

Radiation Safety Manual



**Louisiana State University
Eunice**

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This Manual is distributed to the following:

- LSUE Radiologic Technology Program Director's Office
- LSUE Radiologic Technology Energized Laboratory
- LSUE Safety Committee Chair
- LSUE Science Division Office
- LSU System Radiation Safety Officer

ALARA Program

The following conditions describe the program followed by **Angela Sonnier, Radiation Safety Officer (RSO)**, to ensure that occupational radiation exposures to faculty, staff, and students engaged in the use of radioactive equipment are kept as low as reasonably achievable.

I. Management Commitment

Angela Sonnier, RSO, is committed to make every reasonable effort to minimize radiation exposures to faculty, staff and students, through the following control measures:

- The campus's radiation safety officer will make personnel aware of the LSU System Radiation Safety Committee's commitment to maintain low exposure levels.
- The LSU System Radiation Safety Committee will periodically review operating procedures with the System Radiation Safety Officer to determine steps taken to reduce exposures.
- The LSU System Radiation Safety Committee will ensure that the person, or persons, selected for the Radiation Safety Officer responsibilities are fully qualified to administer all aspects of a radiation protection program.
- The LSU System Radiation Safety Committee will ensure that all faculty, staff, and students engaged in the use of radioactive equipment are fully educated in the area of radiation safety. This will be reviewed at least once every three years, and addition education will be scheduled as necessary.
- The RSO has full authority to enforce safe operation, and to communicate as required with the LSU System Radiation Safety Committee to halt an operation that he or she deems unsafe.

II. Vigilance by the RSO and Radiation Protection Staff

The RSO has the responsibility to monitor the Radiation Safety Program to ensure that exposures are as low as reasonably achievable, and to search for new and better ways to perform jobs with less exposure. The following aspects apply to this responsibility:

- The RSO shall know the origins of radiation exposure and be aware of trends in exposures.
- Should unusual exposures occur, the RSO shall initiate an investigation of the circumstances to determine causes and prevent the likelihood of a recurrence.

Operating procedures should periodically be reviewed to identify situations in which exposures can be reduced.

- The RSO shall be responsible for ensuring that the equipment used on campus is maintained in good working order and used properly. Written procedures for use of the equipment are to be available and followed.

A handwritten signature in blue ink that reads "Angela Sonnier MSRS (R.T.R.)". The signature is written in a cursive style and is positioned above a horizontal line.

Angela Sonnier, MSRS, RT (R)
Radiation Safety Officer
Louisiana State University, Eunice

Emergency Notice

Despite the strict adherence to all laboratory safety rules, it is **possible that accidents involving radioactive material** will occur on occasion. For this reason, it is important that radioactive material users are aware of the proper procedures to follow for various types of accidents.

Minor Spills:

Incidents that involve the release or spillage of less than 100 microcuries of a radionuclide in a nonvolatile form can generally be regarded as minor. In such cases:

1. Notify all other persons in the room at once.
2. Clear the room of all persons except those needed to deal with the spill.
3. Confine the spill immediately.
 - Liquids: Drop absorbent paper or chemical (e.g. calcium bentonite) on the spill. The standard "Spill Controls Kits" are available from Chemistry Stores.
 - Solids: Dampen thoroughly, taking care not to spread contaminants; otherwise use oil.
4. Notify the laboratory supervisor.
5. Notify the Radiation Safety Officer:
 - Rob McLaughlin, ext. 340.
 - Campus Security: 550-1225
 - After hours, notify Campus Security:
 - (Cell) 580-0720 or (Cell)305-1765

Major Spills or Releases:

An incident that occurs outside of a fume hood and involves the release of more than 100 microcuries of a radionuclide in a nonvolatile form, or the release of any amount of a radionuclide in a volatile form, should be considered "major." In such cases:

1. Evacuate the room immediately, shutting doors and windows on the way out.
2. Notify the laboratory supervisor.
3. Notify the Radiation Safety Officer:
 - Angela Sonnier, ext. 275.
 - After hours, notify Campus Security:
 - (Cell) 580-0720 or (Cell)305-1765
4. Post the laboratory door with a "Keep Out" sign.
5. Assemble those persons who were present in the laboratory far enough away to assure everyone's safety.
6. Wait for assistance.

Accidents Involving Personal Injury:

For any accident involving personal injury, medical treatment or assistance will always be the first priority. This may involve administering first aid and/or calling ext. 218 (Office of Student Affairs) for emergency medical assistance. Inform the police of the potential for radioactive contamination. For accidents involving radioactive materials, contamination control and exposure control are important but should never delay or impede medical assistance. If radioactive materials are involved, emergency personnel should be notified before treatment takes place, so they can take appropriate action to protect themselves as well as prevent the spread of contamination. Both the Radiation Safety Officer (Angela Sonnier, ext. 275) and the Safety Committee Chairperson (Michael Broussard, ext 292) must also be notified as soon as possible. After the injured person is treated and removed from the accident site, the previously described procedures should be followed as appropriate.

Personal Contamination:

In the event of any personal contamination:

1. Notify the Radiation Safety Officer (Angela Sonnier, ext. 275) immediately.
2. Remove all contaminated laboratory personal protective clothing (lab coat, gloves, etc.)
3. If possible, wash contaminated area with mild soap and water.
4. Monitor the contaminated area.
5. Repeat washing as necessary.

Decontamination Procedure:

In the event that surfaces or equipment within the laboratory are suspected or determined to be contaminated with radioactive material, the radionuclide user must initiate and complete appropriate decontamination procedure. For most relatively minor contamination incidents, the following general steps should be taken upon discovery of the contamination:

1. Mark the perimeter of the contaminated area.
2. Notify the Radiation Safety Officer (Angela Sonnier, ext. 275) and the Safety Committee Chairperson (Michael Broussard, ext 292) of the contamination so that their staff can more accurately assess the extent of the contamination and advise and assist in the decontamination effort.
3. Assemble cleaning supplies such as paper towels, detergent in water, plastic bags and plastic gloves.
4. Proceed with scrubbing the area from the borders to the center, cleaning small areas at a time.
5. Periodically monitor the effectiveness of the decontamination effort with surface wipes and instrument surveys.

6. Place all contaminated cleaning materials such as paper towels, rags, and gloves in a plastic bag and label as radioactive waste.
7. Notify the Radiation Safety Officer and the Safety Committee Chairperson upon completion of the decontamination effort so that a follow-up contamination survey can be made.

If additional information on the procedures listed above is needed, please contact the Radiation Safety Officer at extension 275.

Duties of the Radiation Safety Officer

1. Assure that radioactive materials possessed under the license conform to the materials listed on the license.
2. Assure that only individuals authorized by the license use licensed radioactive materials.
3. Assure that all authorized users were required personnel monitoring equipment, such as OSL badges.
4. Review all personnel monitoring reports:
 - Alert the radiation worker (faculty, staff, or student) if there is a high or unusual exposure.
 - Notify the LSU System Radiation Safety Committee as required if there is a high or unusual exposure.
 - Investigate all unusual exposures.
 - Take corrective action to prevent other high or unusual exposures.
5. Assure that licensed radioactive materials are properly secured against unauthorized removal at all times when they are not in use.
6. Serve as a point of contact between radiation workers (faculty, staff, and students) and the LSU System Radiation Safety Committee.
 - Give assistance in case of an emergency
 - Notify proper authorities in case of accident or damage to equipment or personnel
7. Assure that the terms and conditions of the license are met.
 - Perform periodic leak tests of sealed sources with the appropriate faculty of the Division of Sciences.
 - Review records periodically to assure compliance with PM-30 of the Louisiana State University System.

**LSU EUNICE RADIATION PROTECTION POLICY
RADIOLOGIC TECHNOLOGY PROGRAM**

Revised 1/19

Each student will be issued **two Luxel OSL (optically stimulated luminescent) dosimeters**.

One dosimeter will remain at the clinical education setting for the student to wear during their clinical assignment. The other dosimeter will remain at LSU Eunice for the student to wear during their performance in the energized labs. This method is to reduce unnecessary radiation exposure to the OSLs. Also, the dosimeters will be exchanged every quarter during the **first and second week of that month** by the Clinical Coordinator at each facility and by the Program Director at LSU Eunice.

Dosimeters **must not** be exposed to excessive heat or moisture. **If the dosimeter is taken home, never leave it in the car, place it in the washer or dryer, or in close proximity of a television set.** Students must wear dosimeters in the proper position (**outside the protective lead apron, on the collar**). Results of the radiation monitoring will be available **quarterly** immediately upon receipt of the report. It is the **responsibility of students** to track their own radiation exposure.

The **Radiation Safety Officer (RSO)** will evaluate each report thoroughly. Any exposure will be investigated for cause and necessary corrective measures taken where applicable. **The occupational dose equivalent limits for adults are:**

1. **Annual Limit:**
 - a. **Total effective dose equivalent being equal to 50 mSv (5 rem).**
 - b. **The sum of the deep dose equivalent and the committed dose equivalent to any individual organ or tissue other than the lens of the eye being equal to 0.5 Sv (50 rem).**

2. **Annual Limit to the lens of the eye, skin, and extremities are:**
 - a. **Eye dose equivalent of 150 mSv (15 rem)**
 - b. **Shallow dose equivalent of 500 mSv (50 rem) to the skin or any extremity.**

A Student Exposure Report (Appendix C-2) will be completed by the RSO on any student who receives more than 2.5 mSv (250 mrem) in one calendar quarter. Students should not receive more than 10 mSv (1000 mrem) in ONE YEAR. Students must employ safe radiation protection techniques for the patient, self, and others during imaging exposures.

Students assisting in fluoroscopic examinations must wear lead aprons. Lead gloves **must be worn** if the hands must lie in the primary beam. **Students are responsible** for seeing that lead aprons are available for **all persons** involved in fluoroscopic procedures. Aprons **must be worn** during mobile imaging and mobile fluoroscopy. Gonadal shields **must be used** on patients of reproductive age or younger when the presence of the shield does not obscure clinically significant data. Collimation **must be used** to restrict the primary beam to the area of clinical interest.

The program assures that students are instructed in the utilization of imaging equipment, accessories, optimal exposure factors, and proper patient positioning to minimize radiation exposure to patients, selves, and others. These practices assure radiation exposures are kept as low as reasonably achievable (ALARA). (JRCERT)

Students must understand basic radiation safety practices prior to assignment to clinical settings. Students must not hold image receptors during any radiographic procedure. Students should not hold patients during any radiographic procedure when an immobilization method is the appropriate standard of care. As students' progress in the program, they must become increasingly proficient in the application of radiation safety practices. (JRCERT)

The program also assures radiation safety in energized laboratories. Students' utilization of energized laboratories is under the supervision of a program faculty member who is readily available. If a program faculty member is not readily available to provide supervision, the radiation exposure mechanism will be disabled.
(JRCERT)

**LSU EUNICE RADIATION PROTECTION POLICY
RADIOLOGIC TECHNOLOGY PROGRAM**

Revised 9/04
Reviewed 1/19

STUDENT EXPOSURE REPORT FORM

Student's Name _____ Student's Date of Birth _____

Student's Social Security Number _____ Date OSL Issued _____

Date OSL Read _____ OSL Reading _____

The above reading exceeds the recommended dose equivalence for one calendar quarter set forth in the Student Clinical Handbook under the Radiation Protection Policy, and by the LSU System Radiation Safety Committee.

The object of our ALARA program is to maintain radiation exposure at the lowest possible levels. This program is based on the premise that radiation exposure is not free of risk and therefore, radiation exposure should be kept to levels well below the limits allowed by the Nuclear Regulatory Commission, the state of Louisiana and other regulatory agencies. The state dose equivalent limit for an occupational imaging technologist is 5,000 mrem/yr or 5 rem/yr. For students in clinical education experience of a diagnostic imaging program, the administrative dose equivalent limit is 1,000 mrem/yr or 1 rem/yr. Therefore, investigational action levels set by the Radiologic Technology Program at LSU Eunice are as follows:

A student who receives more than 250 mrem per calendar quarter or 0.250 rem/calendar quarter.

Your dose is below the NRC and State limits but exceeds the limit recommended for student clinical education experience at a clinical site. This behavior indicates a need to review imaging procedures performed during a specific clinical assignment in order to reduce your exposure. Apply the basic rules of radiation protection (time, distance and shielding) to lower your radiation exposure.

Please provide (in the space below) a written explanation as to why you believe this level was exceeded. Please be specific.

Student Signature

Program Director (RSO) Signature

Date

Student's Clinical Coordinator

SAFETY POLICY FOR MRI

Safety Policy for MRI The purpose of this policy is to ensure the safety of the Radiologic Technology students before entering a Magnetic Resonance Imaging (MRI) scanning room/field. As students could have potential access to the magnetic resonance environment at the beginning of clinical rotations, students should be screened and prepared for magnetic resonance safe practices prior to entering the clinical setting. If the status of the student should change prior to magnetic resonance rotations, the student should be screened AGAIN to ensure the health and safety of the student is maintained (JRCERT) This policy assures appropriate MRI Safety screening has been completed prior to beginning clinical rotations MRI clinical elective rotation.

POLICY: All students will be instructed on MRI Safety upon entering the clinical phase of the Radiologic Technology program. They will be screened at the beginning of each summer semester prior to the start of their clinical assignment. In addition, all students will be screened again prior to a clinical rotation at an MRI facility. Students may also be subject to additional screenings at MRI facilities. MRI scanners generate a very strong magnetic field within and surrounding the MR scanner. As this field is always on, unsecured magnetically susceptible (ferromagnetic) materials, even at a distance, can accelerate into the bore of the magnet with a force significant enough to cause severe injury or damage to the equipment, patient, and/or any personnel in its path. Anyone entering the MR environment without being thoroughly screened by qualified MR personnel may potentially compromise his/her safety and/or the safety of everyone in the MR environment. It is the MRI technologist's responsibility to control all access to the scan room. Radiologic Technology program students become part of this safety team adhering to all MRI safety policies and procedures. An MRI Technologist or Radiologist should be consulted if a student has a doubt at any point. Students will be responsible for reporting any changes which impact this screening and may thus compromise safety.

Although there is no definitive evidence that occupational exposure to MRI is harmful to a pregnant student or her fetus, pregnant students will try to limit her exposure to the MR field. She will not enter the MRI room during active scanning to reduce the exposure to higher level of static magnetic fields and time-varying (RF) fields.

*source <http://mri-q.com/personnel-exposure.html>

Revised 6/19

Reviewed 6/21



DIVISION OF HEALTH SCIENCES AND BUSINESS TECHNOLOGY
RADIOLOGIC TECHNOLOGY PROGRAM

APPENDIX G
MRI SCREENING FORM

STUDENT _____ CLASS _____ DATE _____

General Questions: Do you have any of the following?

Yes No Cardiac pacemaker. Implanted Cardioverter Defibrillator (ICD)/Heart valve/Heart surgery: Date/type _____

Yes No Shunts/Stents/Intravascular coil: Date/type _____

Yes No Ear or eye implants/surgery: Date/type _____

Yes No Injury to eye involving metal or metal shavings _____

Yes No Are you or do you suspect pregnancy? Or are you breast feeding? _____

Yes No Brain or brain aneurysm surgery: Date/type _____

Yes No Any electrical, mechanical, magnetic pumps, stimulators, and/or implants? Date/type _____

Yes No Any body piercing jewelry?

Yes No Any breast tissue expanders? Date/type _____

Yes No Shrapnel or metal fragments in skin or body? Specify: _____

Yes No Dentures/Hearing aid/Wig: Please circle which applies.

Yes No Any type of prosthesis? Date/type _____

All other surgeries: Date/type _____

If any of the above items have changed since entering the program, please notify the clinical coordinator.

I understand that this confidential information will be shared with the MRI technologist/clinical site approving this screening for safety.

_____ Student Signature

_____ MRI Technologist

Pregnancy Policy

A student is given the option of whether or not to inform program officials of pregnancy. If the student chooses to voluntarily inform officials of the pregnancy, it must be in writing. In the absence of this voluntary written disclosure, a student cannot be considered pregnant. However, due to the sensitivity of the unborn child to radiation, it is necessary to inform applicants of the possible health risks involved as a result of occupational exposure during pregnancy.

1. Pregnant students may notify the Program Director (PD) and the Radiation Safety Officer as soon as pregnancy is suspected/determined so that appropriate radiation safety measures can be instituted. Even though this written notification is voluntary, the Division of Health Science & Business Technology encourages the pregnant student to perform this measure.

1.1 If the student chooses to voluntarily inform officials of the pregnancy, a physician statement verifying the pregnancy shall be submitted by the student. This statement must include a medical release, which allows the student to continue with clinical assignments. If, for medical or personal reasons, the student is unable to complete the clinical assignments, she may initiate a request for authorization of an "I grade" through the office of Academic Affairs and Services. The student must subsequently remove the "I grade" following the regulations in the University catalog. Should the student choose to withdraw from a clinical course, the "Withdrawal" guidelines in the University catalog must be followed. Should the student choose to resign from the program, the "Resignation" guidelines in the University catalog must be followed.

2. The Declared Pregnant Student is a student who has voluntarily informed their Program Director and Radiation Safety Officer (RSO) in writing of the pregnancy and the estimated date of conception is considered a declared pregnant student. A student has the right to declare the pregnancy and follow the precautions listed below.

2.1 The student understands that the radiation limit is 0.5 rem for the remainder of the gestation period, not to exceed 0.05 rem in any given month. In order to insure compliance with these standards the student will request one of the following options:

- a) Request continuance in the program with modification
 - Issued the use of a lead apron specially designed for the pregnancy
 - Wear a fetal radiation monitoring device
 - Limit cases in fluoroscopy during clinical experience
 - Change the declared student's clinical rotation schedule (e.g., no fluoro and/or surgery during the first 3 months of pregnancy). Note: The program requires the declared student to submit a medical release to continue with clinical assignments. In addition, the Title IX coordinator can assist with providing additional modifications.
- b) Request continuance in the program without modification

2.2 Notify appropriate radiology personnel of the expectant status of the student in order to insure proper clinical education experience while maintaining the standards of radiation safety.

2.3 The student will be directed to the following documents to review:

- A. NRC Regulatory Guide 8.13 (Instruction Concerning Prenatal Radiation

exposure) <https://www.nrc.gov/docs/ML0037/ML003739505.pdf>

B. NRC Regulatory Guide 8.36 (Radiation Dose to the Embryo/Fetus)
<https://www.nrc.gov/docs/ML0037/ML003739548.pdf>

2.4 Changes in the clinical assignments may be instituted in order to ensure compliance with the recommended Effective Dose Equivalent standards upon completion of the declared pregnancy form (Radiologic Technology Program Handbook-Appendix H).

Upon verification of pregnancy (Declaration Pregnancy Form), the PD will review all appropriate and applicable principles of proper radiation safety with the student.

A student also has the right to not declare their pregnancy, in which case, the student will be treated as though she was not pregnant. Once a student has declared the pregnancy, the student also has the right to undeclare the pregnancy in writing at any time. This is in accordance with Federal and State laws as well as the most current NRC Regulations. The student will need to submit a medical release which allows continuance with the clinical assignments. If a student needs to, they can initiate authorization from an "I" grade through the Office of Academic Affairs.

3. Following completion of the declared pregnancy form, the Effective Dose Equivalent to the fetus from occupational exposure of the expectant mother should not exceed 0.5 rem during the remaining gestation period. The monthly exposure shall not exceed 0.05 rem. The student will be furnished an OSL fetal radiation monitoring device. This device must always be worn at waist level at all times and underneath the protective lead apron during fluoroscopy.

4. If the student is unable to fulfill the required didactic and/or clinical objectives, the student may request authorization of an "I grade" through Academic Affairs for the clinical course or resign from the program. The student may submit a request to reenter the same semester of the following year if guidelines for removal of the "I grade" have been followed and a letter of intent to reenter the program is turned in to the Program Director by the appropriate due date. Should the student choose to withdraw from a clinical course, the "Withdrawal" guidelines in the University catalog must be followed. Should the student choose to resign from the program, the "Resignation" guidelines in the University catalog must be followed.

Exception: If a student has to resign from the program due to health reasons, he or she would be allowed to apply for reentry based upon the semester withdrawn and availability in the clinical setting. All Pregnancy Forms and related documentation are kept in the student's active file located in the Program Director's office.

Revised 5/19, 5/20

Location of Radiation Safety Manuals

It is the responsibility of all students to abide by the laboratory safety rules, basic operations, and operator methods set forth by the Radiologic Technology Program. Any misuse of equipment or deliberate failure to follow these rules will result in disciplinary action. The ALARA Plan, the laboratory safety rules, basic laboratory operations, and operator methods are kept in a binder labeled, "Radiation Safety Manual" located in the radiographic film library, T-105A. Additional copies of the Radiation Safety Manual are kept in the offices of Director of Radiologic Technology, Director of Physical Plant, Division Head of Sciences, and the RSO Systems Office at LSU-BR.

Material Safety Data Sheets (MSDS) for processing chemicals, radiation protection, and lab equipment are kept in a binder labeled, "MSDS" and "QA PRODUCTS" located in the radiographic film library, T-105A.

In case of an emergency, refer to the "LSUE Emergency First Aid Response Procedures" posted on the wall in all radiology labs (T-105, T-142)

Revised 5/09

Reviewed 1/19

Reviewed 10/21

LSU Eunice Emergency First Aid Response Procedures

In case of a Medical Emergency:

1. Remain with the victim.
2. Call 911 (9-911 from a campus telephone) if a victim is unconscious, has trouble breathing, has chest pain or pressure, or is bleeding severely.
3. Call LSU Eunice Police and Campus Security at 337-550-1225 or x225 from a campus phone for any type of emergency.

NOTES:

1. IF VIOLENCE OR POTENTIAL VIOLENCE is observed, call the LSU Eunice Police and Campus Security at 337-550-1225 and/or 911 (9-911 from a campus telephone).
2. To report a NATURAL GAS ODOR in or around a building
 - a. during normal operating hours (Monday through Friday 8 am to 4:30 pm), call extension 291, extension 225, or 337-550-1225.
 - b. after hours, weekends, or holidays, call the Eunice Police Department at 337-457-2626. The dispatcher will send Eunice Gas Department to respond and assess situation. If all else fails, dial 911.

Emergency Response and the Command Team

It is the responsibility of any employee who learns of an actual or impending emergency between 8:00 a.m. and 4:30 p.m. to report it immediately to a senior administrative officer available. This begins with the Office of the Chancellor (ext. 201), Vice Chancellor for Academic Affairs (ext. 301), Vice Chancellor for Business Affairs (ext. 288), Dean of Student Affairs (ext. 218), Director of Physical Plant/Safety Coordinator (ext. 291), and such other administrative personnel should be notified as is appropriate to initiate the emergency response decision making process. In the event of an emergency situation occurring before 8:00 a.m., after 4:30 p.m., or on the weekend, all emergencies should be reported by calling 911, and in addition notify LSU Eunice Police and Campus Security at ext. 225 or mobile number 337-580-0720.

The Chancellor or designated representative will evaluate the threat and order any or all of the following:

1. Establish the Command Team (see Appendix I) at its designated location.
2. Call 911 and report the threat. (Provide only the basic information needed to generate a response from fire/police agencies; do not inadvertently release sensitive information on the radio that can be heard on scanners throughout Southwest Louisiana.)
3. Contact other service agencies as required (see Appendix J).
4. Order evacuation of the campus or one or more campus buildings.

Appendix I: Command Team Members

Chancellor

Dr. Nancee Sorenson 337-550-1203 520-490-9727

Vice Chancellor for Academic Affairs

Dr. John Hamlin 337-550-1301 337-943-0434

Interim Vice Chancellor for Business Affairs

Ms. Amy Greagoff 337-550-1288 337-278-1689

Dean for Student Affairs

Dr. Kyle Smith 337-550-1218 337-385-8600

Director of Facilities Services/Safety Coordinator

Mr. Michael P. Broussard 337-550-1292 337-580-6519

LSU Eunice Police & Campus Security

Mr. J. Cory, Lalonde 337-550-1225 225-337-2586

Director of Information Technology

Mr. Stephen Heyward 337-550-1307 225-229-2735

Interim Director of Public Relations

Mr. Travis Webb 337-550-1211 337-581-5746

Appendix J: Additional Contacts for Local Services

LSU System Office 225-578-2111

Mr. James Simon, Director Acadia Parish OHSEP 337-783-4357 337-523-2679

Ms. Lisa Vidrine, Director St. Landry Parish OHSEP 337-948-7177 337-351-2467

Chief Randy Fontenot Eunice Police Department 337-457-2626

Chief Michael Arnold Eunice Fire Department 337-457-6557

Sheriff K. P. Gibson Acadia Parish Sheriff's Office 337-788-8700 337-788-8772

Sheriff Bobby Guidroz St. Landry Parish Sheriff's Office 337-948-6516 337-948-5801

Sheriff Eddie Soileau Evangeline Parish Sheriff's Office 337-363-2161

LA State Police (Troop I) 337-262-5880

Mr. Gerald Manuel, Supt. Eunice Gas Department 337-457-6576 337-580-4747

Mr. David Willie Bergeron CLECO 337-550-3535 337-849-3999

Ms. Chellie Godeaux Utility Compliance Solutions, LLC 337-277-7817

Williams Gas Pipelines Transco 337-457-3602

Acadian Ambulance Service 800-259-3333 337-291-1111

Mr. Huey Miller Service Master 337-234-1289 337-654-270

**GUIDELINES FOR SAFETY AND OPERATION
FOR THE ENERGIZED LABORATORIES**

The program assures radiation safety in energized laboratories. Students' utilization of energized laboratories is under the supervision of a program faculty member who is readily available. During a lecture or lecture/lab course, a student performing in the lab will be under direct supervision. Outside of lecture or lecture/lab course, a student practicing in the lab will be under indirect supervision. However, NO EXPOSURES are to be made in the lab without an LSUE faculty member present. If a program faculty member is not readily available to provide supervision, the radiation exposure mechanism will be disabled. (JRCERT) The Program Director and faculty members of the Radiologic Technology Program are responsible for the supervision of all students enrolled in the program. The Program Director and faculty members are responsible for personnel who enter the energized labs at all times.

Safety guidelines for the energized labs include the following:

- The OSL radiation monitoring device shall be worn during any operation of the energized unit.
- Close all doors to the energized lab before making any exposure.
- Ensure that there is no one in the lab during exposures.
- Observe low hanging and projecting equipment while manipulating the unit.
- Ensure that all doors are locked when the lab is not in use.
- The lab shall be used only with permission of the radiography faculty.
- Students shall practice all standard radiation safety practices while operating the equipment.
- A professional demeanor shall be practiced at all times.
- A copy of the LSU System Radiation Protection Program (PM-30) regarding radiation safety is located in this manual.

It is the responsibility of all students to abide by these rules and operating methods. Any misuse of equipment or deliberate failure to follow rules will result in disciplinary action.

Revised 12/16 Reviewed 3/19 Revised 5/20, 10/21

II. Basic Operation of Equipment (Performed under Direct Supervision)

A. Exposure Unit Console for AMRAD Energized Lab (T-105)

1. Turn on all line circuit breakers located near the radiographic table in each lab.
2. Energize the console by depressing the exposure switch.
3. Perform tube warm-up if unit has not been used for two hours. Be sure to close collimator.
4. Select technical factors as needed.
5. Avoid prolonged rotor activation (boost) prior to exposure.
6. Consult tube-rating charts prior to large exposures.
7. When use is completed, turn off power switches in reverse order.

B. Exposure Unit Console for QUANTUM DRX Energized Lab (T-142)

Start Up Procedure:

1. Turn on main circuit breaker located above x-ray generator cabinet.
2. Turn on circuit breaker #1 in the electrical box located beside the main breaker box.

3. Power on the x-ray unit with the switch located on the wall in the operator's control booth.
4. Power on the DRX computer with on/off switch located on the front of the computer.
5. Follow tube warm up procedure posted in the control booth.

Shut Down Procedure:

1. Shut down the DRX computer from the shutdown screen on the computer monitor.
 2. Power off the x-ray unit with the switch located on the wall in the control booth.
 3. Turn the main circuit breaker off located above the x-ray generator cabinet.
 4. Turn off the circuit breaker #1 in the electrical box located beside the main breaker box. Leave on all other breakers within the electrical box.
- C. Table and Tube Support in Both Energized Labs (T-105, T-142)
1. Move table, tube/tube stand only when proper locks are selected.
 2. Insure that all stretchers, chairs and stools are not obstruction the table or tube before moving.
- D. Human Phantoms and Test Phantoms
1. When positioning human or test phantoms onto a wheelchair, gurney, or radiographic table, demonstrate lifting and transfer techniques using proper body mechanics.
 2. The phantoms must be handled with the utmost care.
 3. Return all phantoms to the proper storage areas when finished.
- E. Laboratory Accessories
1. Handle film/screen and CR imaging cassettes and QC instruments with the utmost care.
 2. Return all items to proper storage areas after use.
- F. Darkroom Operation (if used)
1. Turn on white ceiling light on wall.
 2. Turn on large circuit breaker on wall.
 3. Turn on processor power and darkroom safe lights.
Make sure the white ceiling light goes off.
 4. Perform top roller daily cleaning if necessary.
 5. Close process lid.
 6. Process 2 14x17-scrap films for cleanup.
 7. Make sure film bin is closed before leaving the darkroom.
 8. Mixing chemical will be conducted with direct supervision of the program faculty.
- G. Computed Radiography (CR) Reader (if used)
1. Turn on the CR Reader
 2. Turn on the Computer
 3. Make sure the back-up surge protector is on.

Appendices

Louisiana State University System RADIATION SAFETY COMMITTEE

June 2021

EXECUTIVE COMMITTEE

CHAIR

DENNIS J. PAUL
LSU Health Sciences Center New Orleans
Pharmacology & Experimental Therapeutics
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PERMANENT MEMORANDUM 30 RADIATION PROTECTION PROGRAM

POLICY DIGEST

Monitoring Unit: Office of Academic Affairs
Initially Issued: September 9, 2010
Last Revised: June 19, 2020

The Louisiana State University Radiation Safety Committee has been established to implement and maintain a program to assure the proper and safe usage of radioisotopes and other sources of ionizing and non-ionizing radiation and radioactive materials within LSU – conducted research, instructional, and service programs.

Non-ionizing radiation is defined as non-ionizing radiation produced as a result of equipment used at such a level that is recognized as harmful to humans. Non-ionizing radiation associated with welding, cutting and burning operations is excluded.

I. COMMITTEE MEMBERSHIP

Membership on the LSU Radiation Safety Committee shall be as follows:

- A. Coordinator of the LSU Radiation Safety Program
- B. Secretary of the LSU Radiation Safety Committee
- C. Radiation Safety Officer
- D. Chair from each of the Campus Radiation Safety Committees, or the equivalent

The President shall designate as Coordinator any member of the LSU Faculty (from any LSU institution/campus) who is knowledgeable in the use of radiation and radioactive materials. The Coordinator shall serve as Chair of the LSU Radiation Safety Committee. The Coordinator shall be administratively responsible for the radiation safety necessary in the use of ionizing and non-ionizing radiation and radioactive materials in LSU research, instructional, and service programs. The Coordinator shall maintain surveillance of all properties owned or controlled by the LSU, and all personnel on or about these properties where there exists the possibility of occupational exposure to ionizing and non-ionizing radiation or radioactive materials. The term of appointment shall be at the pleasure of the President.

The President shall designate a Vice Chair from among the current members of the Committee, excluding the Coordinator, Secretary or Radiation Safety Officer, and representing an institution/campus other than that of the Coordinator. The Vice Chair shall preside at Committee meetings when the Chair is unavailable. The Vice Chair will serve as interim Coordinator if the Coordinator becomes unable to perform his or her duties for any reason, until such time as the President appoints a new Coordinator. The term of appointment shall be at the pleasure of the

President.

The President shall designate as Secretary any member of the LSU Faculty (all LSU institutions/campuses) who is knowledgeable in the use of ionizing and non-ionizing radiation and radioactive materials. In addition to keeping the minutes of Radiation Safety Committee meetings, the Secretary will be responsible for arranging the meetings, including the preparation and dissemination of agendas. The term of appointment shall be at the pleasure of the President.

The Committee shall designate as Radiation Safety Officer any member of the LSU Faculty or Staff (all LSU institutions/campuses) who has the qualifications required to serve as Radiation Safety Officer for a broad scope radioactive material license. The Radiation Safety Officer is directly responsible for implementation and review of compliance with the regulations and policies established by the Coordinator and the Radiation Safety Committee. The Radiation Safety Officer is vested with the authority to act immediately in all matters pertaining to radiation safety involving LSU personnel engaged in University-sponsored activities or any other personnel on University property. The Radiation Safety Officer's authority and actions, as defined in this memorandum, are subject to review by the Radiation Safety Committee. This assigned authority shall not relieve the individual from the normal review and authority of his/her departmental administration. The term of appointment shall be at the pleasure of the President.

Each Chancellor (or equivalent campus head), with the approval of the Coordinator of the LSU Radiation Safety Program, shall appoint a Campus Radiation Safety Officer(s) and a Campus Radiation Safety Committee(s) if nuclear materials or other sources of ionizing or non-ionizing radiation are in use on the campus. These individuals shall be selected from those faculty and staff members having knowledge and work experience in the areas of radiation and radioactive materials.

The Campus Radiation Safety Officers and Campus Radiation Safety Committees will be responsible to the LSU Coordinator for the proper control and supervision of projects utilizing ionizing and non-ionizing radiation and/or radioactive materials on that campus. On campuses where the only sources of ionizing and non-ionizing radiation and radioactive materials consist of small teaching sources or those in analytical instruments, the Chancellor is required to appoint only an individual responsible for radiation safety on the campus.

II. COMMITTEE RESPONSIBILITIES

The LSU Radiation Safety Committee shall have direct responsibility for (a) licensing of all matters requiring and/or affecting campus use of LSU's license or registration, and (b) supervision of the activities of each Campus Radiation Safety Committee and of the Campus Radiation Safety Officers on those campuses without a Committee. Also, the Radiation Safety Committee shall have oversight authority for non- LSU organizations that (1) possess a valid license to use radioactive materials or are approved to use ionizing or non-ionizing radiation producing equipment and (2) operate in LSU facilities under administrative agreement with an LSU unit subject to this procedure. LSU-owned facilities leased to or used by third parties for the operation of a hospital or medical clinic pursuant to a Cooperative Endeavor Agreement with LSU, the State of Louisiana Division of Administration, and the Louisiana Department of Health and Hospitals are excluded from this oversight authority.

The Campus Radiation Safety Officer and/or the Campus Radiation Safety Committee on each campus

must approve:

- A. **Personnel** - all responsible persons desiring to use *licensed* radioactive materials or *registered/regulated* ionizing or non-ionizing radiation *sources*, including acceptable training or experience.
- B. **Procurement** - all requisitions for *licensed* radioactive materials and *registered/regulated* ionizing and non-ionizing radiation sources.
- C. **Projects** - all academic programs, research and development projects, and other University activities involving ionizing or non-ionizing radiation and radioactive materials.
- D. **Contracts and Grants** - all contracts and grants requiring use of ionizing or non-ionizing radiation or radioactive materials.
- E. **Facilities and Radiation Monitoring Equipment** - the suitability of facilities and radiation monitoring equipment for all University activities requiring ionizing or non-ionizing radiation or radioactive materials.
- F. **OSHA Regulations Pertaining to Ionizing Radiation** - all University activities falling within the purview of the Occupational Safety and Health Act, Section 1910.96, entitled "Ionizing Radiation."
- G. **Regulations Pertaining to Non-Ionizing Radiation** - all University activities falling within the purview of the LSU Non-Ionizing Radiation Safety Procedure.

III. MONITORING OF ACCUMULATIVE ANNUAL RADIATION EXPOSURE

To monitor accumulative annual radiation exposure to LSU employees who have the potential for exposure at multiple facilities, including LSU and non-LSU facilities, each campus subject to this procedure shall:

- A. Establish procedures to identify those LSU employees who have a radiation exposure potential at multiple facilities, i.e., individuals who have been issued a radiation monitoring device at each facility.
- B. Cooperate with the affected LSU employee and radiation safety personnel at the other facilities by notifying them when an LSU employee exceeds 20% of the applicable regulatory limit.

IV. COMMITTEE OPERATIONS

The Committee shall meet no fewer than three times each year. One meeting will be in-person with the site to rotate among the institutions/campuses; other meetings may be by teleconference, videoconference or other means. The Chair, Vice Chair, Secretary and Radiation Safety Officer shall serve as an Executive Committee with authority to conduct official business after polling the other committee members.

At the first meeting of each calendar year, the Radiation Safety Committee will prepare a budget for the next fiscal year. Each administrative unit within LSU (all institutions/campuses) which uses radiation and/or radioactive material shall pay a proportional share of this budget, as determined by the Committee. Should the Committee be unable to agree on proportions, the allocation decision will be made by the Executive Vice President & Provost in their capacity as chief academic officer. Each administrative unit will be invoiced at the beginning of each fiscal year for its respective proportion of the annual costs. Administration of the budget shall reside with the Radiation Safety Officer.

Reviewed October 2021

SAFETY PROCEDURES FOR NON-IONIZING RADIATION



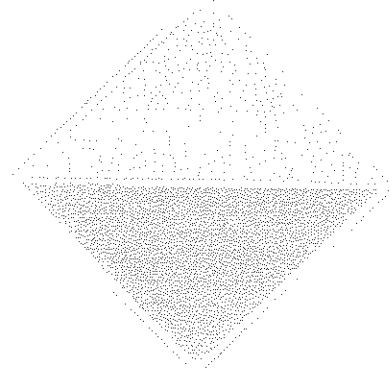
Louisiana State University

System Radiation Safety Committee

April 2000

CAUTION

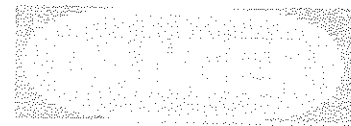
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SAFETY PROCEDURES FOR NON-IONIZING RADIATION

1 GENERAL

1.1 PURPOSE

This procedure sets forth the Louisiana State University (LSU) System non-ionizing radiation safety policy and procedural requirements of the program. The use of the term non-ionizing radiation in this document is defined as meaning non-ionizing radiation produced as a result of normal equipment use and which is at such a level that is recognized as harmful to humans.

NOTE: This procedure does not cover non-ionizing radiation generated during welding, cutting, or burning activities.

1.2 POLICY

The LSU System policy is to limit exposure to personnel from non-ionizing radiation to levels as low as reasonably achievable; however, under no circumstances is exposure to exceed appropriate Louisiana or Federal regulatory limits.

To implement this policy, LSU System has set up a non-ionizing radiation safety program to ensure:

- a. The use of equipment which produces non-ionizing radiation within LSU System for official business is used in a manner that will minimize risks to health and safety of the faculty, staff, students, and the general public.
- b. The identification of non-ionizing radiation source hazards.
- c. The prompt investigation of all reported non-ionizing radiation over-exposures and the establishment of immediate corrective action to prevent their recurrence.
- d. The maintenance of an accurate inventory for accountability of the hazardous non-ionizing radiation sources within the LSU System.

2 SAFETY PROCEDURES FOR MICROWAVE AND RADIOFREQUENCY RADIATION

2.1 INTRODUCTION

Microwave energy, frequently referred to as microwave radiation, is sometimes confused with ionizing radiation. This is unfortunate since the two types of radiation have no important similarities as far as biological effects are concerned. Microwaves have some of the characteristics of infrared radiation in that they produce localized heating of the skin; however, they penetrate deeper than infrared radiation. In general, the heating produced is proportional to the field intensity of this type of radiation. Other factors influencing the effects of microwave radiation include:

- a. Frequency or wavelength of the radiation from the generating equipment.
- b. Period of exposure time.
- c. Air currents and ambient temperatures.

- d. Body weight or mass in relation to the exposed area.
- e. The irradiation cycle rate, referring to the individual ON-OFF periods during a unit time interval (one minute), when total time of irradiation per minute is kept constant.
- f. Orientation or position of the body or its parts.
- g. Difference in sensitivity of organs and tissues.
- h. Effect of reflections.
- i. Blood circulation and water content.

The known biological effects of microwave radiation include:

- a. Whole-body heating (such as heat overexposure).
- b. Cataract formation (damage to the lens of the eye).
- c. Testicular heating.

Of the three effects mentioned above, cataract formation is of the greatest concern and the lens of the eye is the critical organ.

The adverse physiological effects that result from exposures to radiofrequency radiation are due to the absorption of a sufficiently large amount of energy to produce highly localized heating in specific organs or body parts.

2.2 SAFETY PROCEDURES

The following safety procedures have been established for all LSU facilities utilizing microwave and radiofrequency sources of non-ionizing radiation **with the exception of microwave ovens intended to be used for the preparation or heating of foods:**

- a. No person will be permitted to enter a radiation field where the power density exceeds those listed in Table 1 by frequency range.
- b. Tests involving fields with power densities above the Table 1 values will not be conducted outside a radiofrequency anechoic chamber or equivalent type enclosure. This enclosure will be constructed so as to reduce fields below 10% of Table 1 values at all exits.
- c. At least two persons shall be present when the known or suspected power density operating conditions exceed 10 times Table 1 values at any point in the field.
- d. Untrained personnel will not operate equipment capable of generating fields greater than 10% of Table 1 values.
- e. Warning signs (Fig. 1 and Fig. 2) shall be posted at all entrances and a flashing red warning light will be installed in areas with equipment capable of generating fields greater than Table 1 values. This warning light will be energized when the equipment is operating.
- f. Interlocks that will cause power interruption when doors are opened shall be installed on all entrances to enclosures in which power densities greater than Table 1 values are generated.

- g. All microwave and radiofrequency systems capable of generating fields greater than 10% of Table 1 values will be registered with the corresponding Radiation Safety Office. Registration will include the following information:
- (1) Manufacturer and model number.
 - (2) Power output.
 - (3) Frequency range.
 - (4) Intended use.
 - (5) Location.
 - (6) Contact information of the principal investigator and person in charge.
- h. Exposure of employees to microwave and radiofrequency radiation shall not exceed, under normal operating conditions, those levels specified in Table 1.
- (1) The above guide applies whether the radiation is continuous or intermittent, or whether whole-body or partial body irradiation is involved.
 - (2) An exposure exceeding the above limitations in Table 1 shall be reported in writing to the Radiation Safety Committee.

2.3 WARNING SIGNS

The warning signs (Fig. 1 and Fig. 2) for microwave and radiofrequency radiation hazards will consist of the appropriate signal word, symbol, and pertinent sign information. The inclusion and choice of warning information or precautionary instructions is at the discretion of the user.

Table 1. Limits for Maximum Permissible Exposure (47 CFR 1.1310)

Frequency Range (MHz)	Electric Field (V/m)	Magnetic Field (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	100	6
3.0-30	1,842/f	4.89/f	900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500	.....	.....	f/300	6
1,500-100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposures				
0.3-1.34	614	1.63	100	30
1.34-30	824/f	2.19/f	180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500	.....	.....	f/1,500	30
1,500-100,000	.....	.....	1.0	30

f = frequency in MHz



Figure 1. Typical Warning Signs for Microwave Radiation



Figure 2. Typical Warning Signs for Radiofrequency Radiation

2.4 EMPLOYEES' RESPONSIBILITY

Supervisors in charge of operating microwave and radiofrequency equipment shall have such equipment monitored periodically in areas near the power source to assure compliance with these procedures.

2.5 SAFETY DEVICES

The safety devices of microwave ovens intended to be used for the preparation or heating of foods shall not be bypassed or rendered inoperative. Such microwave ovens whose safety devices are compromised shall be taken out of service.

3 SAFETY PROCEDURES FOR LASER RADIATION

3.1 INTRODUCTION

The term Laser is an acronym derived from "Light Amplification by Stimulated Emission of Radiation." The effects of laser radiation are essentially the same as light generated by more conventional ultraviolet, infrared, and visible light sources. The unique biological implications attributed to laser radiation are generally those resulting from the very high intensities and monochromaticity of laser light. Such sources differ from conventional light emitters primarily in their ability to attain highly coherent light (in phase). The increased directional intensity of the light generated by a laser results in concentrated light beam intensities at considerable distances.

3.2 CONTROL MEASURES

The fundamental objective of the control methods as outlined in this section is to limit the possibility of a potentially hazardous exposure, particularly to unaware transient personnel, and to provide reasonable and adequate guidance for the safe use of lasers and laser systems. **NOTE:** Associated non-beam hazards such as electrical shock, chemicals, and fire are excluded from this procedure.

In establishing laser control measures, the following factors determine the type and amount of control necessary:

- a. Power or energy output.
- b. Pulse length.
- c. Pulse repetition rate.
- d. Wavelength.
- e. Beam path.
- f. Beam shape (divergence, hot spots, atmospheric effects).
- g. Number of laser systems at a particular location.
- h. Laboratory layouts, position of windows, doors, etc.
- i. Degree of isolation of location.
- j. Type of population (informed staff in control, local knowledgeable personnel, uninformed transients).

In addition to the above factors, control measures also depend on laser classification. In general:

- a. A Class 1 laser system is one that is considered to be incapable of producing damaging radiation levels during operation, and is exempt from any control measures or other forms of surveillance.
- b. A Class 1M laser system is one that is considered to be incapable of producing hazardous exposure conditions during normal operation unless the beam is viewed with an optical instrument such as an eye-loupe or a telescope, and is exempt from any control measures and other forms of surveillance.
- c. A Class 2 laser system is one that emits in the visible portion of the spectrum (0.4 to 0.7 μm), and eye protection is normally afforded by the aversion response.

- d. A Class 2M laser system is one that emits in the visible portion of the spectrum (0.4 to 0.7 μm), and eye protection is normally afforded by the aversion response for unaided viewing. However, it is potentially hazardous if viewed with certain optical aids.
- e. A Class 3R laser system is one that is potentially hazardous under some direct and specular reflection viewing conditions if the eye is appropriately focused and stable, but the probability of an actual injury is small. This class of laser will not pose either a fire hazard or a diffuse-reflection hazard.
- f. A Class 3B laser system is one that may be hazardous under direct and specular reflection viewing conditions. This class of laser is normally not a diffuse reflection or fire hazard.
- g. A Class 4 laser system is one that is a hazard to the eye or skin from the direct beam and may pose a diffuse reflection or fire hazard.
- h. Use the above information and applicable sections of ANSI Z136.1-2007 as official guidelines in providing safe practices for laser operations.

Table 2 summarizes the safety requirements by laser classification. The table may not be applicable for unique applications. For specialized applications refer to ANSI Z136.1-2007.

For those campuses using Class 3B or Class 4 lasers, a Laser Safety Officer shall be appointed by the Campus Radiation Safety Committee. This person shall be properly indoctrinated in laser safety and will have the vested authority to supervise the control of laser hazards.

Table 2. Control Measures by Laser Classification (ANSI Z136.1-2007)

Class	Procedural & Administrative Controls	Training	Medical Surveillance	LSO
1	Not Required	Not Required	Not Required	Not Required
1M	Required (2)	Application Dependent	Application Dependent	Application Dependent
2	Not Required (1)	Not Required (1)	Not Required	Not Required
2M	Required (2)	Application Dependent	Application Dependent	Application Dependent
3R	Not Required	Not Required (1)	Not Required (1)	Not Required (1)
3B	Required	Required	Suggested	Required
4	Required	Required	Suggested	Required

(1) Not required except for conditions of intentional intra-beam exposure applications.
(2) Control measures to prevent potentially hazardous optically aided viewing.

3.2.1 SPECIFIC CONTROL MEASURES

To reduce the control measures required and the potential hazard from a laser source, a complete enclosure of the laser beam (an enclosed laser) shall be used when feasible. A closed installation (any location where lasers are used will be closed to transient personnel during laser operation) provides the next most desirable hazard control measure. Specific control measures to reduce the possibility of exposure of the eye and skin to hazardous laser radiation and to other hazards

associated with the operation of those devices are outlined in the "American National Standard for the Safe Use of Lasers" (ANSI Z136.1-2007). Typical control measures for Class 3B and Class 4 lasers are listed below:

- a. Protective housing.
- b. Interlocks.
- c. Service access panel.
- d. Nominal hazard zone analysis.
- e. Beam stop.
- f. Activation warning systems.
- g. Laser controlled area.
- h. Equipment labels.
- i. Warning signs (Fig. 3).
- j. Standard operating procedures.
- k. Training.
- l. Authorized personnel.
- m. Protective equipment (eyewear, window, barrier, curtain, etc.).

3.3 LASER PERSONNEL (Class 3B and Class 4)

Only authorized persons who have received training in the proper operation of the laser equipment shall work with such equipment.

3.4 OTHER PERSONNEL IN THE VICINITY OF LASER OPERATION (Class 3B and Class 4)

These personnel shall be duly informed concerning the potential hazards from these devices and be provided with proper personal protection equipment.

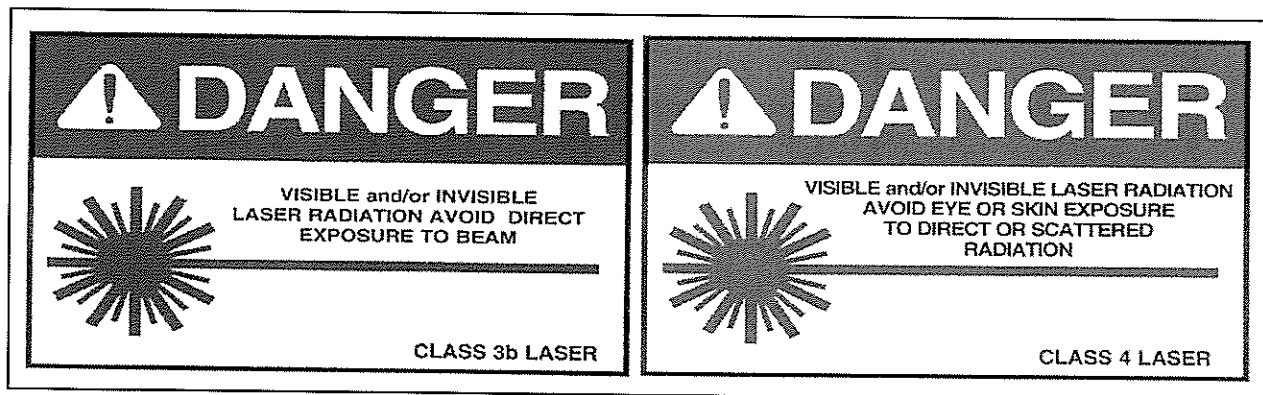


Figure 3. Sample Warning Signs for Class 3B and Class 4 Lasers

3.5 SPECTATORS (Class 3B and Class 4)

Spectators shall not be permitted into a laser controlled area, unless appropriate supervisory approval has been obtained, the degree of hazard and the avoidance procedure have been explained, and appropriate protective measures are taken.

3.6 RESPONSIBILITY OF LASER SAFETY OFFICER (Class 3B and Class 4)

The Laser Safety Officer shall have the responsibility and authority to:

- a. Provide consultation services on laser hazard evaluation and control.
- b. Suspend, restrict, or terminate the operation of a laser system if s(he) deems that the laser hazard control is inadequate.
- c. Recommend protective equipment to control laser hazards when necessary.
- d. Survey approved laser laboratories periodically.
- e. Review plans for installation and/or modification of laser equipment relative to laser hazards control.
- f. Investigate upon notification of a real or suspected incident resulting from laser operation and initiate corrective action.
- g. Post warning signs in appropriate locations and ascertain that warning systems are functional.
- h. Use the above procedures and applicable sections of ANSI Z136.1-2007 as official guidelines in providing safe practices for laser operations.

3.7 WARNING SIGNS (Class 3B and Class 4)

The laser hazard symbol shall be a sunburst pattern consisting of two sets of radial spokes of different length and one longer spoke radiating from a common center (Fig. 3). The color, dimensions, and location of the symbol within the sign shall be consistent with the specifications in ANSI Z136.1-2007.

3.8 EMPLOYEES' RESPONSIBILITY

- a. An employee shall not energize or work with or near a laser unless authorized to do so by the supervisor of that laser.
- b. Employees must comply with safety rules and procedures as well as applicable regulations prescribed by the laser supervisor and the Laser Safety Officer.
- c. When an employee knows or suspects that an accident has occurred involving a laser, s(he) will immediately notify the supervisor and the Laser Safety Officer.
- d. All employees shall wear prescribed safety equipment and observe all safety procedures at all times when working with or in the vicinity of energized lasers.

3.9 MEDICAL EXAMINATIONS (Class 3B and Class 4)

Medical surveillance of personnel working in a laser environment should be consistent with those recommended in ANSI Z136.1-2007.

3.10 STATE OR FEDERAL REGULATIONS FOR THE SAFE USE OF LASERS (Class 3B and Class 4)

At the present time no specific State of Louisiana or Federal regulations have been promulgated concerning the safe use of lasers. Until such regulations are published, LSU shall consider the ANSI Z136.1-2007 as the official guidelines to be followed regarding all aspects of laser safety.

4 SAFETY PROCEDURES FOR ULTRAVIOLET RADIATION

4.1 INTRODUCTION

Ultraviolet radiation is an invisible radiant energy that is produced by natural and artificial sources and accompanies much visible light.

The sun is the major natural source of ultraviolet radiation, but many artificial sources are used in industry, medicine, and research. LSU may use a variety of ultraviolet producing equipment, including germicidal lamps, chemical synthesis and analytic devices, carbon arcs, furnaces, welding and cutting torches, and photocopying machines.

Biological effects of ultraviolet radiation include damages to the eyes and skin. A typical example of the injurious effects produced by ultraviolet radiation is sunburn which is due to the naturally occurring ultraviolet rays produced by the sun. How serious the sunburn is depends on the length of the exposure and the intensity of the radiation as well as on the individual's sensitivity. Continual exposure to ultraviolet radiation speeds skin aging and may cause skin cancer.

Exposure to the eyes is particularly dangerous because the ultraviolet radiation cannot be seen, or, at first, felt. Consequently, an individual being exposed is not always aware that her/his eyes are being affected. Conjunctivitis usually occurs 4 to 8 hours after exposure. It is extremely painful and, although usually temporary, can cause permanent damage to the eyes.

4.2 PERMISSIBLE EXPOSURE LIMITS

The permissible exposure limit for ultraviolet light is somewhat complicated to determine. The limit is based on the wavelengths of the specific region of the ultraviolet spectrum to which the individual is exposed, the duration of the exposure, and the intensity of the light. The Threshold Limit Values (ACGIH TLVs and BEIs-2008) range from 3.0 mJ/cm^2 at 270 nm to $1.0 \times 10^5 \text{ mJ/cm}^2$ at 400 nm.

4.3 CONTROL MEASURES

NOTE: Photocopy equipment is not covered under this policy and thus is exempt from these requirements. Ultraviolet radiation resulting from cutting, burning, or welding operations is not part of the scope of this policy and thus responsibility is deferred to individual campus or facility safety organizations.

Employees shall wear protective clothing, gloves, and face shields when operating equipment that produces ultraviolet radiation.

Enclosures or shields that are non-transparent to ultraviolet radiation can also be utilized to control exposures

Proper ventilation shall be provided to remove excessive amount of toxic gases that may be created when ultraviolet radiation reacts with air and atmospheric contamination.

Supervisors shall inform all employees that ultraviolet radiation is present in areas where such devices capable of producing ultraviolet radiation are used and shall inform those employees of the potential hazards from ultraviolet radiation.

4.4 WARNING SIGNS

Warning signs (Fig. 4) shall be placed to alert workers and the general public in areas where there are high-intensity ultraviolet light emitting sources.

Warning signs are available from commercial suppliers or may be available from the manufacturer of the ultraviolet light product.

4.5 EMPLOYEES' RESPONSIBILITY

Each employee shall:

- a. Be familiar with the procedures outlined above and avoid all unnecessary exposure to ultraviolet radiation.
- b. Use all required protective equipment and clothing when operating ultraviolet radiation producing equipment.
- c. Check the ventilation system for adequate performance before starting work on tasks that require ventilation systems.
- d. Report any ill effects on skin and eye resulting from the exposure to ultraviolet radiation due to the official business use of such ultraviolet radiation producing equipment to her/his supervisor and the Radiation Safety Office.
- e. Report to her/his supervisor about any malfunctions of the ultraviolet radiation producing equipment.

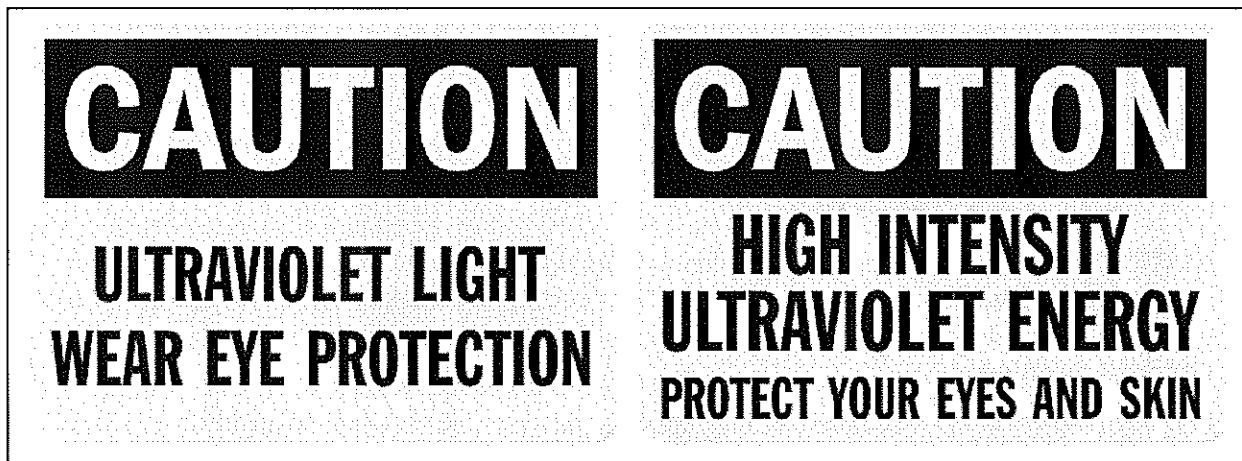


Figure 4. Typical Warning Signs for Ultraviolet Radiation

Official Use Only-Security Related Information

RADIOACTIVE MATERIAL LICENSE						
LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	AI NUMBER	PAGE 2 OF 6 PAGE(S)		
Louisiana State University	LA-0001-L01	50	5540			
I	131	Total	1.5 Ci	Any		Instruction and Research
Cs	137	Total	500 mCi	Approved Sealed Sources*	Troxler Electronic Labs or Campbell-Pacific Nuclear Devices	Surface/Soil Density, Moisture or Asphalt Content Gauging
Cs	137	8	170 Ci	Eberline Models SCS-1001 through SCS-1008	Eberline Model 1000B	Calibration Sources
Cs	137	Total	15 Ci	Any		Instruction and Research
Cs	137	2	600 Ci	RAMCO-50-ORNL Model A*	AECL Gammacell 1000	Instruction and Research
Cs	137	Total	500 Ci	Sealed Sources*	Custom Design	Pool Irradiator
Cs	137	1	550 Ci	Shepherd 6810 ORNL A-0096*	J. L. Shepherd & Assoc. Model 143-45A	Gamma Irradiator
Cs	137	1	4,000 Ci	Approved Sealed Sources* Model MDS Nordion C-440	MDS Nordion, Inc. Gammacell 40 Exactor	Gamma Irradiator
Cs	137	Total	9,000 Ci	Approved Sealed Sources*	J.L. Shepherd & Associates, Mark-I Series	Gamma Irradiator
Ir	192	Total	1 Ci	Any		Instruction and Research
Ra	226	Total	50 mCi	Any		Instruction and Research
Th	229	Total	1 mCi	Any		Instruction and Research
Pu	239	Total	200 gm	Sealed Capsules		Instruction and Research
Am (Am-Be)	241	Total	500 mCi	Approved Sealed Sources*	Troxler Electronic Labs or Campbell-Pacific Nuclear Devices	Soil/Surface Density, Moisture or Asphalt Content Gauging

Official Use Only-Security Related Information

RADIOACTIVE MATERIAL LICENSE						
LICENSEE		LICENSE NUMBER		AMENDMENT NUMBER		AI NUMBER
Louisiana State University		LA-0001-L01		50		5540
PAGE 3 OF 6 PAGE(S)						
Am	241	Total	50 mCi	Any		Instruction and Research
Cf	252	Total	130 mCi (230 ug)	Sealed Sources*	Custom Design	Instruction and Research
Th	Natural	Total	10 mCi (90 kg)	Any		Instruction and Research
U	235	Total	214 µCi (100 gm)	Any		Instruction and Research
U	Natural	Total	30 mCi (90 kg)	Any		Instruction and Research
U	Natural	Total	760 mCi (2510 kg)	Aluminum-Clad Metal Slugs		Fuel for Sub-Critical Reactor

*Sealed sources which have been evaluated and approved for licensing purposes and authorized for use in accordance with the Sealed Sources and Devices Registry Safety Evaluation of the Device.

**SNM-Special Nuclear Material, as defined in Chapter 1 of LAC 33:XV.

1. Radioactive material shall be stored and used at locations within the legal properties, auxiliary facilities and rental properties of the Louisiana State University System (See Attached Addendum). Radioactive material may also be used at temporary sites in the State of Louisiana.
2. Radioactive material shall be used only by, or under the supervision of individuals designated by the Louisiana State University System Radiation Safety Committee, Dr. Dennis J. Paul, Committee Chairman.
3. The Radiation Safety Officer for this license is Wei-Hsung Wang, Ph.D., and the alternate Radiation Safety Officer is Amin M. Hamideh.
4.
 - A. Radioactive material shall not be used in or on humans without prior written approval of the Department.
 - B. Radioactive material used in field applications where activities are released to the environment shall be in accordance with LAC 33:XV.422. A written report which verifies that the provisions of LAC 33:XV.422 have been met shall be submitted to the Department within 30 days of each such release.
5. Experimental animals administered radioactive material, or their products, shall not be used for human consumption or as animal feed.
6.
 - A. Sealed sources, other than those fabricated by the licensee, shall not be opened by the licensee without prior authorization from the Department.
 - B. Sealed sources fabricated by the licensee shall be specifically subject to the survey requirements of LAC 33:XV.430, and to the labeling requirements of LAC 33:XV.450 and 451 as though the sources were not sealed.

Official Use Only-Security Related Information

RADIOACTIVE MATERIAL LICENSE

LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	AI NUMBER	
Louisiana State University	LA-0001-L01	50	5540	PAGE 4 OF 6 PAGE(S)

7.
 - A. The periodic leak tests required by LAC 33:XV.426 do not apply to the sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to use or transfer to another person, unless they have been leak tested within six (6) months prior to the date of transfer or use.
 - B. Leak test intervals may be extended to three (3) years for those devices which have been authorized by the Department, an Agreement State, a licensing state or the Nuclear Regulatory Commission for three (3) year testing intervals. For those devices, the licensee must maintain documentation from the manufacturer to support the three (3) year authorization.
 - C. Gas chromatograph detector cells radioactive material, except those containing Hydrogen-3, shall be considered as sealed sources and shall be leak tested in accordance with the collective requirements of this condition.
8. The licensee is authorized to calibrate radiation detection instruments as a customer service. Each calibration of instruments shall include at least two (2) points other than zero for each scale that the instrument is certified as "calibrated" by the licensee.
9. Pursuant to LAC 33:XV.422 and 461, the licensee is authorized to dispose of radioactive waste by incineration provided gaseous effluent from incineration does not exceed the limits specified for air in Chapter 4, Appendix B, Table II, LAC 33:XV. Ash residues may be disposed of as ordinary waste provided appropriate surveys pursuant to LAC 33:XV.430 are made to determine that concentrations of radioactive material appearing in the ash residues do not exceed the concentrations (in microcuries per gram) specified for water in Chapter 4, Appendix B, Table II, LAC 33:XV. Individuals operating the incinerator shall have specific training in the incineration of radioactive material, and shall be designated by the System Radiation Safety Officer. Incineration of radioactive material shall be conducted only at L.S.U. Veterinary Medicine School at Baton Rouge, L.S.U. School of Dentistry at New Orleans, the University of New Orleans at New Orleans, the Pennington Biomedical Center at Baton Rouge, and the L.S.U. School of Medicine at Shreveport.
10. The licensee is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal in ordinary trash provided:
 - A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of 10 half-lives. Radioactive waste with a physical half-life greater than 36 days shall be held for decay only at the primary radioactive waste storage site at each campus.
 - B. Before disposal as normal waste, radioactive waste shall be surveyed to determine that its radioactivity cannot be distinguished from background, and all radiation labels shall be removed or obliterated.
11. Except for plutonium contained in a medical device designed for individual human application, no plutonium, regardless of form, shall be delivered to a carrier for shipment by air transport or transported in an aircraft by the licensee except in packages the design of which the Nuclear Regulatory Commission has specifically approved for transport of plutonium by air.
12. The licensee is authorized to perform and analyze internal sealed source leak tests. Leak tests shall be performed in accordance with LAC 33:XV.426 and procedures submitted in the licensee's application.

Official Use Only-Security Related Information

RADIOACTIVE MATERIAL LICENSE			
LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	AI NUMBER
Louisiana State University	LA-0001-L01	50	5540

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13. If, in an emergency, it becomes necessary for the licensee to evacuate the facility at which radioactive material is stored, it shall be the responsibility of the licensee to contact the Radiation Licensing Section at LDEQradpermits@la.gov or (225)-219-3041 prior to leaving. The licensee shall submit a detailed description of how the storage location was secured prior to leaving and the licensee's temporary address, phone number(s) or other means of being contacted. This information shall be kept updated until the licensee is able to return to the licensed storage location.
14. The licensee shall comply with the regulations for the physical protection of Category 1 and Category 2 quantities of radioactive material in LAC 33:XV.Chapter16.
15. Except as specifically provided otherwise by the license, the licensee shall possess and use radioactive material described in all schedules of this license in accordance with LAC 33:XV and statements, representations, and procedures contained in the licensee's application (complete submission) dated April 30, 2021, and in all subsequent correspondence. The regulations in LAC 33:XV shall take precedence unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than these regulations.

LI:ZF

Official Use Only-Security Related Information

RADIOACTIVE MATERIAL LICENSE

LICENSEE	LICENSE NUMBER	AMENDMENT NUMBER	AI NUMBER	
Louisiana State University	LA-0001-L01	50	5540	PAGE 6 OF 6 PAGE(S)

ADDENDUM

Radioactive materials will be used and stored at locations within the legal properties, auxiliary facilities, and rental properties of Louisiana State University, as listed below:

- * Louisiana State University and A & M College Complex
Center for Energy Studies
Energy, Coast and Environment Bldg.rm 1067
Baton Rouge, Louisiana 70803

Pennington Biomedical Research Center
6400 Perkins Road
Baton Rouge, LA 70808

Radiation Safety Office
112 Nuclear Science Building
Baton Rouge, LA 70803

- * Louisiana State University Health Sciences Center

- ** New Orleans
1901 Perdido Street
New Orleans, Louisiana 70112
AI No. 2348

- ** Shreveport
1501 Kings Highway
Shreveport, Louisiana 71130
AI No. 3486

- * LSU AgCenter
Northeast Research Station
4589 HWY 605
Saint Joseph, LA 71366
AI No. 128992



LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL COMPLIANCE
EMERGENCY & RADIOLOGICAL SERVICES DIVISION

**REGISTRATION CERTIFICATE
FOR
NON-LICENSED SOURCES OF RADIATION**

LICENSING & REGISTRATIONS SECTION
POST OFFICE BOX 4312
BATON ROUGE, LOUISIANA 70821-4312

Louisiana State University- Eunice AI No: 3376	REGISTRATION #: 6538-EQT9	EXPIRATION DATE NONE
ADDRESS: 2048 Johnson Hwy. Eunice, LA 70535	TYPE OF NON-LICENSED SOURCE: <input checked="" type="checkbox"/> Medical <input type="checkbox"/> Dental <input type="checkbox"/> C. T. <input type="checkbox"/> Industrial X-Ray <input type="checkbox"/> Mammography <input type="checkbox"/> Accelerator <input type="checkbox"/> Other	
MANUFACTURER Summit	MODEL NUMBER L501-1	SERIAL NUMBER AFB-313-0507

CONDITIONS

1. The registrant shall notify the Louisiana Registrations and Certifications Section, within ten days, of any change that renders the information contained in the application invalid.
2. The registrant shall notify the Section in accordance with LAC 33:XV.213.D of the final disposition of the X-ray machine (sale, transfer, etc.).
3. The Section will terminate the registration certificate upon written request by the registrant, provided the registrant no longer possesses the registered device.
4. No person, in any advertisement, shall state or imply that any activity under this registration has been approved by the Department.
5. The registrant shall comply with all applicable provisions of Part XV of Title 33 of the Louisiana Administrative Code (LAC 33:XV; formerly the Louisiana Radiation Regulations).
6. This registration certificate, or a copy thereof, shall be placed on or immediately adjacent to the control panel to which it applies.
7. This registration certificate invalidates all previous certificates issued for the above source of radiation.

James M. Pate, III
Environmental Scientist Supervisor

Date: 8/16/2007

LOUISIANA STATE UNIVERSITY
RADIATION SAFETY OFFICE
Baton Rouge, LA
Ph. (225) 578-2743 ; Fax (225) 578-2943
Email: weihung@lsu.edu

GENERAL RADIOGRAPH INSPECTION REPORT

Registrant	LSU Eunice	Registration #	6538-EQT9
Projections/Wk	10	Agency ID #	3376
Person Interviewed	Rob McLaughlin	Typical Procedure	Abdomen
Phototimed %	Manual %	Room #	T105
Film Speed	Digital	mA	300
Unit Manufacturer	Summit	Model #	L501-1
		Time	0.167
		S/N	AFB 313-0507
		kVp	80
		mAs	50
		SID	40

AREAS OF CONCERN :

YES NO

AREAS INSPECTED

kVp	Exposure	Time	mAs	HVL
80.83 kVp	314.041 mR	0.166 s	50.000	3.579 mmAl
80.78 kVp	315.130 mR	0.166 s	50.000	3.580 mmAl
80.78 kVp	312.371 mR	0.166 s	50.000	3.584 mmAl
80.55 kVp	312.995 mR	0.166 s	50.000	3.588 mmAl
80.67 kVp	629.315 mR	0.333 s	100.000	3.581 mmAl

- 406 Adequate Radiation Protection Program Yes No
- 603.A.9 Patient Exp: C.F. 1.63 ESE 511.2 mR (Nat. Avg ESE 388 mR)
- 603.A.3 Technique Chart Yes No
- 1011 Posting; DRC-3 Yes No Regulations Yes No Certificate Yes No
- 604.A.1 Warning Label Posted on X-Ray unit Yes No
- 606.A Beam limitation; PBL Manual
- 606.A.2.a SID; indicated SID 40 measured SID 40 SID indicator deviation 0.0%
- 606.A.2.c Collimator deviation acceptable? Yes No
- 606.A.1.b Light field/X-ray field align. Acceptable? Yes No
- 606.D Exposure reproducibility ($E_{max} - E_{min} \leq 0.1 E_{avg}$) 0.01 ≤ 0.1
avg 313.6 mR max 315.1 mR min 312.4 mR
- 606.B.4 Timer reproducibility ($T_{max} - T_{min} \leq 0.1 T_{avg}$) 0.00 ≤ 0.1
avg 0.166 sec max 0.166 sec min 0.166 sec
- 606.F Timer accuracy; % difference ($\pm 10\%$ or manufacturer's limits) 0.5%
- 604.A.5.a Filtration adequate: HVL = 3.58 mm Al @ 80 kVp Req= 2.3 mm Al Okay
- 606.F kVp accuracy; % difference ($\pm 10\%$ or manufacturer's limits) 0.9% avg 80.7
- 606.G mAs Linearity; $(X_1 - X_2) \leq 0.1(X_1 + X_2)$ 0.001629 ≤ 0.1
mR1 313.6 mAs1 50 X1 6.273 mR2 629.3 mAs2 100.000 X2 6.293
- 431.A Personnel monitoring; supplied by: Landauer, Inc. Type OSL

Scatter radiation measurements @ 80 kVp 300 mA 0.167 second

Location 1 Control background Location 2 Door background

Comments: This device is used on phantoms, not people. Bkg=0.04 mR/h
Multi-meter Used: Raysafe Solo R/F, Serial # 245101, Calibrated Feb. 20, 2020
Survey Instrument Used: Ludlum 9DP (SN 25014300), calibrated 12/07/2020

Date: 2/9/2021 Performed by: Amin Hamideh, M.S, CLSO & Dr. Wei-Hsung Wang, CHP



LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL COMPLIANCE
EMERGENCY & RADIOLOGICAL SERVICES DIVISION

**REGISTRATION CERTIFICATE
FOR
NON-LICENSED SOURCES OF RADIATION**

LICENSING & REGISTRATIONS SECTION
POST OFFICE BOX 4312
BATON ROUGE, LOUISIANA 70821-4312

LSU Eunice AI No: 3376	REGISTRATION #: 6538-EQT10	EXPIRATION DATE NONE
ADDRESS: 2048 Johnson Road Eunice, LA 70535	TYPE OF NON-LICENSED SOURCE: <input checked="" type="checkbox"/> Medical – Mobile <input type="checkbox"/> Dental <input type="checkbox"/> C. T. <input type="checkbox"/> Industrial X-Ray <input type="checkbox"/> Mammography <input type="checkbox"/> Accelerator <input type="checkbox"/> Other	
MANUFACTURER G.E. Medical	MODEL NUMBER 46-270954G2	SERIAL NUMBER S1740120

CONDITIONS

1. The registrant shall notify the Louisiana Registrations and Certifications Section, within ten days, of any change that renders the information contained in the application invalid.
2. The registrant shall notify the Section in accordance with LAC 33:XV.213.D of the final disposition of the X-ray machine (sale, transfer, etc.).
3. The Section will terminate the registration certificate upon written request by the registrant, provided the registrant no longer possesses the registered device.
4. No person, in any advertisement, shall state or imply that any activity under this registration has been approved by the Department.
5. The registrant shall comply with all applicable provisions of Part XV of Title 33 of the Louisiana Administrative Code (LAC 33:XV; formerly the Louisiana Radiation Regulations).
6. This registration certificate, or a copy thereof, shall be placed on or immediately adjacent to the control panel to which it applies.
7. This registration certificate invalidates all previous certificates issued for the above source of radiation.

James M. Pate, III
Environmental Scientist Supervisor

Date: 1/26/2010

LOUISIANA STATE UNIVERSITY
 RADIATION SAFETY OFFICE
 Baton Rouge, LA
 Ph. (225) 578-2743 ;Fax (225) 578-2943
 Email: weihsung@lsu.edu

GENERAL RADIOGRAPH INSPECTION REPORT

Registrant	LSU EUNICE		Registration #	6538-EQT10	
Projections/Wk	2	Agency ID #	3376	Typical Procedure	Extremity
Person Interviewed	Rob McLaughlin		Exam Technique	kVp	70
Phototimed %	Manual %	Room #	Portable	mAs	10
Film Speed	Digital		Time	0.116	SID 40
Unit Manufacturer	GE Medical	Model #	46-270954G2	S/N	S1740120

AREAS OF CONCERN : YES NO

AREAS INSPECTED

kVp	Exposure		Time	mAs	HVL
68.98 kV	51.966 mR	447.126 mR/s	0.116 s	1 pulse 10.000	2.749 mmAl
68.70 kV	52.001 mR	448.283 mR/s	0.116 s	1 pulse 10.000	2.768 mmAl
68.84 kV	51.967 mR	447.987 mR/s	0.116 s	1 pulse 10.000	2.762 mmAl
68.78 kV	52.012 mR	442.449 mR/s	0.118 s	1 pulse 10.000	2.762 mmAl
68.89 kV	104.439 mR	435.968 mR/s	0.240 s	1 pulse 20.000	2.790 mmAl

406 Adequate Radiation Protection Program Yes No

603.A.9 Patient Exp: C.F. 1 ESE 52.0 mR (Nat. Avg ESE N/A mR)

603.A.3 Technique Chart Yes No

1011 Posting; DRC-3 Yes No Regulations Yes No Certificate Yes No

604.A.1 Warning Label Posted on X-Ray unit Yes No

606.A Beam limitation; PBL Manual

606.A.2.a SID; indicated SID 40 measured SID 40 SID indicator deviation 0.0%

606.A.2.c Collimator deviation acceptable? Yes No

606.A.1.b Light field/X-ray field align. Acceptable? Yes No

606.D Exposure reproducibility ($E_{max} - E_{min} \leq 0.1 E_{avg}$) 0.00 ≤ 0.1
 avg 52.0 mR max 52.0 mR min 52.0 mR

606.B.4 Timer reproducibility ($T_{max} - T_{min} \leq 0.1 T_{avg}$) 0.01 ≤ 0.1
 avg 0.116 sec max 0.118 sec min 0.116 sec

606.F Timer accuracy; % difference ($\pm 10\%$ or manufacturer's limits) 0.4%

604.A.5.a Filtration adequate: HVL = 2.76 mm Al @ 70 kVp Req= 1.5 mm Al Okay

606.F kVp accuracy; % difference ($\pm 10\%$ or manufacturer's limits) 1.7% avg 68.8

606.G mAs Linearity; $(X_1 - X_2) \leq 0.1(X_1 + X_2)$ 0.002237 ≤ 0.1
 mR1 52.0 mAs1 10 X1 5.199 mR2 104.4 mAs2 20.000 X2 5.222

431.A Personnel monitoring; supplied by: Landauer, Inc. Type OSL

mAs is fixed @ 100 mA

Scatter radiation measurements @ 70 kVp 100 mA 0.116 second

Location 1 Operator 0.18 mR/hr Location 2 Door Background

Comments: This device is used on phantoms, not people. Bkg = 0.02mR/h
 Multi-meter Used: Raysafe Solo R/F, Serial # 245101, Calibrated Feb 20, 2020
 Survey Instrument Used: Ludlum 9DP (SN 25014300), calibrated 12/07/2020

Date: 2/9/2021 Performed by: Amin Hamideh, M.S, CLSO & Dr. Wei-Hsung Wang, CHP



LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
 OFFICE OF ENVIRONMENTAL COMPLIANCE
 EMERGENCY & RADIOLOGICAL SERVICES DIVISION

**REGISTRATION CERTIFICATE
 FOR
 NON-LICENSED SOURCES OF RADIATION**

LICENSING & REGISTRATIONS SECTION
 POST OFFICE BOX 4312
 BATON ROUGE, LOUISIANA 70821-4312

LSU Eunice AI No: 3376	REGISTRATION #: 6538-EQT11	EXPIRATION DATE NONE
ADDRESS: 2048 Johnson Hwy. Eunice, LA 70535	TYPE OF NON-LICENSED SOURCE: <input checked="" type="checkbox"/> Medical - Mobile <input type="checkbox"/> Dental <input type="checkbox"/> C. T. <input type="checkbox"/> Industrial X-Ray <input type="checkbox"/> Mammography <input type="checkbox"/> Accelerator <input type="checkbox"/> Other	
MANUFACTURER OEC	MODEL NUMBER 9600	SERIAL NUMBER 62-0307

CONDITIONS

1. The registrant shall notify the Louisiana Registrations and Certifications Section, within ten days, of any change that renders the information contained in the application invalid.
2. The registrant shall notify the Section in accordance with LAC 33:XV.213.D of the final disposition of the X-ray machine (sale, transfer, etc.).
3. The Section will terminate the registration certificate upon written request by the registrant, provided the registrant no longer possesses the registered device.
4. No person, in any advertisement, shall state or imply that any activity under this registration has been approved by the Department.
5. The registrant shall comply with all applicable provisions of Part XV of Title 33 of the Louisiana Administrative Code (LAC 33:XV; formerly the Louisiana Radiation Regulations).
6. This registration certificate, or a copy thereof, shall be placed on or immediately adjacent to the control panel to which it applies.
7. This registration certificate invalidates all previous certificates issued for the above source of radiation.

James M. Pate, III
 Environmental Scientist Supervisor

[Signature] Date: 1/20/2011

LOUISIANA STATE UNIVERSITY
SYSTEM RADIATION SAFETY OFFICE
Baton Rouge, LA
Ph. (225) 578-2743 ; Fax (225) 578-2943
Email: weihsung@lsu.edu

FLUOROSCOPIC INSPECTION REPORT

Registrant LSU Eunice Registration # 6538- EQT11
 Patients/Week 2 Typical Procedure Chest
 Person Interviewed Rob McLaughlin Exam Technique kVp 74
 Agency ID # 3376 Room # portable mA-min per week 12.00 mA 2.5
 Typical fluoro exam time 2.4
 Unit Manufacturer OEC Model # 9600 S/N 62-0307

AREAS OF CONCERN : YES NO

AREAS INSPECTED

kVp	Exposure	Exp. Rate	Time	mA	HVL
74.24 kV	49.096 mR	1040.208 mR/min	2.832 s	2.300	3.375 mmAl
74.01 kV	42.348 mR	1038.930 mR/min	2.446 s	2.400	3.389 mmAl
73.91 kV	44.685 mR	1038.954 mR/min	2.581 s	2.400	3.385 mmAl
114.49 kV	138.309 mR	2757.090 mR/min	3.010 s	2.400	5.649 mmAl
106.88 kV	111.884 mR	2675.238 mR/min	2.509 s	2.400	6.236 mmAl
103.17 kV	114.107 mR	2633.454 mR/min	2.600 s	5.000	6.535 mmAl

- 603.A.10 Yes No
- 1011.A.2 Certificate of registration posted; Yes No
- 605.A.1.a Primary barrier ganged to tube housing; physically microswitches
- 605.A.2 Dead-man type exposure switch; Yes No
- 605.A.3.b Exposure rate measured and posted annually; Yes No
 Qualified expert Amin Hamideh, M.S., CLSO Date 2/9/2021
 Typical value measured at 1.040 R/min; 74.24 kVp 2.300 mA
 Max value measured at 2.63 R/min; 103.2 kVp 5.000 mA
- 605.A.1.b Stepless collimation; variable SID Yes No ; visible area > 300 sq. cm Yes No
- 605.A.6 Minimum SSD; stationary (38 cm) ; mobile (30 cm) ; dedicated mobile (20 cm)
- 604.A.5.a Filtration adequate: HVL = 3.38 mm Al @ 74.24 kVp Req= 2.172016 mmAl Okay
 Exam technique exposure rate 1040 mR/min
- 605.A.3 Max exposure rate within limits; kVp 114.49 , mA 2.400 , rate 2757 mR/min
- 605.A.7 Fluoro timer; max cumulative time ≤ 5 min audible signal or terminates beam
- 605.A.8 1. Lead aprons present; Yes No
 2. Bucky slot cover or scatter shield adequate; Yes No
- 605.A.9 Spot film device reproducibility, kVp 74.24 mA 2.300 sec 2.832
 Not Used avg 45.4 mR max 49.1 mR min 42.3 mR 0.14871 ≤ 0.1
 N/A avg 2.619 sec max 2.832 sec min 2.446 sec 0.147447 ≤ 0.1

Scatter radiation measurements @ 74 kVp 2.5 mA 2.7 second
 Location 1 table top 1601.000 mR/min Location 2 6 ft away 0.020 mR/hr

Comments: Typical measured with using 1.5" of Al and maximum measured with 1.5" of Al + 3 mm Pb
 Multi-meter Used: Raysafe Solo R/F, Serial # 245101, Calibrated Feb. 20, 2020
 Survey Instrument Used: Ludlum 9DP (SN 25014300), calibrated 12/07/2020
 The maximum exposure rate didn't exceed 10 R/min (the limit without high exposure control)

Date: 2/9/2021 Performed by: Amin Hamideh, M.S, CLSO & Dr. Wei-Hsung Wang, CHP



LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL COMPLIANCE

**REGISTRATION CERTIFICATE
FOR
NON-LICENSED SOURCES OF RADIATION**

LICENSING & REGISTRATIONS SECTION
POST OFFICE BOX 4312
BATON ROUGE, LOUISIANA 70821-4312

LSU Eunice AI No: 3376	REGISTRATION #: 6538-EQT12	EXPIRATION DATE NONE
ADDRESS: 2048 Johnson Hwy. Eunice, LA 70535	TYPE OF NON-LICENSED SOURCE: <input checked="" type="checkbox"/> Medical <input type="checkbox"/> Dental <input type="checkbox"/> C. T. <input type="checkbox"/> Industrial X-Ray <input type="checkbox"/> Mammography <input type="checkbox"/> Accelerator <input type="checkbox"/> Other	
MANUFACTURER Quantum	MODEL NUMBER QG-Dig-DRX	SERIAL NUMBER 12M-1216

CONDITIONS

1. The registrant shall notify the Louisiana Registrations and Certifications Section, within ten days, of any change that renders the information contained in the application invalid.
2. The registrant shall notify the Section in accordance with LAC 33:XV.213.D of the final disposition of the X-ray machine (sale, transfer, etc.).
3. The Section will terminate the registration certificate upon written request by the registrant, provided the registrant no longer possesses the registered device.
4. No person, in any advertisement, shall state or imply that any activity under this registration has been approved by the Department.
5. The registrant shall comply with all applicable provisions of Part XV of Title 33 of the Louisiana Administrative Code (LAC 33:XV; formerly the Louisiana Radiation Regulations).
6. This registration certificate, or a copy thereof, shall be placed on or immediately adjacent to the control panel to which it applies.
7. This registration certificate invalidates all previous certificates issued for the above source of radiation.

Richard S. Blackwell
Environmental Scientist Supervisor

Date:

2/13/13

LOUISIANA STATE UNIVERSITY
SYSTEM RADIATION SAFETY OFFICE
Baton Rouge, LA
Ph. (225) 578-2743 ; Fax (225) 578-2943
Email: weihung@lsu.edu

GENERAL RADIOGRAPH INSPECTION REPORT

Registrant	<u>LSU EUNICE</u>	Registration #	<u>6538-EQT12</u>
Projections/Wk	<u>7</u>	Agency ID #	<u>3376</u>
Person Interviewed	<u>Rob McLaughlin</u>	Typical Procedure	<u>Lumbar Spine</u>
Phototimed %	<u>Manual %</u>	Exam Technique	<u>kVp 75</u>
Film Speed	<u>Digital</u>	Room #	<u>T142</u>
Unit Manufacturer	<u>Quantum</u>	Model #	<u>QG-Dig-DRX</u>
		Time	<u>200 mAs 100</u>
		S/N	<u>0.500 SID 40</u>
			<u>12M-1216</u>

AREAS OF CONCERN : YES NO

AREAS INSPECTED

kVp	Exposure	Time	mAs	HVL
75.20 kVp	464.706 mR	0.500 s	100.000	3.602 mmAl
75.12 kVp	464.727 mR	0.500 s	100.000	3.600 mmAl
75.07 kVp	464.517 mR	0.500 s	100.000	3.606 mmAl
75.01 kVp	464.525 mR	0.500 s	100.000	3.606 mmAl
74.97 kVp	931.650 mR	1.001 s	200.000	3.606 mmAl

- 406 Adequate Radiation Protection Program Yes No
- 603.A.9 Patient Exp: C.F. 1.63 ESE 757.3 mR (Nat. Avg ESE 491 mR)
- 603.A.3 Technique Chart Yes No
- 1011 Posting; DRC-3 Yes No Regulations Yes No Certificate Yes No
- 604.A.1 Warning Label Posted on X-Ray unit Yes No
- 606.A Beam limitation; PBL Manual
- 606.A.2.a SID; indicated SID 40 measured SID 40 SID indicator deviation 0.0%
- 606.A.2.c Collimator deviation acceptable? Yes No
- 606.A.1.b Light field/X-ray field align. Acceptable? Yes No
- 606.D Exposure reproducibility ($E_{max} - E_{min} \leq 0.1 E_{avg}$) 0.00 ≤ 0.1
avg 464.6 mR max 464.7 mR min 464.5 mR
- 606.B.4 Timer reproducibility ($T_{max} - T_{min} \leq 0.1 T_{avg}$) 0.00 ≤ 0.1
avg 0.500 sec max 0.500 sec min 0.500 sec
- 606.F Timer accuracy; % difference ($\pm 10\%$ or manufacturer's limits) 0.1%
- 604.A.5.a Filtration adequate: HVL = 3.60 mm Al @ 75 kVp Req= 2.188889 mm Al Okay
- 606.F kVp accuracy; % difference ($\pm 10\%$ or manufacturer's limits) 0.1% avg 75.1
- 606.G mAs Linearity; $(X_1 - X_2) \leq 0.1(X_1 + X_2)$ 0.001296 ≤ 0.1
mR1 464.6 mAs1 100 X1 4.646 mR2 931.7 mAs2 200.000 X2 4.658
- 431.A Personnel monitoring; supplied by: Landauer, Inc. Type OSL

Contact Phone #:

Scatter radiation measurements @ 75 kVp 100 mA 0.500 second

Location 1 Operator Background Location 2 Door Background

Comments: This device is used on phantoms, not humans. Bkg=0.02 mR/h
Multi-meter Used: Raysafe Solo R/F, Serial # 245101, Calibrated Dec. 27, 2017
Survey Instrument Used: Ludlum 9DP, (SN 25014300), calibrated 12/07/2020

Date: 2/9/2021 Performed by: Amin Hamideh, M.S, CLSO & Dr. Wei-Hsung Wang, CHP

**The Mammography Unit,
Acoma: M43-5021
registration #6538-R03,
is not in use. Therefore, this
equipment is not evaluated.**

DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF AIR QUALITY AND RADIATION PROTECTION

REGISTRATION CERTIFICATE
FOR
NON-LICENSED SOURCES OF RADIATION

RADIATION PROTECTION DIVISION
P.O. BOX 82135
BATON ROUGE, LOUISIANA 70884-2135

NAME OF REGISTRANT LSUE Radiologic Technology Program	REGISTRATION NUMBER 6538-R03	EXPIRATION DATE 60 days after notification
ADDRESS P.O. Box 1129 Eunice, La. 70535	TYPE OF NON-LICENSED SOURCE <input type="checkbox"/> Medical <input type="checkbox"/> Dental <input type="checkbox"/> C.T. <input type="checkbox"/> Industrial X-Ray <input checked="" type="checkbox"/> Mammography <input type="checkbox"/> Accelerator <input type="checkbox"/> Other	
Manufacturer Acoma	Model Number M43-5021	Serial Number 621412

CONDITIONS

- The registrant shall notify the Louisiana Radiation Protection Division, within ten days, of any change which renders the information contained in the application for registration no longer accurate. A change in ownership shall terminate this registration.
- No person, in any advertisement, shall state or imply that any activity under this registration has been approved by the Radiation Protection Division.
 - The registrant shall comply with all applicable provisions of Volume 15 of Title 33 of the Louisiana Administrative Code (LAC 33:XV; formerly the Louisiana Radiation Regulations).
 - This registration certificate, or a copy thereof, shall be placed on or immediately adjacent to the control panel to which it applies.

Gustave Von Bodungen, P.E.
Assistant Secretary

DATE

January 20, 1995

**LSU
Diagnostic Inspection Report**

Registration # 6538-R03_ Console SN 621412 AI# 3376

No measurements taken

Manufacturer Acoma Model MX 43S

Facility LSU at Eunice

Person Responsible: Rob McLaughlin

Most Frequent Exams: NONE Film size NONE

Projections /week 0

<input checked="" type="checkbox"/>	Registration Certificate
<input checked="" type="checkbox"/>	DRC 3 Posted
<input checked="" type="checkbox"/>	Adequate Signs Posted

Scatter Measurements Not measured

Date: 02/13/2014	<i>L. Max Scott</i>	System Radiation Safety Officer L. Max Scott, Ph.D., CHP
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Comments: This mammography unit is for teaching only. Not used for diagnosis on animals or humans. **NO EXPOSURES HAVE EVER BEEN MADE ON THIS UNIT** And there are no plans at this time to make any exposures with this unit. The unit is registered with LA DEQ. Registration certificate has different model number—MX-43S on unit vs. MA-43-5021 on certificate, but has the correct serial number.

