	Noy, Noa	H3	1.0000	0.65957	10/7/2010
796	Noy, Noa	C14	1.0000		10/7/2010
797	Chandler, Margaret	H3	8.0000	6.84872	10/7/2010
797	Chandler, Margaret	C14	8.0000	6.29909	10/7/2010
797	Chandler, Margaret				10/7/2010
799	Manor, Danny	P32	12.0000		10/7/2010
799	Manor, Danny	H3	6.0000	0.14260	10/7/2010
799	Manor, Danny	C14	9.0000	0.40080	10/7/2010
799	Manor, Danny	S35	12.0000		10/7/2010
800	Shoham, Menachem	H3	0.5000	0.24341	10/7/2010
801	Dealwis, Chris	C14	5.0000	0.24842	10/7/2010
801	Dealwis, Chris	H3	5.0000	0.67710	10/7/2010
802	Boron, Walter	S35	3.0000		10/7/2010
802	Boron, Walter	C14	2.0000	2.24961	10/7/2010
802	Boron, Walter	C136	0.2000	0.11000	10/7/2010
802	Boron, Walter	H3	20.0000	18.18361	10/7/2010
802	Boron, Walter	P32	2.0000		10/7/2010
802	Boron, Walter	Ca45	4.0000		10/7/2010
803	Cooke, Kenneth	CR51	10.0000		10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
803	Cooke, Kenneth	P32	0.5000	0.00000	10/7/2010
803	Cooke, Kenneth	H3	10.0000	0.47941	10/7/2010
804	Jin, Ge	I125	0.0200	0.00271	10/7/2010
804	Jin, Ge	S35	15.0000		10/7/2010
804	Jin, Ge	P32	2.0000		10/7/2010
804	Jin, Ge	P33	5.0000	0.62660	10/7/2010
806	Pikuleva, Irina A.	H3	10.0000	2.63869	10/7/2010
806	Pikuleva, Irina A.	C14	10.0000		10/7/2010
809	Jackson, Mark	P32	2.0000	0.00009	10/7/2010
810	McGuffin-Cawley,	AL26	0.0001	0.00005	10/7/2010
811	Zhang, Youwei	P32	1.0000	0.00000	10/7/2010
939	Alagramam, Kumar	P32	2.0000	0.00000	10/7/2010
940	Romani, Andrea	H3	30.0000	0.88138	10/7/2010
940	Romani, Andrea	C14	10.0000	4.86978	10/7/2010
940	Romani, Andrea	I125	5.0000	0.00000	10/7/2010
940	Romani, Andrea	NA22	2.0000		10/7/2010
940	Romani, Andrea	CA45	5.0000	0.69164	10/7/2010
940	Romani, Andrea	P32	10.0000		10/7/2010
940	Romani, Andrea	CL36	1.0000	0.25000	10/7/2010
940	Romani, Andrea	SR85	5.0000		10/7/2010
940	Romani, Andrea	RB86	1.0000		10/7/2010
940	Romani, Andrea	S35	20.0000		10/7/2010
941	Harter, Marian	P32	2.0000	0.00000	10/7/2010
941	Harter, Marian	H3	50.0000		10/7/2010
941	Harter, Marian	C14	0.0200		10/7/2010
941	Harter, Marian	S35	2.0000		10/7/2010
942	Murakami, Shunichi	P32	2.0000		10/7/2010
942	Murakami, Shunichi	S35	3.0000	0.00000	10/7/2010
944	Palczewski, Krysztof	P32	5.0000	0.00000	10/7/2010
944	Palczewski, Krysztof	S35	5.0000	0.00024	10/7/2010
944	Palczewski, Krysztof	CA45	5.0000		10/7/2010
944	Palczewski, Krysztof	P33	5.0000	0.06939	10/7/2010
944	Palczewski, Krysztof	H3	25.0000	0.84579	10/7/2010
944	Palczewski, Krysztof	C14	1.0000	0.04999	10/7/2010
946	SAIRC	F18	60.0000	0.00000	10/7/2010
946	SAIRC	C11	60.0000	0.00000	10/7/2010

PI Rad Summary Listing and Post Screen

PI #	PI Name	Isotope	Poss Lmt	Inventory	Date
946	SAIRC	N13	60.0000		10/7/2010
946	SAIRC	O15	60.0000		10/7/2010
946	SAIRC	I124	10.0000		10/7/2010
946	SAIRC	I123	10.0000		10/7/2010
946	SAIRC	I125	10.0000		10/7/2010
946	SAIRC	I131	10.0000		10/7/2010
946	SAIRC	IN111	20.0000	0.00000	10/7/2010
946	SAIRC	LU177	20.0000		10/7/2010
946	SAIRC	TC99m	20.0000	0.00000	10/7/2010
947	Cobb, Brian	H3	200.0000	94.16123	10/7/2010
948	Qu, Cheng-Kui	P32	1.0000	0.00000	10/7/2010
950	Croniger, Colleen	H3	4.0000	0.47682	10/7/2010
950	Croniger, Colleen	P32	4.0000	0.00000	10/7/2010
950	Croniger, Colleen	C14	2.0000	0.75492	10/7/2010
952	Coller, Jeff	S35	10.0000	0.16187	10/7/2010
952	Coller, Jeff	P32	30.0000	8.65466	10/7/2010
953	Nguyen, Liem D.	P32	4.0000	0.06809	10/7/2010
954	Welford, Scott	P32	2.0000		10/7/2010
954	Welford, Scott	H3	1.0000		10/7/2010
956	Kong, Qingzhong	F18	5.0000		10/7/2010
957	Bernstein, Helene	P32	2.0000	0.05790	10/7/2010
957	Bernstein, Helene	Cr51	2.0000	0.23548	10/7/2010
958	Taylor, Derrick	P32	5.0000	0.00000	10/7/2010
958	Taylor, Derrick	S35	5.0000		10/7/2010
959	Schiemann, William P.	H3	10.0000	4.97235	10/7/2010
959	Schiemann, William P.	P32	1.0000		10/7/2010
959	Schiemann, William P.	I25I	0.0100		10/7/2010
960	Prologo, J. David	F18	25.0000		10/7/2010

	PI Name	Location	Isotope	Emits	Current Activity	
326	Matisoff, Gerald	A.W. SMITH 211E	Co57	Gamma	7.13e-8	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co57	Gamma	1.39e-9	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co57	Gamma	2.90e-8	mCi
665	Akerib, Daniel S.	Rockefeller 16	Co57	Gamma	9.06e-5	mCi
665	Akerib, Daniel S.	Rockefeller 16	Co57	Gamma	5.12e-5	mCi
665	Akerib, Daniel S.	Rockefeller 16	Co57	Gamma	1.22e-4	mCi
665	Akerib, Daniel S.	Rockefeller 16	Co57	Gamma	2.90e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co57	Gamma	3.94e-7	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co57	gamma	7.96e-6	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	1.10e-4	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	1.56e-3	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	1.56e-3	mCi
936	Shutt, Tom	Rockefeller 118	Co57	Gamma	1.56e-3	mCi
936	Shutt, Tom	Rockefeller 16	Co57	Gamma	2.49e-2	mCi
946	SAIRC	Lerner Tower B213	Co57	Gamma	1.03e-1	mCi
946	SAIRC	Lerner Tower B216	Co57	Gamma	3.94e-1	mCi
946	SAIRC	Lerner Tower B206	Co57	Gamma	9.32e+0	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	3.37e-4	mCi
113	RSOF	Service Building Rad	Co60	Gamma	4.15e-4	mCi
113	RSOF	Service Building Rad	Co60	Gamma	3.07e-3	mCi
236	Jamieson,	Kent Hale Smith 205	Co60	Gamma	4.60e-4	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Co60	Gamma	6.50e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	4.45e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	4.45e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	5.38e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	1.54e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	7.70e-5	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Co60	Gamma	2.32e-4	mCi
665	Akerib, Daniel S.	Rockefeller 16	Co60	Gamma	1.14e-3	mCi
946	SAIRC	Lerner Tower B216	Co60	Beta/Gam	4.39e-3	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Cs134	Gamma		mCi

	PI Name	Location	Isotope	Emits	Current Activity	
113	RSOF	SOM-Research	Cs137	Beta/Gam	2.55e-2	mCi
113	RSOF	Dental (DOA) 990	Cs137	Beta/Gam	2.62e-2	mCi
113	RSOF	Dental (DOA) 990	Cs137	Beta/Gam	2.59e-2	mCi
113	RSOF	Dental (DOA) 990	Cs137	Beta/Gam	2.58e-2	mCi
113	RSOF	Med East-Robbins	Cs137	Beta/Gam	2.59e-2	mCi
113	RSOF	Service Building Rad	Cs137	Beta/Gam	4.17e-3	mCi
113	RSOF	Service Building Rad	Cs137	Beta/Gam	4.78e-4	mCi
113	RSOF	Service Building Rad	Cs137	Beta/Gam	1.78e-4	mCi
113	RSOF	Service Building 1st	Cs137	Beta/Gam	6.77e-4	mCi
113	RSOF	Wearn 520	Cs137	Beta/Gam	4.91e-5	mCi
113	RSOF	Service Building 1 st	Cs137	Beta/Gam	6.03e-4	mCi
113	RSOF	MILLIS 120	Cs137	Beta/Gam	6.39e-4	mCi
113	RSOF	Wolstein 5514	Cs137	Beta/Gam	2.62e-2	mCi
115	Markowitz,	Wolstein 3113	Cs137	Beta/Gam	2.53e-2	mCi
121	Medof, Edward	Pathology 301	Cs137	Beta/Gam	2.62e-2	mCi
135	Nilsen, Timothy	H.G. WOOD 128	Cs137	Beta/gam	2.68e-2	mCi
135	Nilsen, Timothy	H.G. WOOD 123	Cs137	beta/gam	2.68e-2	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Cs137	Beta/Gam	5.11e-4	mCi
439	Gott, Jonatha M.	H.G. WOOD 109	Cs137	Beta/Gam	5.90e-4	mCi
653	Harris, Michael	SOM-Research	Cs137	Beta/Gam	5.95e-4	mCi
653	Harris, Michael	H.G. WOOD 103	Cs137	Beta/Gam	6.03e-4	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	3.05e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	3.90e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	3.79e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.96e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.96e-3	mCi
665	Akerib, Daniel S.	Rockefeller 118	Cs137	Beta/Gam	5.96e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.96e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.96e-3	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Cs137	Beta/Gam	5.96e-3	mCi

	PI Name	Location	Isotope	Emits	Current Activity	
772	Karn, Jonathan	SOM-Research	Cs137	Beta/Gam	2.65e-2	mCi
786	Hoppel, Charles	H.G. WOOD 148	Cs137	Beta/Gam	8.99e-4	mCi
786	Hoppel, Charles	H.G. WOOD 148	Cs137	Beta/Gam	2.47e-2	mCi
801	Dealwis, Chris	SOM-Research	Cs137	Beta/Gam	2.78e-2	mCi
944	Palczewski,	H.G. WOOD 322	Cs137	Beta/Gam	2.71e-2	mCi
946	SAIRC	Lerner Tower B216	Cs137	Beta/Gam	6.10e-2	mCi
113	RSOF	Dental (DOA) 990	Eu152	Gamma	8.08e-3	mCi
113	RSOF	Dental (DOA) 990	Eu152	Gamma	7.38e-3	mCi
665	Akerib, Daniel S.	Rockefeller 16	Fe55	Gamma	1.56e-1	mCi
936	Shutt, Tom	Rockefeller 118	Fe55	Gamma	6.14e-9	mCi
946	SAIRC	Lerner Tower B206	Ge68	Gamma	6.54e-4	mCi
946	SAIRC	Lerner Tower B206	Ge68	Gamma	5.12e-1	mCi
113	RSOF	Service Building Rad	I129	Gamma	4.42e-5	mCi
113	RSOF	Service Building Rad	I129	Gamma	1.03e-4	mCi
936	Shutt, Tom	Rockefeller 118	I129	Gamma	5.00e-5	mCi
138	Oleinick, Nancy	BRB 350A	Ir192	gamma	2.37e-3	mCi
951	Sankaran, Mohan	A.W. SMITH 230C	Kr85	Beta/Gam	1.46e+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
665	Akerib, Daniel S.	Rockefeller 314B	Mixed	Beta/Gam		mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mixed	Beta/Gam		mCi
113	RSOF	Service Building Rad	Mn54	Gamma	1.42e-10	mCi
113	RSOF	Service Building Rad	Mn54	Gamma	3.11e-15	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mn54	Gamma	9.90e-9	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mn54	Gamma	1.33e-7	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mn54	Gamma	1.23e-6	mCi
665	Akerib, Daniel S.	Rockefeller 314B	Mn54	gamma	1.50e-5	mCi
113	RSOF	Service Building Rad	Na22	Gamma	2.22e-5	mCi
113	RSOF	Service Building Rad	Na22	Gamma	8.44e-4	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Na22	Gamma	3.93e-6	mCi

	PI Name	Location	Isotope	Emits	Current Activity	
113	RSOF	Service Building Rad	Ni63	beta	1.30e-5	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Pb210	Alpha	9.37e-5	mCi
113	RSOF	Service Building Rad	Pm147	Beta	3.37e-7	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Po210	Alpha	3.19e-21	mCi
951	Sankaran, Mohan	A.W. SMITH 230C	Po210	Alpha/Ga	7.54e-4	mCi
113	RSOF	Service Building Rad	Pu239	Alpha	5.99e-6	mCi
113	RSOF	Dental (DOA) 990	Ra226	Alpha	9.90e-3	mCi
936	Shutt, Tom	Rockefeller 202	Rb83	Gamma		mCi
113	RSOF	Service Building Rad	Si32	Beta	5.11e-5	mCi
113	RSOF	Service Building Rad	Sr90	Beta	1.22e-5	mCi
113	RSOF	Service Building Rad	Tc99	Beta	4.10e-5	mCi
113	RSOF	Service Building Rad	Th230	Alpha	7.00e-6	mCi
326	Matisoff, Gerald	A.W. SMITH 211E	Ti204	Beta		mCi
236	Jamieson,	Kent Hale Smith 205	Ti44	Gamma	1.95e-3	mCi