

# INDIAN AFFAIRS MANUAL

**1.1 Purpose.** This chapter describes the minimum Safety and Occupational Health Program Requirements for protecting Indian Affairs (IA) employees and the public from adverse exposure to radiation sources. Additional information may be found in the IA Safety and Health Handbook, and is incorporated into this IAM by reference. The Handbook can be found at:

<http://www.bia.gov/WhatWeDo/Knowledge/Directives/Handbooks/index.htm>

**1.2 Scope.** This policy applies to all offices under the authority of the Assistant Secretary – Indian Affairs (AS-IA), including the Bureau of Indian Affairs (BIA) and the Bureau of Indian Education (BIE).

**1.3 Policy.** It is the policy of IA to comply with all applicable federal laws, regulations, and Departmental policies and procedures regarding radiation safety, and to ensure that resources are available to facilitate compliance.

**1.4 Authority.**

- A. P.L. 91-596, “Occupational Safety and Health Act of 1970,” Section 19
- B. Executive Order 12196, “Occupational Safety and Health Programs for Federal Employees,”
- C. Title 10 Code of Federal Regulations (CFR), “Nuclear Regulatory Commission (NRC)”
- D. Title 29 CFR, “Labor”
- E. Title 29 CFR, Part 1960, “Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters”
- F. Title 49 CFR, Chapter I, “Pipeline and Hazardous Materials Safety Administration, Department of Transportation (DOT)”
- G. Title 41 CFR, Part 102-80, “Safety and Environmental Management”
- H. 485 Departmental Manual (DM), Safety and Occupational Health Program

**1.5 Responsibilities.**

**A. Regional Directors are responsible for:**

- (1) Establishing a Radiation Safety Program.
- (2) Ensuring compliance with statutory and regulatory policy and Radiation Safety Program requirements.
- (3) Providing the resources and staff support necessary for the successful implementation of a Radiation Safety Program.
- (4) Appointing and assigning responsibilities to a qualified Radiation Safety Officer at each applicable facility.

**B. IA Designated Agency Safety and Health Official (DASHO) is responsible for:**

- (1) Exercising the authority of the Assistant Secretary-Indian Affairs (AS-IA) for monitoring compliance with the radiation protection program and recommends any necessary improvements.
- (2) Providing pertinent information concerning the bureau/office's program to the Departmental DASHO or his/her designee upon request.

**C. Chief, Division of Safety and Risk Management is responsible for:**

- (1) Advising and supporting the IA DASHO in carrying out program responsibilities.
- (2) Providing technical assistance and guidance to management in carrying out program requirements.

**D. Managers/Supervisors are responsible for:**

- (1) Providing support at operating locations to ensure that identified controls are implemented and maintained, and work environments are safe.
- (2) Ensuring that each employee under their supervision who is an operator of a portable nuclear gauge is fully qualified to operate such equipment under the requirements of this policy, and that only such qualified individuals operate a portable nuclear gauge in the performance of their duties.

- E. **Radiation Safety Officer (RSO)** is responsible for recommending or approving corrective actions, identifying radiation safety problems, initiating action(s), and ensuring regulatory compliance.

## 1.6 Definitions.

- A. **Ionizing Radiation** is the most energetic forms of radiation, capable of removing electrons from atoms (ionization) and damaging the DNA within living cells. X-rays, gamma rays and alpha & beta particles are examples of ionizing radiation.
- B. **Non-ionizing Radiation** is radiation having enough energy to excite atoms (make them move more rapidly), but not enough to ionize them (alter them physically). Examples of non-ionizing electromagnetic radiation include microwaves, radio waves, lasers, and visible light.
- C. **General Licensed Materials** are those materials subject to the NRC regulations listed in 10 CFR 31.5. General licensed materials are devices containing radioactive material and are typically used to detect, measure, gauge, or control the thickness, density, level, or chemical composition of various items. Examples of such devices are gas chromatographs (detector cells), density gauges, nuclear gauges, fill-level gauges, and static elimination devices.
- D. **Radon** is a naturally occurring radioactive gas found in soils, rock, and water throughout the U.S. It has numerous different isotopes, but radon-220, and -222 are the most common. Radon can cause lung cancer.
- E. **Laser(s)** are devices that convert incident electromagnetic radiation of mixed frequencies to discrete frequencies of highly amplified and coherent ultraviolet, visible, or infrared radiation.
- F. **Restricted Area(s)** is an area where access is controlled to protect an individual from exposure to radiation or radioactive materials.
- G. **Naturally Occurring Radioactive Materials (NORM)** are naturally occurring uranium and thorium and their decay products present in air, soil, rocks, and water. NORM is a potential health concern when concentrations and radio activities are above typical environmental levels or where anthropogenic processes such as oil and gas production, mining, mineral processing, water treatment, etc., may concentrate uranium and thorium above typical environmental levels.

- H. X-rays** are penetrating electromagnetic radiation (photon) having a wavelength that is much shorter than that of visible light. These rays are usually produced by excitation of the electron field around certain nuclei.

**1.7 Requirements for Ionizing Radiation (IR).**

- A.** Affected locations shall protect employees and the public against exposures to IR and shall comply with the appropriate standards and regulations.
- B.** Affected locations should make every reasonable effort to maintain exposures to employees and to the public “as low as reasonably achievable” (ALARA), and at no time shall exceed the applicable limits set by 10 CFR 20, 29 CFR 1910.1096, and 29 CFR 1926.53.
- C.** Locations conducting activities or possessing radioactive materials under a license issued by the NRC shall conduct activities and handle materials in accordance with their license requirements and applicable NRC regulations. These include General Licensed Materials.
- D.** Locations possessing or using radiation sources not requiring NRC licensing shall implement a program to meet the requirements of 29 CFR 1910.1096.
- E.** Each affected location shall develop, document, and implement a radiation protection program that governs the use and exposure to ionizing radiation. Radiation protection programs shall include, at a minimum, the following elements:
- (1) Establish a process that provides accountability and control of ionizing radiation sources through procurement, use, storage, final disposition or disposal. This includes an annual physical inventory of radiation sources or more often when specified by governing regulations and established procedures.
  - (2) Functional responsibilities for program implementation and oversight will be determined by the Regional Director.
  - (3) Maintain exposures below dose limits and airborne concentrations limits specified in the governing standard or regulation.
  - (4) Conduct surveys and monitoring to determine the magnitude and extent of radiation levels; concentrations, quantities of radioactive material, and potential radiological hazards; and, where applicable, conduct leak tests of sealed sources, x-ray producing devices, and other radiation producing equipment housing radioactive materials.

## INDIAN AFFAIRS MANUAL

- (5) Where required or as applicable, evaluate employee and public exposure to ionizing radiation.
- (6) Post restricted area or rooms with the appropriate radiation caution or danger signage, (i.e., 3-bladed, magenta or purple and yellow signage or other accepted color schemata). Provide physical means to prevent unauthorized access to such areas.
- (7) Label containers with the appropriate radiation caution or danger signage, in which radioactive materials are transported, stored or used, and maintain appropriate manufacturer's labels on radiation producing devices.
- (8) Establish emergency and immediate evacuation procedures, as applicable.
- (9) Ensure that radioactive materials are transported (shipping and receiving) in accordance with the appropriate NRC and Department of Transportation (DOT) regulations and conduct radiation surveys, as needed, on packages containing radioactive materials prior to accepting receipt within the regulated time frame.
- (10) Provide appropriate and effective training to employees who are potentially exposed to ionizing radiation. Training shall be provided at the time of initial assignment and repeated if there is a change in operational procedure or exposure. DOT training is required for employees involved in the transportation of radioactive materials at least once every 3 years.
- (11) Ensure that radioactive materials are properly secured and stored.
- (12) Ensure that radioactive waste is disposed of in accordance with applicable regulations.
- (13) Make appropriate notification and reporting of radiation incidences and over exposures to the appropriate governing authority where applicable.
- (14) Maintain records of, including but not limited to, surveys, exposure monitoring, training, public dose, leak testing, maintenance, audits, program review and other program records.
- (15) Notify employees of exposures in accordance with applicable regulations or standards.
- (16) Establish procedures to address post-exposure action.

# INDIAN AFFAIRS MANUAL

- (17) Establish a declared pregnant worker program that initiates appropriate protective actions against exposure to ionizing radiation once a pregnancy is voluntarily declared in writing to management.
  - (18) Conduct an annual program review. Assess local program implementation and compliance annually
  - (19) Repair, maintenance, and alignment of X-ray producing devices, equipment housing general license materials, and other ionizing radiation producing and measuring equipment shall be conducted by a trained and qualified individual of the manufacturer or an individual approved by the Division of Safety and Risk Management or its designee.
  - (20) Ensure a job hazard analysis for all IR sources is prepared and maintain training log for all personnel using the IR sources.
- F. Naturally Occurring Radioactive Materials (NORM).** IA shall evaluate potential exposures to employees involved in handling and storing NORM, and performing activities at sites where exposures are above background radiation levels, (i.e., working in mines with radon or collecting samples from a NORM waste stream.) Applicable procedures and requirements shall be implemented to control exposures to ensure exposures do not exceed limits in 29 CFR 1910.1096.

## **1.8 Requirements for Non-ionizing Radiation (NIR).**

- A.** Regional Directors are responsible for establishing programs and controls that prevent NIR hazards and ensure employee and public exposures below recommended regulatory limits.
- B.** Each affected location will implement a program that addresses the following at minimum:
  - (1) Ensure that potential NIR hazards are properly identified and that appropriate hazard controls are developed.
  - (2) Use of methods such as, warning signs, barriers, and lockout-tagout procedures to prevent accidental exposures to harmful quantities of NIR
  - (3) Maintain inventory of hazardous NIR areas including all known hazardous electromagnetic and radiofrequency sources and class IIIb and IV lasers
  - (4) Evaluate NIR radiation sources. Measurement procedures and techniques recommended in IEEE C95.3 may be used as basic guidance for evaluating

radiofrequency/electromagnetic hazards. Notify affected employees of monitoring results and of NIR hazardous equipment and areas.

- (5) Ensure that all employees receive appropriate safety training commensurate with potential hazards from NIR sources they may encounter. Prepare job hazard analysis for all NIR sources and maintain training log for all personnel using the NIR sources.
- (6) Investigate all incidents related to actual or suspected NIR exposures. Investigations shall address results of NIR measurements, including detailed descriptions of circumstances leading to the incident, and make recommendations to prevent future reoccurrence.
- (7) Follow guidelines in ANSI Z136.1 and ANSI Z136.3 and establish laser safety committees where applicable. Only a qualified expert will design, review, and test controls for access to a Class IIIb or IV laser. A laser safety officer will design or review for adequacy all laser safety standard operating procedures for each such facility.
- (8) Inspect NIR sources at least annually and survey if modifications were made.

## **1.9 Requirements for Nuclear Devices (Gauges).**

### **A. Licensing.**

- (1) A license from the Nuclear Regulatory Commission (NRC) for the specific source material shall be obtained prior to the purchase of the nuclear device. The agreements made in the application for the license shall be followed.
- (2) Use of an unlicensed nuclear device to perform Indian Affairs work is strictly prohibited.

### **B. Identification of a Radiation Safety Officer (RSO). A qualified individual shall be responsible for the radiation protection program.**

### **C. Handling and Storage.**

- (1) Nuclear gauges must be stored away from occupied areas and secured against unauthorized removal.
- (2) Handling of nuclear gauges shall be in accordance with the manufacturer's instructions.

**D. Transportation.**

- (1) Shipping papers must accompany the nuclear gauge device in the transport vehicle and be within reach of the driver. The shipping papers consist of:
- (2) Bill of Lading filled out in accordance with 49 CFR 172.200-2004.
- (3) An emergency response information document shall be in the transport vehicle and immediately accessible to the driver or emergency personnel.
- (4) Whenever the nuclear gauge is transported in a vehicle, it must be locked in the trunk of a car, locked in a van, or secured by a lock and chain and properly tied down while in an open bed truck.
- (5) The nuclear gauge must be in a TYPE A package and a copy of the TYPE A Package Certificate provided by the gauge manufacturer must accompany the package during transport.
- (6) The package must be properly labeled, inspected, and sealed prior to each shipment.

**E. Public Dose.**

- (1) Nuclear gauge users shall ensure that licensed gauges are used, transported, and stored in such a way that members of the public will not receive more than a 1 millisievert (1 mSv) [100 millirem (100 mrem)] in one year and the dose in any unrestricted areas will not exceed 0.02 millisievert (mSv) [2 millirem (millirem)] in any one hour from licensed operations.
- (2) Members of the public include persons who live, work or may be near locations where portable nuclear gauges are used or stored, and employees whose assigned duties do not include the use of licensed materials and who work in the vicinity where nuclear gauges are used or stored.

**F. Personal Monitoring and Recordkeeping.**

- (1) All operators shall be monitored for radiation exposure by personal monitoring equipment (i.e. film badges). Processing of personnel monitoring equipment shall be per the manufactures directions and be read by a qualified laboratory employee.

- (2) The gauges shall be accounted for periodically. Inventories are to be conducted at not more than 6-month intervals. Inventory records must be kept for three years and the RSO must maintain copies of these inventories.

**G. Records and Reports.**

- (1) Training certificates shall be on file with the Radiation Safety Officer prior to engaging in nuclear gauge operations.
- (2) Each facility storing a nuclear gauge shall designate an individual to perform an annual audit. Document and note corrective actions taken. The audit shall be sent to the Radiation Safety Officer for review, verification and signature. A copy of the signed audit report shall be kept by the initiating organization.
- (3) Maintain records of receipt, transfer, and disposal of nuclear gauges.
- (4) Conduct physical inventories at intervals not to exceed six (6) months.

**H. Emergency Procedures.**

- (1) Develop, implement, and maintain operating and emergency procedures.
- (2) Provide copies of the operating and emergency procedures to all nuclear gauge users and at each job site.

**I. Leak Testing.**

- (1) Leak tests shall be performed by approved NRC organizations, an Agreement State, or according to procedures approved by the NRC.
- (2) Leak tests will be conducted at intervals approved by NRC.

**J. Security**

- (1) The nuclear gauge must be controlled by constant surveillance and must be secured against unauthorized use or removal.
- (2) Notify NRC if nuclear gauges are lost or stolen.

**K. Maintenance and Maintenance Records.**

- (1) Maintenance (routine cleaning and lubrication) of nuclear gauges shall be in accordance with the manufacturer's recommendations and instructions.
- (2) Non-routine maintenance or repair that involves tasks which personnel could receive radiation doses exceeding NRC limits, must be performed by the nuclear gauge manufacturer or a person specifically authorized by NRC.

**L. Training.**

- (1) The operation of a nuclear gauge device without the required training is prohibited while in the performance of official duties. Users shall receive refresher training at least every five years to include radiation safety and regulatory requirements, practical safety use of the gauge; radiation vs. contamination; internal vs. external exposure; concept of time, distance and shielding to minimize exposure; control and surveillance of nuclear gauges, location of seal source within the portable nuclear gauge; inventory, record keeping; incidents; licensing and inspection by the regulatory agency; need for complete and accurate information; employee protection and misconduct.
- (2) Individuals serving as RSO shall receive training as directed in NUREG 1556, Section 8.7 Item 7: Individual(s) Responsible for Radiation Safety Program and Their Training and Experience.

**1.10 Requirements for Radon.**

- A.** Occupational exposures of employees and volunteers shall be maintained as low as reasonably achievable (ALARA) and at no time shall be above 4 Working Level Month (WLM) per year.
- B.** Areas at or exceeding 25 pCi/L must be posted as radon hazard areas and employees exposures must be evaluated.
- C.** Occupational exposures of employees and volunteers under the age of 18 years shall be maintained below 0.4 WLM (10% of 4 WLM).
- D.** Concentrations in IA owned housing units must not exceed 4 pCi/L. Functional responsibilities for radon in IA owned housing will be determined by the Regional Director.