



Dear TMC Radiation Client:

We are very excited to provide this update for your Radiation for Dental Safety Manual.

Several sections in the manual were updated. Each section with changes is listed below with directions on what needs to be removed, replaced, or added. The left hand column will list the pages that are impacted, while the right hand column lists the actual change or addition and directions for completion.

Written Radiation Safety Plan– Remove/replace the following pages:

Page 1	<p>On page 1 document location of training/experience of RSO: The documented training and experience of the Radiation Safety Officer (RSO) as required in .203(b)(3) is stored_____.</p> <p>Under RSO Responsibilities, the following added:</p> <ul style="list-style-type: none"> • Maintain awareness of the State and Federal radiation safety legislation and keep abreast of the trends in radiation safety. • Assist, interact, and be available for licensing and inspections by regulatory agencies.
Page 2	<p>Under RSO duties, the following added:</p> <ul style="list-style-type: none"> • Ensure all personnel are properly trained on the radiation protection principles including As Low As Reasonably Achievable (ALARA) before operating equipment and annually as needed. • Advise and communicate with staff on safe working practices. • Removed the Radiation Safety Officer training topics and relocated to training section.
Pages 3-4	<p>Added:</p> <ul style="list-style-type: none"> • Additional documents and their locations added to this page. Review the list and check all applicable documents.
Page 5-6	<p>On page 6, updated training section to clearly reflect indications for training.</p>
Page 15 - 20	<ul style="list-style-type: none"> • On page 16 - Changes under fetal badging and declared pregnant worker. Removed terminology baseline badging. • Page 17 - Removed terminology - baseline badging. Review clarification on badging policy and document badging process for the facility. Fetal monitoring badges are to be worn UNDER the apron at waist level • Page 18 – Updated process and documentation requirements for reporting of individual monitoring results.

Practice Specific Protocols – Remove/replace/add the following pages:

Table of Contents	Added Mobile and Portable Exams
Mobile and Portable	Add this page in the Sample Protocols area of this section.

Training – Remove/replace the following pages:

Table of Contents	RSO qualifications outlined for small and large facilities
Page 1 – 2	On page 2, changed title and description to clearly reflect all indications for training
RSO Qualifications	After Training Documentation, add document outlining RSO qualifications for small and large facilities

Additional resources can be located at <http://www.ncradiation.net/>, which is the website for the N.C. Health and Human Services, Radiation Protection Section.

RADIATION SAFETY OFFICER

The Written Radiation Safety Plan polices, and procedures are reviewed by the Safety Officer and updated annually and when changes are made:

Name	Date	Signature

The Radiation Safety Officer (RSO) as required in .0203(b)(2,3) for our practice is:

Name	Date	Signature

The documented training and experience of the Radiation Safety Officer (RSO) as required in .203(b)(3) is stored _____ and guidelines are noted under RSO Requirements in the Training Section .

If the primary Radiation Safety Officer for the practice is located at another office, the contact for this office/satellite is:

Name	Date	Signature

The RSO responsibilities include industry monitoring, office performance, daily duties and equipment safety. The RSO will:

- Monitor radiation safety for our office.
- Report on radiation safety issues and take action to correct the issues.
- Maintain awareness of the State and Federal radiation safety legislation and keep abreast of the trends in radiation safety.
- Assist, interact, and be available for licensing and inspections by regulatory agencies.

The RSO duties on an ongoing basis are to:

- Ensure all personnel are properly trained on the radiation protection principles including As Low As Reasonably Achievable (ALARA) before operating equipment and annually as needed.
- Ensure all personnel utilize appropriate PPE as outlined in the Hazard Assessment Certification.
- Monitor the safety of the x-ray equipment, premises and protective equipment and devices to identify that relevant radiation safety standards are in compliance. (for example, compliance may be affected by damage to, or modification of, the x-ray equipment or premises)
- Maintain records of all x-ray equipment and the locations at which it is installed
- Identify ways to minimize radiation doses
- Advise and communicate with staff on safe working practices
- Ensure regulatory requirements are met for personal monitoring badges for new and existing employees, devices are properly calibrated, and appropriate reports are maintained and available for review.
- Investigate radiation incidents.

The RSO will keep management informed:

- Provide reports on radiation incidents and action taken or recommendations for improvements
- Notify management of any action that needs to be taken to achieve compliance with this plan or relevant Radiation Safety Standard.
- Provide written assurance that the plan has been reviewed annually as outlined below.

Annually the RSO will ensure completion of the following actions and report the action to management:

- The equipment inventory list is accurate and all equipment has been accounted for.
- The State registration is current and appropriate. All changes must be reported to the State immediately.
- All users of the x-ray equipment have been trained and necessary licensure or certifications are current.
- All maintenance and operational checks have been completed within the stated timeframes and recorded, and any relevant problems have been appropriately rectified.
- Recommendations for improvement.

Location and Retention of Required Documents

Employees can locate the following documents for inspection and review in the following locations:

The Radiation for Dental Manual is located: _____

The following documents are located in the Equipment and Facility section:

- Copy of Shielding Design (Plan Reviews) [.0603(a)(2)(A)]; [.0603(b)]
- Letter of Acknowledgement [.0603(a)(2)(A)]
- Current Notice of Registration [.0209]; [.1002(a)(2)]
- Post installation Survey as required for dental units utilizing cephalometric equipment, dental CT, tomography, and i-CAT. Survey is also required when taking radiographs in an open bay if stated in the Letter of Acknowledgement or during an inspection by the State. [.0603(a)(2)(B)]; [.0603(c)]
- Waivers on file for handheld devices (if applicable) [.0108(a)]
- FDA 2579 Report of Sale/Installation Report [.0115]

The location of the following documents is listed:

- Current copy of NC Regulation for Protection Against Radiation [.1002(a)(1)] :

- Records of initial & refresher training [.0806 (a)(2)]: In the Training tab in this manual
- Notice to Employees [.1002(c)]: In the State Regulations tab in this manual and posted in
_____ of this facility.
- Records of notification if occupational doses exceed 1 mSv (100 mrem) TEDE or 1 mSv (100 mrem) to any individual organ or tissue [.1004(b)(1)]: _____
- Personnel monitoring and exposure records [.1614]; [.1640]:

- Written Safety Procedures [.0603(a)(1)(D)]; [.0603(a)(1)(H)(i) & (ii)]: Radiation Safety Program and Protection of Persons sections of this manual
- Review of Written Procedures [.1603(c)] [.1636(a)(2)]: Page 1 of Radiation Safety Program

Records Retention

Retention schedules are set to consider legal requirements and business requirements.

	Record Type	Retention Policy
	Employee Training Records	For duration of employment
	Patient X-rays	Same time as all patient medical records. In the case of practice ceasing business, state laws will be followed.
	Dosimeter reports	Forever
	Surveys	Latest report will be retained as long as equipment is in service +5 years
	Equipment Maintenance & Repair Records	Retain for the life of the equipment
	Approvals to acquire/relocate equipment	Permanent
	Operational Checklists	6 years
	Incident Reports	Life of the equipment
	Equipment Inventory	Permanent
	Equipment Registration	Most current
	Plan Reviews	Latest for each piece of equipment used
	Letter of Acknowledgement	Permanent
	Post Installation Survey	Latest for each piece of equipment
	FDA Form 2579 Report of Assembly	Life of equipment
	Notice of Registration	Most current for life of equipment

PERSONNEL TRAINING POLICY

Certification Requirements-NC

Only individuals certified or otherwise recognized by the State of NC may operate x-ray equipment.

- All RDH, DDS & DMDs are qualified as per current licensure.
- A certified dental assistant (one who successfully completes the DANB exam) may take radiographs without further examination.
- Dental assistant who can show evidence of satisfactory performance on an equivalency examination, recognized by the Board of Dental Examiners, based on seven hours of instruction in the production and use of dental x rays and an educational program of not less than seven hours in clinical dental radiology.

Operation of x-ray equipment in this practice must be authorized by the Radiation Safety Officer. As outlined in [.0603(a)(1)(B))] training must occur PRIOR to operation of equipment.

The following sections of the Radiation Manual must be read by personnel prior to operation of x-ray equipment:

- Introduction
- Written Radiation Safety Plan
- State Regulations and Guidance
- Quality Control Plans
- Supplemental Materials
 - Infection Control Procedures
 - Recycling Plans

Employees Authorized to Operate Equipment

- A list of employees authorized to operate the x-ray equipment is located in the training section of the manual. These employees have met the certification requirements for x-ray safety training and have been trained on the policies and procedures of this practice.
- No one under the age of 18 will be allowed to be involved with radiation services.
- Exceptions will be handled by the RSO.

Training

Upon hire, all employees will be trained on the policies and equipment of this office. Training will be conducted at least annually, and if the office is remodeled, relocates, or adds radiation equipment or moves to a new facility.

Documentation on training will be maintained for the duration of employment in the training section of the manual.

A copy of this policy is located in the training section of the manual.

In order to keep exposures as low as reasonably achievable (ALARA) as outlined in [.1603(b)], employees and this practice will protect themselves, and the patient by:

- Operator standing behind the protective barrier.
- Visually control the area. The operator will verify hallways and other areas are clear in order to protect others from scatter radiation.
- All appropriate doors are closed and appropriate shields are used during x-ray operation as documented in the operating procedures and Plan Review.
- Cone positioning is adjusted to ensure that no beam is aimed at a non-shielded area.
- Use of lead aprons and thyroid collars when possible on patients for all exposures.
- Appropriate construction of the walls, floor and ceiling areas exposed to the useful beam in accordance with regulatory requirements to provide appropriate protection to all employees taking x-rays.
- Employees must be aware of their own accumulated dose as registered on their badge or as accumulated from a prior or an additional employer. Based on accumulated exposures, duties may be reassigned to prevent further exposure. [.1604(f)]
- All equipment is maintained in good operating order. Maintenance and calibration records are stored behind the Equipment and Facility tab for the lifetime of the equipment.
- Other _____

As outlined in [.1604(a)(1)] the Maximum Annual Occupation Dose Limits:

- 5 rems (.05 Sv), total effective dose to whole body.
- 15 rems (0.15 Sv) eye dose equivalent to the lens of the eye.
- 50 rems (0.50 Sv) total organ does equivalent.
- 50 rems (0.50 Sv) shallow dose equivalent to skin or any extremity

Additional measures taken in order to ensure that *members of the general public* do not receive a total effective dose that exceeds 0.1 rem (1mSv) in a year as outlined in [.1611(a)(1)] and that the dose in any unrestricted area of this practice will not exceed 0.002 rem (0.02 mSv) in any hour [.1611(a)(2)] :

- No member of the general public is allowed in controlled areas.

VOLUNTARY DECLARED EMPLOYEE PREGNANCY POLICY

For the declared pregnant worker, this practice has the responsibility to take appropriate action to ensure the dose to a fetus due to occupational exposure [.1610]:

- Does not exceed 0.5 rem (5 mSv or 500 millirems) during the entire pregnancy
- Does not exceed more than 0.5 mSv in any month

The dose to the fetus is measured as the sum of:

- The deep-dose equivalent to the declared pregnant woman and
- The dose to the embryo from radionuclides in the embryo and radionuclides in the pregnant woman.

Verbal notification is not an acceptable form of notification. Declaration of pregnancy must be submitted in writing and must include the following information:

- Pregnant employee's name.
- Estimated due date or date of conception.
- The date the declaration was signed.

Upon receipt of written notification of pregnancy the following apply:

Fetal Badging:

- The use of a fetal badge is required at any time the potential for radiation exposure exists. The badge will be worn at waist level and under the protective apron of the pregnant worker.

Declared pregnant worker:

- This practice has documented that adult workers are not likely to receive, in one year, in excess of 10 percent of the annual limits in rule .1604(a).
- The required use of a personal badge is monitored when there is the likelihood the pregnant women would receive a deep dose equivalent in excess of 0.1 rem (1mSv) as required in [.1614(1)(c)].
- Information will be provided to the employee on the dangers of fetal exposure to radiation, as well as techniques and procedures to minimize exposure to the fetus.
- Job reassignment or other actions depending on the potential for exposure may be considered. The employee may also request reassignment of duties if desired.
- Exposure history will be reviewed.

Record Keeping [.1640(f)]

The practice will maintain the employee declaration of pregnancy records of dose to an embryo/fetus with the records if indicated of dose to the declared pregnant woman for 30 years past the last date of employment or until the practice license or registration is terminated by The North Carolina Department of Health and Human Services, Radiation Protection, whichever is longer.

MONITORING OF OCCUPATIONAL DOSE

Radiation Monitoring for Employees

Personnel radiation dose monitoring devices are required for workers using dental x-ray machines if an employee is likely to receive 10 percent of the annual limit allowed by regulation [.1614].

If previous radiation monitoring records show that it is not likely that a person will receive a dose of this amount, then the practice may decide to discontinue ongoing personal monitoring except in outlined situations. A decision to discontinue monitoring should be discussed with the NC Radiation Inspector to insure that the practice understands the liabilities inherent in the decision such as the inability to determine if an employee needs further training or equipment needs maintenance or recalibration.

For the safety of employees and to meet regulations outlined in [.1614], this office will provide personal monitoring badges for workers as outlined below:

- Personal monitoring badging is required for all workers using radiation.
- Personal monitoring badging has been discontinued by decision of the practice. This practice has performed monitoring for a minimum of one year which has documented workers are not likely to receive, in one year, in excess of 10% of the annual limits in rule .1604 (a) which is listed on page 15. The practice will accept the implied liability due to equipment malfunctions and employee compliance to policies and procedures.
- Discussed the decision to discontinue badging with NC Radiation Inspector. Spoke with: _____ (name) on _____ (date).
- Other _____
- Monitoring will be initiated in any of the following circumstances:
 - Employee required to hold patient(s)
 - Employee using a mobile x-ray device
 - If instructed to do so by the RSO and/or NC Radiation Inspector
 - New equipment installed since monitoring was performed
 - Walls or layout changes since monitoring was performed
 - Significant increase in volume of x-rays taken since monitoring was performed

Personal Monitoring Devices Placement and Recommendations:

- Follow manufacturer's guidelines for use.
- Whole body monitoring devices are placed at the neck level or upper torso. If a protective apron is worn the monitoring device is placed at collar level outside the apron.
- Fetal monitoring devices are placed at the waist and always on the inside of any protective apron.
- Badges are issued to a specific employee and records of the personal exposure are maintained. Do not share your badge with another employee it will distort both records.
- Remove badge when receiving personal radiographic studies.

Changing of Personal Monitoring Badges

The schedule for badge changing is set by the RSO.

- Badges will be changed:_____ (must be at least every 3 months).
- This practice will change badges on the first working day of the month.
- If any employee in the practice reaches the maximum annual allowed dose of 5 mSv, then all workers will change badges monthly until the cause for the high reading has been resolved.
- Fetal monitoring badges will be changed on a monthly basis.
- Notify the RSO if badge is lost or misplaced.

Storage of Personal Monitoring Badges

- Store in a safe place, at work away from sources of radiation and heat.
- Do not store badge clipped to lab coat or jacket as someone could accidentally pick up your badge or it could fall off of the jacket and become lost, or laundered accidentally.

Storage location for this office: _____

Control badge monitoring – A control personal monitoring device must be stored in an area where only background radiation will be measured. The control badge will not be used for area monitoring or assigned to a person.

Storage location for this office: _____

The monitoring badge service provider is

The provider is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology (NIST).

When the defined issuing period has passed, all badges, including the control, must be returned to the service provider for measurement. Any badges that have not been issued, or if issued have not been worn, must also be returned to the service provider.

Report of Individual Monitoring Results

Individual reports of dose levels reported by the dosimeter will be reviewed by the RSO and with employees on a quarterly basis when badging is in process. These reports will be retained in the employees file and are available for review by the employee upon request. The employee will initial each report to acknowledge the review process.

In addition, each employee must receive a report IN WRITING under the following circumstances per of Section 15A NCAC 11 .1004.

- At least annually while personal monitoring is in progress.
- Upon request by the employee and former employees within 30 days.
- If any employee exceeds 1mSv or 100mrem TEDE (Total Effective Dose Limit) or 1mSv, 100mrem, to any organ or tissue.

The report must include the following:

- Name of practice as shown on radiation license.
- Employee's name, social security number and exposure information.
- The following statement: "This report is furnished to you under provisions of Section 15A NCAC 11 .1000: NOTICES: INSTRUCTIONS: REPORTS AND INSPECTIONS. You should preserve this report for further reference".

Reports of Excessive Radiation Exposure

In this practice the RSO will investigate if a report is received that indicates any employee badge has a reading that exceeds the following ALARA investigational limits.

Quarterly Investigational Limits for Monthly Wear Dates

- 125 mRem for whole body badges
- 30 mRem for fetal badges

Each employee must be aware of their own accumulated dose as registered on their badge. Accumulated exposure, even from a prior employer, must be considered in the overall exposure limit.

If at any time the employee for any reason (accident, etc.) believes they have received an exposure that exceeds the limit the employee must notify the RSO immediately.

Reassignment of duties may be necessary if dose limits are met or exceeded for any reason.

Prior Records for Occupational Dose for New Worker [.1638(a)(1)&(2)],

- This practice has documented its adult workers are not likely to receive, in one year, in excess of 10 percent of the annual limits in rule .1604(a).
- This practice will attempt to obtain previous occupational dose history for the current year from the previous employer(s) on all new employees and will attempt to obtain the records of lifetime cumulative occupational radiation dose.
- This practice will accept any of the following:
 - Signed statement from the individual, or from the individual's most recent employer for work involving radiation exposure, that discloses the nature and the amount of any occupational dose that the individual may have received during the current year;
 - Accept, as the record of lifetime cumulative radiation dose, an up-to-date agency form for recording occupational radiation dose history, or equivalent, signed by the individual and counter-signed by an appropriate official of the most recent employer for work involving radiation exposure, or the individual's current employer if the individual is not employed by this practice (example – staffing service).
 - Reports of the individual's dose equivalent(s) obtained by telephone, telegram, electronic media, or letter from the most recent employer for work involving radiation exposure, or the individual's current employer if the individual is not employed by this practice (example – staffing service). This practice will request

a written verification of the dose data if the authenticity of the transmitted report cannot be established.

Working for Multiple Employers

It is the employee's responsibility to provide dose information to each employer from the other place of employment. Employees working for multiple employers with the possibility of radiation exposure should talk with the RSO about the best method of ensuring the total radiation dose is recorded.

Information in Personnel and Exposure Records

- Records will be maintained for 30 years past the last date of employment or until the practice license or registration is terminated by The North Carolina Department of Health and Human Services, Radiation Protection, whichever is longer [1640(a)(1)&(g)] and will include:
 - Full name, sex and date of birth.
 - Home address.
 - The date of commencement of employment and the last date of employment.
 - Description of work performed by the employee.
 - Details of the types of ionizing radiation to which the employee may have been exposed in the course of their employment.
 - Details must be provided of any radiation accidents in which the employee has been involved or by which they may have been affected.
 - Details of the personal monitoring badge worn by the employee. This may include the type of monitor, where on the body the monitor was worn and the name of the monitoring service provider.
 - Radiation exposure dose results for the employee.
 - Radiation exposure dose for the fetus.

Radiation Exposure Records for Departing Employees

This practice will provide the following:

- A copy of their radiation exposure records. This will include all annual dose records and any subsequent periodic reports received after the employee has ceased employment **if available**.
- An additional copy of the radiation exposure records will be provided to the new employer if requested by the employee. These records are required to be given to a new employer so that an assessment can be made of possible future doses that can be received to keep an employee under their annual limit.

PRACTICE SPECIFIC PROTOCOLS

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Orthomantomography Panorex OP100 Orthoceph	
Air Techniques Proverta 70	
Mobile/Portable Exams	

Note: This section of the Written Radiation Protection Safety Program contains:

- Procedures to minimize exposures to blood, OPIM or chemicals.
- Procedures for operating specific equipment.
- Office specific policies and procedures.

These serve as instructions and guidelines for employees and must be followed as outlined.

Sample protocols are provided as examples. Replace the samples with protocols specific to instrumentation in use. Use the samples only if they are accurate for your practice.

MOBILE/PORTABLE EXAMS

- This unit is utilized in multiple areas in this facility.
- This unit is routinely used in only one exam room. The Shielding Plan Review and Letter of Acknowledgment are located:

1. All operators are authorized to operate X-ray equipment in North Carolina and will receive training provided by the equipment manufacturer prior to use.
2. Documentation of the training is located:
 - In the training section of this manual
 - Employee file
3. Security of the mobile device to prevent theft or unauthorized use is ensured by:
 - The machine(s) is secured in a restricted area of the practice
 - The machine(s) is secured in an uncontrolled area of the practice and is secured by: _____
(Locked cabinet, door secured in some manner to prevent access)
4. If use requires angling the unit to a position that reduces the protection to the operator then the operator will be protected from the direct scatter radiation by protective aprons or whole body protective barriers of not less than 0.25 mm lead equivalent.
5. All unnecessary individuals will be removed from the room or radiation area prior to exposures whenever possible.
6. For individuals who cannot be removed from the room during X-ray exposures will be positioned behind a protective barrier.
7. All entrances to exam rooms will have radiation area warning signs posted.
8. If/when the device is used in an open area, a controlled perimeter will be established and monitored by the operator.
9. All operators will wear a radiation monitoring device during hand-held dental X-ray exposures.
10. At a minimum, E or F Speed Film or a digital sensor will be used for dental exams.

TRAINING

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PERSONNEL TRAINING POLICY

Certification Requirements-NC

Only individuals certified or otherwise recognized by the State of NC may operate x-ray equipment.

- All RDH, DDS & DMDs are qualified as per current licensure.
- A certified dental assistant (one who successfully completes the DANB exam) may take radiographs without further examination.
- Dental assistant who can show evidence of satisfactory performance on an equivalency examination, recognized by the Board of Dental Examiners, based on seven hours of instruction in the production and use of dental x rays and an educational program of not less than seven hours in clinical dental radiology.

Operation of x-ray equipment in this practice must be authorized by the Radiation Safety Officer. As outlined in [.0603(a)(1)(B))] training must occur PRIOR to operation of equipment.

The following sections of the Radiation Manual must be read by personnel prior to operation of x-ray equipment:

- Introduction
- Written Radiation Safety Plan
- State Regulations and Guidance
- Quality Control Plans
- Supplemental Materials
 - Infection Control Procedures
 - Recycling Plans

Employees Authorized to Operate Equipment

- A list of employees authorized to operate the x-ray equipment is included in this section of the manual.
- These employees have met the certification requirements for x-ray safety training and have been trained on the policies and procedures of this practice.
- No one under the age of 18 will be allowed to be involved with radiation services.
- Anyone operating equipment will have training including repair personnel.
- Exceptions will be handled by the RSO.

Training

Upon hire, all employees will be trained on the policies and equipment of this office. Training will be conducted at least annually, and if the office is remodeled, relocates, adds radiation equipment or moves to a new facility.

Documentation on training will be maintained for 6 years in the training section of the manual.

Radiation Safety Officer in Smaller Facilities

Radiation Safety Officer (RSO) should have some training and experience in radiation protection. The RSO is charged with the responsibility for radiation safety and should be available to give advice and assistance on radiological safety matters. The RSO should also be able to manage and keep current an effective radiation safety program. RSO should have an understanding of the following subjects:

- Radiation protection principles, including As Low As Reasonable Achievable;
- Units of radiation dose and quantities;
- Biological hazards of exposure to radiation;
- Interpersonal and communication skills;
- U.S. Nuclear Regulatory Commission regulatory requirements and standards; and
- State of North Carolina's requirements and standards. The RSO should also understand radiation detection instruments and personnel dosimeters, and have an understanding of Basic radiation protection principles and good safety practices, including **time, distance and shielding**.

Regulatory Requirements:

- Know NRC dose limits.
- Know State of North Carolina's requirements for radiation safety and protection.
- Have expertise in record-keeping and maintenance of records, and must be able to retain case histories of accidents or problems involving radiation.
- Ensure security and protection for all persons.
- Be able to stop any unsafe activities.
- Ensure that radiation warning signs are visible and legible.
- Assist, interact and be accessible for licensing and inspections by regulatory agencies.
- Supervise annual audit of radiation safety program.

Checklist for Radiation Safety Officer (for record purposes only)

- A) Name of RSO candidate.
- B) Education and/or training
- C) Certification (specialty, category, month and year certified, and dates of certification renewal), if available.
- D) Dates and locations of all practical clinical experience.
- E) Knowledge and/or experience implementing a radiation safety program.
- F) Administrative and supervisory experience.
- G) Basic computer skills (e.g., word processing, databases or spreadsheets).
- H) Experience with regulatory agencies – both state and federal.
- I) Public speaking abilities.
- J) Ability to interact positively with staff.
- K) Ability to interact with clinical staff, patients, and the public.

All workers, working with and around radiation should conduct their activities with the utmost regard for the safety of themselves and others.

Radiation Safety Officer – Larger Facilities

The Radiation Safety Officer should be qualified by training and experience in radiation protection. The (RSO) is charged with the responsibility for radiation safety, responsible for the day-to-day operation of the radiation safety program, and is generally available to give advice and assistance on radiological safety matters. The RSO should also possess an extensive scientific background, as well as, experience in both radiation control and involvement in a medical setting that requires a radiation safety program.

Credentials and Education

A fully functional RSO should have credentials in the field of medical radiation physics and/or health physics. Others that qualify include, but are not limited to, persons holding the degree of doctor of medicine or doctor of osteopathy and licensed to practice medicine or surgery. Some of these modalities include: radiology, dentistry, podiatry, and chiropractic medicine. Credentials in the field of nuclear medicine; knowledge in the field of public health or environmental science, and experience in the administration and enforcement of federal radiation protection regulations are also potential qualifying credentials.

The NRC believes that to demonstrate adequate training and experience, the RSO should have, at a minimum, a college degree at the bachelor level or equivalent training and experience in physical, chemical, biological sciences, or engineering; and/ or training and experience commensurate with the scope of proposed activities. Training should include the following subjects:

- Radiation protection principles:
- Characteristics of ionizing radiation:
- Units of radiation dose and quantities:
- Radiation detection instrumentation:
- Biological hazards of exposure to radiation:
- Guidance on training and experience:
- Interpersonal and communication skills:
- NRC regulatory requirements and standards: and
- State of North Carolina's requirements and standards:

Other areas that should be addressed include- radiation detection using radiation detection instruments and personnel dosimeters, as well as, basic radiation protection principles and good safety practices (including time, distance, and shielding).

Regulatory Criteria

- Know NRC Dose limits.
- Know State of North Carolina's requirements for radiation safety and protection
- Knowledge of materials, control and accountability.
- Record keeping and maintenance of records, especially equipment transfer and disposal.
- Ensure security, and protection for all persons.
- Authority to stop unsafe activities, handles deliberate misconduct, and investigates abnormal events.
- Recognize and ensure that radiation warning signs are visible and legible.
- Assist, interact, and be available for licensing and inspections by regulatory agencies.

- Supervise decontamination, train personnel, and supervise annual audit of radiation safety program.
- When handling incidents, the RSO must retain case histories of accidents and all problems involving radiation.

Recommended Training and Minimum Experience for a Healthcare Facility RSO

Formal education and certification.

- Comprehensive certification by the American Board of Health Physics or the American Board of Medical Physics in medical health physics.
- Graduate degree in health physics, medical physics, radiation physics, nuclear engineering, radiation biology, or nuclear physics.
- Bachelor's degree in health physics, medical physics, radiation physics, nuclear engineering, radiation biology, or nuclear physics.
- Certification in radiology, nuclear medicine, or radiation therapy; or registration in radiography, nuclear medicine technology, radiation therapy technology, or radiation protection technology.

Residency in radiology

- Forty-hour training course, by an accredited university, college or radiation protection course.

Checklist for Radiation Safety Officer's Experience

- Name of RSO candidate
- Education (degree, major, and institution)
- Certification (specialty, category, month and year certified, and dates of certification renewal)
- Dates and locations of all practical clinical experience
- Training received in basic radioisotope-handling techniques
- Experience using radioisotopes; diagnostic and therapeutic
- Experience supervising use of radioisotopes- diagnostic and therapeutic
- Experience implementing a radiation safety program
- Some administrative and supervisory experience
- Computer expertise (e.g., word processing, databases, or spreadsheets)
- Experience with regulatory agencies both state and federal
- Public speaking abilities
- Ability to interact positively with clinical and scientific staff
- Experience interacting with clinical staff, patients, and general public
- Affiliations or service with professional organizations
- Appointments to committees with professional organizations
- Awards, scientific presentations, and publications

All workers, working with and around radiation should conduct their activities with the utmost regard for the safety of themselves and others.

