50 STATE GUIDE TO RADIATION SAFETY

A complete guide to help you navigate radiation safety requirements for your practice

Use this Guide to Gain

CONFIDENCE

Our 3-step process provides the roadmap to help you navigate radiation safety requirements

RESOURCES

We've done the hard work for you by including all the information you need in one place

KNOWLEDGE

Gain a better understanding of compliance to help minimize the chance of missing a requirement

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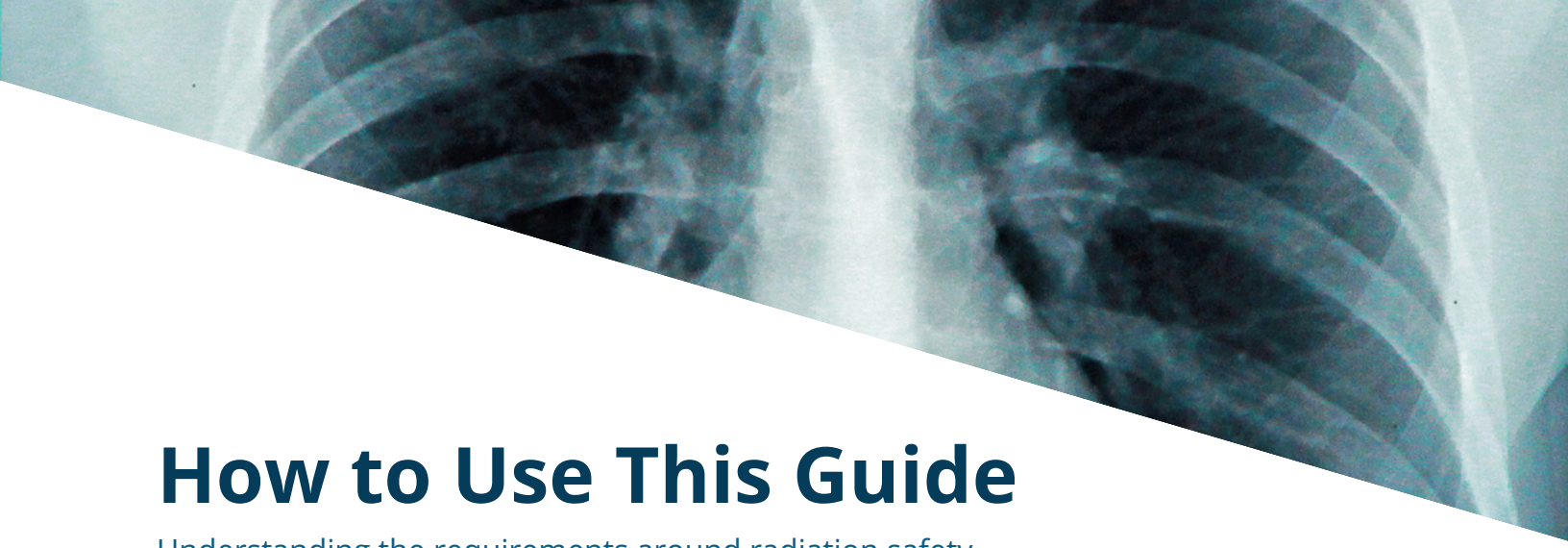

How to Use This Guide

Understanding the requirements around radiation safety can be confusing. Our 3-step process will help you determine the radiation safety needs for your business so you can feel confident that you're protected.

STEP 1 - Know the Federal Requirements

The U.S. NRC (Nuclear Regulatory Commission) has established a list of radiation protection requirements to protect the people and environment from unnecessary exposure to radiation.

STEP 2 - Find any State Requirements

39 out of 50 states regulate their own Radiation Safety Program and are known as "Agreement States". These states may have additional requirements in order to show compliance to safety standards.

STEP 3 - Choose the Right Solution

Once you know what's required, we'll help you determine the right solution for your practice so you can get up and running and focused on what it is you do best.

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Step 1 - Federal Requirements

Helpful Tip: *Quick access to Federal requirements listed are linked in* ***blue***

Dose Limits

The NRC has established Dose Limits for occupational exposure for working with radioactive materials or ionizing radiation, such as x-ray imaging equipment. If you or your staff are working with such materials or equipment, then these regulations apply to you.

Individual personnel monitoring is required if the dose received for any given category is likely to exceed 10% of the Dose Limit in 1 year.

How do you know if you need monitoring? You can evaluate your needs by determining how much exposure individuals receive. This can be accomplished through a dosimetry program serviced by a NVLAP accredited processor who can provide you Dose Reports detailing exposure by individual, which you can compare against the occupational exposure limits.

Be sure to keep all Dose Reports with your records until termination of the license. The chart below lists the annual Occupational Dose Limits set by the NRC.

Occupational Exposure Limits

TYPE	DOSE LIMIT	INDIVIDUAL MONITORING
Radiation Safety Worker (Whole Body)	5,000 mrem	>500 mrem
Radiation Safety Worker (Extremities)	50,000 mrem	N/A
Fetus of a Pregnant Radiation Worker	500 mrem (for the entire pregnancy)	>100 mrem (for the entire pregnancy)
Members of the Public (Whole Body)	100 mrem	N/A
Minors (Whole Body)	10% of adult limits	>100 mrem

Note: *This is a selection of basic limit types. For a complete list of requirements, visit the NRC website*

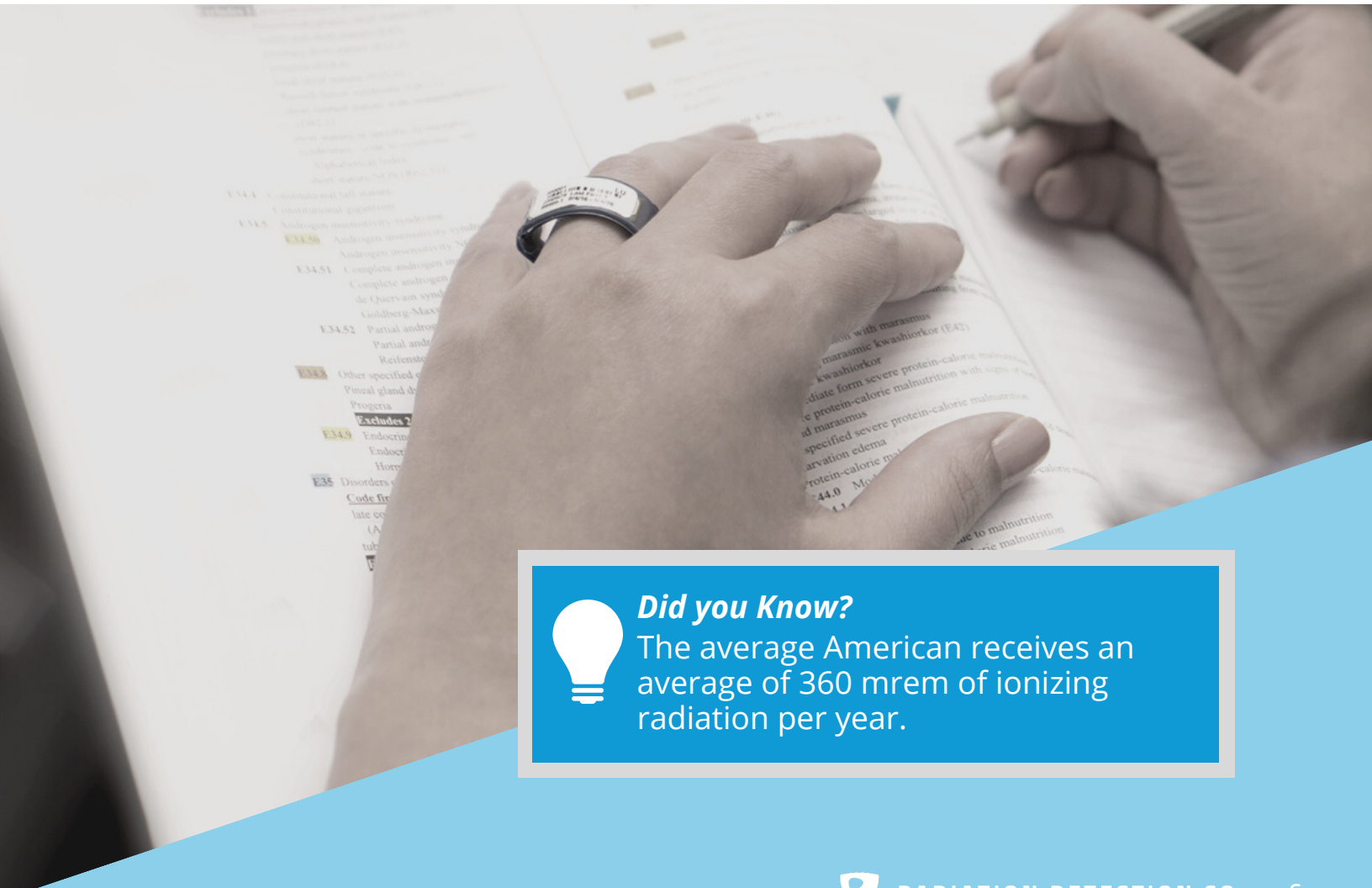
Every reasonable effort must be made to meet **ALARA** (As Low As Reasonably Achievable) requirements to maintain radiation exposures as far below the dose limit as possible.

Training

Both Federal and State requirements require radiation workers likely to receive a dose of more than 100 mrem in 1 year to conduct annual training as specified in 10CFR19.12 to protect themselves against radiation in the workplace.

Additional guidance and instructions must be provided to declared pregnant workers concerning the risks from dose to the embryo/fetus.

How do I know if I need training? You can determine the need for training by reviewing the annual exposure column of your most recent dose report for all radiation workers.



Did you Know?
The average American receives an average of 360 mrem of ionizing radiation per year.

Federal Requirements Review

Complete this checklist if you use radioactive materials or equipment

- [ ] **My employees or I work around radiation**
  You may need a dosimetry program to prove you are operating within Dose Limits.
- [ ] **My employees or I receive >100 mrem annually**
  You will need to provide annual Radiation Safety Training for employees
- [ ] **I service public patients/clients**
  You may need a dosimetry program to prove you are operating within Dose Limits
- [ ] **I can prove my employees or I receive <10% of Dose Limits annually**
  Individual Personnel dosimetry monitoring may be elective vs. required
- [ ] **I am using a NVLAP accredited processor for my badges**
  The NRC requires the use of a NVLAP accredited lab for monitoring
- [ ] **All of our Dose Reports are maintained and accessible**
  You need to keep records until termination of the license

*Helpful Tip - Many companies utilize personnel dosimetry **even when below the10% threshold** out of caution, potential legal liability or insurance considerations.*

Step 2 - State Requirements

Helpful Tip: *Quick access to Federal requirements listed are linked in* ***blue***

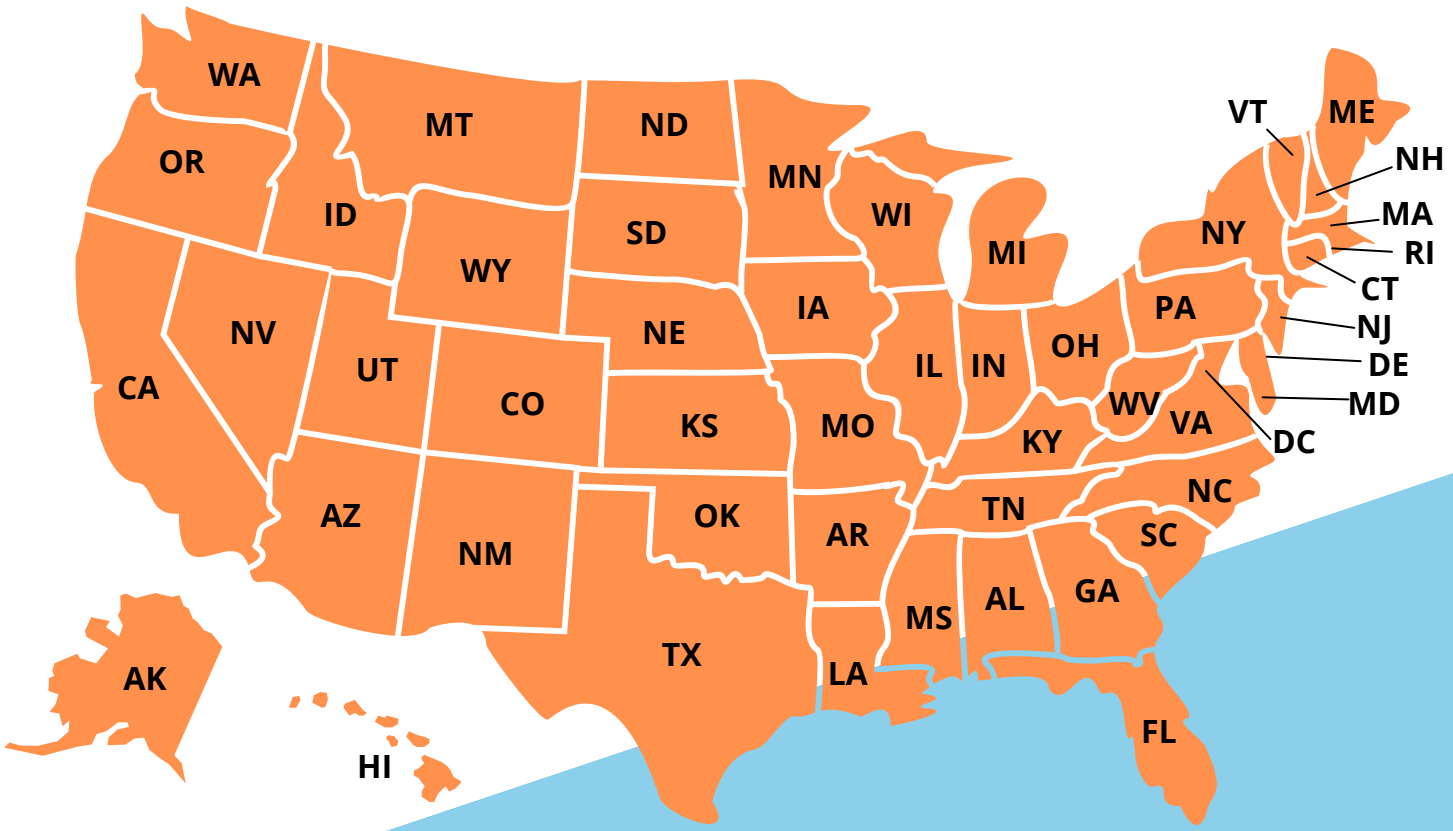
39 out of 50 states have partnered with the NRC to regulate their own Radiation Safety Program and are known as "Agreement States". These states may have additional requirements in order to show compliance to safety standards.

Licensing/Permits

If you are utilizing radioactive materials or equipment, you may be required to obtain a **license** and may be subject to **permitting requirements** from your regulatory authority. Because these requirements vary across the country, we've put together a contact guide to help get you to the right place so they can inform you of needs specific to your business. **Already have a license?** Review the scope of your license to inform you of your compliance needs.

Who is my regulatory authority?

Select your state to find the appropriate contact for your region. This is your licensing contact who can provide you with information specific to your area.



Step 3: Compliance Solutions

Now that you know the requirements for your business, use the checklist below to answer questions and find the right service solutions for your needs.

- [ ] **I need individual Personnel Monitoring**
  A standard Whole Body badge is the most common solution for personnel monitoring.

- [ ] **I wear a lead apron when performing job functions**
  You may benefit from an Effective Dose Equivalent (EDE) to account for the added protection. Make sure to check with your state to see if this calculation is allowed.

- [ ] **My job functions require my arms/legs to receive a higher exposure**
  You may benefit from an ring or wrist badge to monitor extremity exposure.

- [ ] **I have a pregnant employee**
  A fetal monitor can be used to measure dose to the fetus for radiation workers who have declared a pregnancy.

- [ ] **I am not currently monitoring my exposure to the public**
  Area TLDs placed in public areas help ensure you are within allowable limits.

- [ ] **I have employees that have not had Radiation Safety Training this year**
  You can purchase training for employees to show compliance.

Meet Compliance Now

Glossary of Terms

ALARA
ALARA (As Low as Reasonably Achievable) means making every reasonable effort to maintain exposures to radiation as far below the dose limits as is practical and consistent with the purpose of the activity.

DOSIMETRY
Dosimetry is an accurate and systematic measurement of the absorbed dose in matter and tissue resulting from exposure to ionizing radiation.

DOSIMETRY PROCESSOR
An individual or organization that processes and evaluates individual monitoring equipment in order to determine the radiation dose delivered to the equipment.

EFFECTIVE DOSE EQUIVALENT (EDE)
Also known as Webster calculations, refer to a calculation used to reflect the dose of a radiation worker wearing a lead apron. It is important to note that not all states allow EDE calculations.

EXTREMITY
Extremity dose limits are considered the hands, forearms, elbows, feet, knees, leg below the knees, and ankles. Permissible radiation exposures in these regions are generally greater than those for whole body exposure because the extremities contain fewer blood-forming organs and have smaller volumes for energy absorption.

INDIVIDUAL MONITORING DEVICE
Devices designed to be worn by a single individual for the assessment of dose equivalent such as film badges, thermoluminescence dosimeters (TLDs), pocket ionization chambers, and personal ("lapel") air sampling devices.

IONIZING RADIATION
Ionizing radiation is high-energy radiation capable of producing ionization in substances through which it passes.

OCCUPATIONAL DOSE
The internal and external dose of ionizing radiation received by workers in the course of employment.

WHOLE BODY
For purposes of external exposure, head, torso, arms above the elbow, or legs above the knee.

View all NRC definitions under § 20.1003

Additional Links and Resources

Administrative Practices in Radiation Surveys and Monitoring - USNRC Regulatory Guide 8.2, Rev 1 (2011)

Instructions for Recording and Reporting Occupational Dose Data - USNRC Regulatory Guide 8.7, Rev 4 (2018)

Instruction Concerning Risks from Occupational Radiation Exposure - USNRC Regulatory Guide 8.29, Rev 1 (1996)

Radiation Dose to the Embryo/Fetus - USNRC Regulatory Guide 8.36 (1992)

Radiation Protection - NRC Inspection Procedure 83822