

## **PART VIII**

### **SPECIAL REQUIREMENTS FOR WELL LOGGING OPERATIONS**

#### **RHA 8.1 PURPOSE**

The regulations of this Part establish licensing and radiation safety requirements for persons utilizing sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars for well logging in a single well. The provisions and requirements of this Part are in addition to, and not in substitution for, other requirements of these regulations.

#### **RHA 8.2 SCOPE**

The regulations established in this Part apply to all licensees using radioactive material for well logging; provided, however, that nothing in this Part applies to the use of radioactive material in tracer studies involving multiple wells, such as field flooding studies, or to the use of sealed sources auxiliary to well logging but not lowered into wells.

#### **RHA 8.3 DEFINITIONS** as used in this Part:

8.3.1 "Energy compensation source" (ECS) means a small sealed source, with an activity not exceeding 100 microcuries (3.7 MBq), used within a logging tool, or other tool components, to provide a reference standard to maintain the tool's calibration when in use.

8.3.2 "Field station" means a facility where radioactive material may be stored or used and from which equipment is dispatched to temporary jobsites.

8.3.3 "Fresh water aquifer", for the purpose of this Part, means a geologic formation that is capable of yielding fresh water to a well or spring.

8.3.4 "Injection tool" means a device used for controlled subsurface injection of radioactive tracer material.

8.3.5 "Irretrievable well logging source" means any sealed source containing radioactive material that is pulled off or not connected to the wireline that suspends the source in the well and for which all reasonable effort at recovery has been expended.

8.3.6 "Logging assistant" means any individual who, under the personal supervision of a logging supervisor, handles sealed sources or tracers that are not in logging tools or shipping containers or who performs surveys required by RHA 8.22.

8.3.7 "Logging supervisor" means an individual who uses radioactive material or provides personal supervision in the use of radioactive material at a temporary jobsite and who is responsible to the licensee for assuring compliance with the requirements of the Department's regulations and the conditions of the license.

8.3.8 "Logging tool" means a device used subsurface to perform well logging.

8.3.9 "Personal supervision" means guidance and instruction by a logging supervisor, who is physically present at a temporary jobsite, who is in personal contact with logging assistants, and who can give immediate assistance.

8.3.10 "Radioactive marker" means radioactive material used for depth determination or direction orientation. For purposes of this Part, this term includes radioactive collar markers and radioactive iron nails.

8.3.11 "Safety review" means a periodic review provided by the licensee for its employees on radiation safety aspects of well logging. The review may include, as appropriate, the results of internal inspections, new procedures or equipment, accidents or errors that have been observed, and opportunities for employees to ask safety questions.

8.3.12 "Sealed source" means any radioactive material that is encased in a capsule designed to prevent leakage or escape of the radioactive material.

8.3.13 "Source holder" means a housing or assembly into which a sealed source is placed to facilitate the handling and use of the source in well logging.

8.3.14 "Subsurface tracer study" means the release of unsealed radioactive material or a substance labeled with radioactive material in a single well for the purpose of tracing the movement or position of the material or substance in the well or adjacent formation.

8.3.15 "Surface casing for protecting fresh water aquifers" means a pipe or tube used as a lining in a well to isolate fresh water aquifers from the well.

8.3.16 "Temporary jobsite" means a place where radioactive materials are present for the purpose of performing well logging or subsurface tracer studies.

8.3.17 "Tritium neutron generator target source" means a tritium source used within a neutron generator tube to produce neutrons for use in well logging applications.

8.3.18 "Uranium sinker bar" means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.

8.3.19 "Well" means a drilled hole in which well logging may be performed. As used in this Part, "well" includes drilled holes for the purpose of oil, gas, mineral, groundwater, or geological exploration.

8.3.20 "Well logging" means, unless otherwise specified, all operations involving the lowering and raising of measuring devices or tools which contain radioactive material or are used to detect radioactive material in wells for the purpose of obtaining information about the well or adjacent formations which may be used in oil, gas, mineral, groundwater, or geological exploration.

#### **RHA 8.4 SPECIFIC LICENSES FOR WELL LOGGING**

The Department will approve an application for a specific license for the use of radioactive material in well logging if the applicant meets the following requirements:

8.4.1 The applicant shall satisfy the general requirements specified in RHA 2.6 of these regulations and any special requirements contained in this Part.

8.4.2 The applicant shall develop a program for training logging supervisors and logging assistants and submit to the Department a description of this program which specifies:

8.4.2.1 Initial training;

8.4.2.2 On-the-job training;

8.4.2.3 Annual safety reviews provided by the licensee;

8.4.2.4 Means the applicant will use to demonstrate the logging supervisor's knowledge and understanding of and ability to comply with the Department's regulations and licensing requirements and the applicant's operating and emergency procedures; and

8.4.2.5 Means the applicant will use to demonstrate the logging assistant's knowledge and understanding of and ability to comply with the applicant's operating and emergency procedures.

8.4.3 The applicant shall submit to the Department written operating and emergency procedures as described in RHA 8.20 or an outline or summary of the procedures that includes the important radiation safety aspects of the procedures.

8.4.4 The applicant shall establish and submit to the Department its program for annual inspections of the job performance of each logging supervisor to ensure that the Department's regulations, license requirements, and the applicant's operating and emergency procedures are followed. Inspection records must be retained for 3 years after each annual internal inspection.

8.4.5 The applicant shall submit a description of its overall organizational structure as it applies to the radiation safety responsibilities in well logging, including specified delegations of authority and responsibility.

8.4.6 If an applicant wants to perform leak testing of sealed sources, the applicant shall identify the manufacturer and the model numbers of the leak test kits to be used. If the applicant wants to analyze its own wipe samples, the applicant shall establish procedures to be followed and submit a description of these procedures to the Department. The description must include:

8.4.6.1 Instruments to be used;

8.4.6.2 Methods of performing the analysis; and

8.4.6.3 Pertinent experience of the person who will analyze the wipe samples.

## **RHA 8.5 AGREEMENT WITH WELL OWNER OR OPERATOR**

8.5.1 The licensee may perform well logging with a sealed source only after the licensee has a written agreement with the employing well owner or operator. This written agreement must identify who will meet the following requirements:

8.5.1.1 If a sealed source becomes lodged in the well, a reasonable effort will be made to recover it.

8.5.1.2 A person may not attempt to recover a sealed source in a manner which, in the licensee's opinion, could result in its rupture.

8.5.1.3 The radiation monitoring required in RHA 8.22.1 will be performed.

8.5.1.4 If the environment, any equipment, or personnel are contaminated with radioactive material, they must be decontaminated before release from the site or release for unrestricted use; and

8.5.1.5 If the sealed source is classified as irretrievable after reasonable efforts at recovery have been expended, the following requirements must be implemented within 30 days:

8.5.1.5.1 Each irretrievable well logging source must be immobilized and sealed in place with a cement plug;

8.5.1.5.2 A means to prevent inadvertent intrusion on the source, unless the source is not accessible to any subsequent drilling operations; and

8.5.1.5.3 A permanent identification plaque, constructed of long lasting material such as stainless steel, brass, bronze, or monel, must be mounted at the surface of the well, unless the mounting of the plaque is not practical. The size of the plaque must be at least 7 inches (17 cm) square and 1/8 inch (3 mm) thick. The plaque must contain:

8.5.1.5.3.1 The word "CAUTION";

8.5.1.5.3.2 The radiation symbol (the color requirement in RHA 3.21.1 of these regulations need not be met);

8.5.1.5.3.3 The date the source was abandoned;

8.5.1.5.3.4 The name of the well owner or operator, as appropriate;

8.5.1.5.3.5 The well name and well identification number(s) or other designation;

8.5.1.5.3.6 An identification of the sealed source(s) by radionuclide and quantity;

8.5.1.5.3.7 The depth of the source and depth of the top of the plug; and

8.5.1.5.3.8 An appropriate warning, such as "DO NOT RE-ENTER THIS WELL".

8.5.2 The licensee shall retain a copy of the written agreement for 3 years after the completion of the well logging operation.

8.5.3 The licensee may apply, pursuant to RHA 1.10 of these regulations for Department approval, on a case-by-case basis, of proposed procedures to abandon an irretrievable well logging source in a manner not otherwise authorized in RHA 8.5.1.5.

8.5.4 A written agreement between the licensee and the well owner or operator is not required if the licensee and the well owner or operator are part of the same corporate structure or otherwise similarly affiliated. However, the licensee shall still otherwise meet the requirements in RHA 8.5.1.1 through 8.5.1.5.

## **RHA 8.6 LABELING OF WELL LOGGING DEVICES**

8.6.1 The licensee may not use a source, source holder, or logging tool that contains radioactive material unless the smallest component that is transported as a separate piece of equipment with the radioactive material inside bears a durable, legible, and clearly visible marking or label. The marking or label must contain the radiation symbol specified in RHA 3.21.1 of these regulations, without the

conventional color requirements, and the wording "DANGER (or CAUTION) RADIOACTIVE MATERIAL."

8.6.2 The licensee may not use a container to store radioactive material unless the container has securely attached to it a durable, legible, and clearly visible label. The label must contain the radiation symbol specified in RHA 3.21.1 of these regulations and the wording "CAUTION (or DANGER), RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES (or NAME OF COMPANY) IF FOUND."

## **RHA 8.7 STORAGE OF WELL LOGGING DEVICES**

The licensee shall store each source containing radioactive material in a storage container or transportation package. The container or package must be locked and physically secured to prevent tampering or removal of radioactive material from storage by unauthorized personnel. The licensee shall store radioactive material in a manner which will minimize danger from explosion or fire.

## **RHA 8.8 TRANSPORTATION OF WELL LOGGING DEVICES**

8.8.1 The licensee may not transport radioactive material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with regulations set out in the Code of Federal Regulations, Title 10, Part 71.

8.8.2 The licensee shall lock and physically secure the transportation package containing radioactive material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the radioactive material from the vehicle.

## **RHA 8.9 RADIATION SURVEY INSTRUMENTS**

8.9.1 The licensee shall keep a calibrated and operable radiation survey instrument capable of detecting beta and gamma radiation at each field station and temporary jobsite to make the radiation surveys required by this Part and by Part III of these regulations. To satisfy this requirement, the radiation survey instrument must be capable of measuring 0.001 mSv (0.1 mrem) per hour through at least 0.5 mSv (50 mrem) per hour.

8.9.2 The licensee shall have available additional calibrated and operable radiation detection instruments sensitive enough to detect the low radiation and contamination levels that could be encountered if a sealed source ruptured. The licensee may own the instruments or may have a procedure to obtain them quickly from a second party.

8.9.3 The licensee shall have each radiation survey instrument required under RHA 8.9.1 calibrated as follows:

8.9.3.1 At intervals not to exceed 6 months and after instrument servicing;

8.9.3.2 For linear scale instruments, at two points located approximately 1/3 and 2/3 of full-scale on each scale; for logarithmic scale instruments, at midrange of each decade, and at two points of at least one decade; and for digital instruments, at appropriate points; and

8.9.3.3 So that an accuracy within plus or minus 20 percent of the calibration standard can be demonstrated on each scale.

8.9.4 The licensee shall retain calibration records for a period of 3 years after the date of calibration for inspection by the Department.

## **RHA 8.10 LEAK TESTING OF SEALED SOURCES**

8.10.1 Each licensee who uses a sealed source shall have the source tested for leakage periodically. The licensee shall keep records of leak test results in units of microcuries and retain the records for inspection by the Department for 3 years after the leak test is performed.

8.10.2 Method of testing. The wipe of a sealed source must be performed using a leak test kit or method approved by the Department, the U.S. Nuclear Regulatory Commission, or any Agreement State. The wipe sample must be taken from the nearest accessible point to the sealed source where contamination might accumulate. The wipe sample must be analyzed for radioactive contamination. The analysis must be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample and must be performed by a person approved by the Department, the U.S. Nuclear Regulatory Commission, or an Agreement State to perform the analysis.

8.10.3 Test frequency. Each sealed source (except an energy compensation source (ECS)) shall be tested for leakage at intervals not to exceed six (6) months. In the absence of a certificate from a transferor that a leak test has been made within the 6 month period prior to the transfer, the sealed source shall not be put into use until leak tested. Each ECS that is not exempt from testing in accordance with RHA 8.10.5 of this section must be tested at intervals not to exceed 3 years. In the absence of a certificate from a transferor that a test has been made within the 3 years before the transfer, the ECS may not be used until tested.

8.10.4 Removal of leaking source from service. Any test conducted pursuant to RHA 8.10.1, 8.10.2 and 8.10.3 which reveals the presence of 0.005 microcurie or more of removable radioactive material shall be considered evidence that the sealed source is leaking. The licensee shall immediately remove the sealed source involved from use and shall cause it to be decontaminated and repaired or to be disposed of by a licensee authorized by the Department, the NRC or an Agreement State to perform these functions. The licensee shall check the equipment associated with the leaking source for radioactive contamination and, if contaminated, have it decontaminated or disposed of by a licensee authorized by the Department, the NRC or an Agreement State to perform these functions. Within five (5) days after obtaining results of the leak test, the licensee shall file a report with the Department describing the equipment involved, the test results and the corrective action taken.

8.10.5 The following sealed sources are exempt from the periodic leak test requirements set out in RHA 8.10.1 through 8.10.4:

8.10.5.1 Hydrogen-3 (tritium) sources;

8.10.5.2 Sources containing radioactive material with a half-life of 30 days or less;

8.10.5.3 Sealed sources containing radioactive material in gaseous form;

8.10.5.4 Sources of beta or gamma emitting radioactive material with an activity of 100 microcuries or less; and

8.10.5.5 Sources of alpha or neutron emitting radioactive material with an activity of 10 microcuries or less.

## **RHA 8.11 PHYSICAL INVENTORY**

Each licensee shall conduct a semi-annual physical inventory to account for all radioactive material received and possessed under the license. The licensee shall retain records of the inventory for 3 years from the date of the inventory for inspection by the Department. The inventory must indicate the quantity and kind of radioactive material, the location of the radioactive material, the date of the inventory, and the name of the individual conducting the inventory. Physical inventory records may be combined with leak test records.

## **RHA 8.12 UTILIZATION LOGS**

8.12.1 Each licensee shall maintain records for each use of radioactive material showing:

8.12.1.1 The make, model number, and a serial number or a description of each sealed source used;

8.12.1.2 In the case of unsealed radioactive material used for subsurface tracer studies, the radionuclide and quantity of activity used in a particular well and the disposition of any unused tracer materials;

8.12.1.3 The identity of the logging supervisor who is responsible for the radioactive material and the identity of logging assistants present; and

8.12.1.4 The location and date of use of the radioactive material.

8.12.2 The licensee shall make the records required by RHA 8.12.1 available for inspection by the Department. The licensee shall retain the records for 3 years from the date of the recorded event.

## **RHA 8.13 CRITERIA FOR SEALED SOURCE DESIGN AND INTEGRITY**

8.13.1 A licensee may use a sealed source in well logging applications if:

8.13.1.1 The sealed source is doubly encapsulated;

8.13.1.2 The sealed source contains radioactive material whose chemical and physical forms are as insoluble and nondispersible as practical; and

8.13.1.3 The sealed source meets the requirements of RHA 8.13.2, 8.13.3 or 8.13.4.

8.13.2 For a sealed source manufactured on or before July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the requirements of USASI N5.10-1968, "Classification of Sealed Radioactive Sources," or the requirements in RHA 8.13.3 or 8.13.4 of this section.

8.13.3 For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications if it meets the oil-well logging requirements of ANSI/HPS N43.6-1997, "Sealed Radioactive Sources—Classification."

8.13.4 For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications, if--

8.13.4.1 The sealed source's prototype has been tested and found to maintain its integrity after each of the following tests:

8.13.4.1.1 Temperature. The test source must be held at -40° C for 20 minutes, 600° C for 1 hour, and then be subject to a thermal shock test with a temperature drop from 600° C to 20° C within 15 seconds.

8.13.4.1.2 Impact Test. A 5kg steel hammer, 2.5cm in diameter, must be dropped from a height of 1m onto the test source.

8.13.4.1.3 Vibration Test. The test source must be subject to a vibration from 25Hz to 500Hz at 5g amplitude for 30 minutes.

8.13.4.1.4 Puncture Test. A 1 gram hammer and pin, 0.3cm pin diameter, must be dropped from a height of 1m onto the test source.

8.13.4.1.5 Pressure Test. The test source must be subjected to an external pressure of 24,600 pounds per square inch absolute ( $1.695 \times 10^7$  pascals).

8.13.5 The requirements in RHA 8.13.1, 8.13.2, 8.13.3 and 8.13.4 do not apply to sealed sources that contain radioactive material in gaseous form.

8.13.6 The requirements in RHA 8.13.1, 8.13.2, 8.13.3 and 8.13.4 of this section do not apply to energy compensation sources (ECS). ECSs must be registered with the Department under RHA 2.29 or with the NRC under Sec. 32.210.

8.13.7 Energy compensation source. The licensee may use an energy compensation source (ECS) which is contained within a logging tool, or other tool components, only if the ECS contains quantities of licensed material not exceeding 100 microcuries (3.7 MBq).

(a) For well logging applications with a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of RHA 8.10, 8.11, and 8.12.

(b) For well logging applications without a surface casing for protecting fresh water aquifers, use of the ECS is only subject to the requirements of RHA 8.5, 8.10, 8.11, 8.12, 8.18, and 8.27.

8.13.8 Tritium neutron generator target source.

(a) Use of a tritium neutron generator target source, containing quantities not exceeding 30 curies (1,110 MBq) and in a well with a surface casing to protect fresh water aquifers, is subject to the requirements of this part except RHA 8.5, 8.13, and 8.27.

(b) Use of a tritium neutron generator target source, containing quantities exceeding 30 curies (1,110 MBq) or in a well without a surface casing to protect fresh water aquifers, is subject to the requirements of this part except RHA 8.13.

## **RHA 8.14 INSPECTION, MAINTENANCE, AND OPENING OF A SOURCE OR SOURCE HOLDER**

8.14.1 Each licensee shall visually check source holders, logging tools, and source handling tools, for defects before each use to ensure that the equipment is in good working condition and that required

labeling is present. If defects are found, the equipment must be removed from service until repaired, and a record must be made listing the date of check, name of inspector, equipment involved, defects found, and repairs made. These records must be retained for 3 years after the defect is found.

8.14.2 Each licensee shall have a program for semiannual visual inspection and routine maintenance of source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars to ensure that the required labeling is legible and that no physical damage is visible. If defects are found, the equipment must be removed from service until repaired and a record must be made listing date, equipment involved, inspection and maintenance operations performed, any defects found, and any actions taken to correct the defects. These records must be retained for 3 years after the defect is found.

8.14.3 Removal of a sealed source from a source holder or logging tool and maintenance on sealed sources or holders, in which sealed sources are contained, may not be performed by the licensee unless a written procedure developed pursuant to RHA 8.20 has been approved either by the Department pursuant to RHA 8.4.3, the U.S. Nuclear Regulatory Commission, any Agreement State, or a Licensing State.

8.14.4 If a sealed source is stuck in the source holder, the licensee may not perform any operation such as drilling, cutting, or chiseling on the source holder unless the licensee is specifically approved by the Department, the U.S. Nuclear Regulatory Commission, any Agreement State, or a Licensing State to perform this operation.

8.14.5 The opening, repair, or modification of any sealed source must be performed by persons specifically approved to do so by the Department, the U.S. Nuclear Regulatory Commission, any Agreement State, or a Licensing State.

#### **RHA 8.15 SUBSURFACE TRACER STUDIES**

8.15.1 The licensee shall require all personnel handling radioactive tracer material to use protective gloves and, if required by the license, other protective clothing and equipment. The licensee shall take precautions to avoid ingestion or inhalation of radioactive tracer material and to avoid contamination of field stations and temporary jobsites.

8.15.2 A licensee may not knowingly inject radioactive material into fresh water aquifers unless specifically authorized to do so by the Department.

#### **RHA 8.16 RADIOACTIVE MARKERS**

The licensee may use radioactive markers in wells only if the individual markers contain quantities of radioactive material not exceeding the quantities specified in RHA 2.24 of these regulations. The use of markers is subject only to the requirements of RHA 8.11.

#### **RHA 8.17 URANIUM SINKER BARS**

The licensee may use a uranium sinker bar in well logging applications, only if it is legibly impressed with the words "CAUTION - RADIOACTIVE DEPLETED URANIUM" and "NOTIFY CIVIL AUTHORITIES (or COMPANY NAME) IF FOUND."

## **RHA 8.18 USE OF SEALED SOURCES IN A WELL WITHOUT SURFACE CASINGS**

The licensee may use a sealed source in a well without a surface casing for protecting fresh water aquifers only if the licensee follows a procedure for reducing the probability of the source becoming lodged in the well. The procedure must be approved by the Department pursuant to RHA 8.4.3, the U.S. Nuclear Regulatory Commission, any Agreement State, or a Licensing State.

## **RHA 8.19 TRAINING REQUIREMENTS FOR WELL LOGGING PERSONNEL**

8.19.1 The licensee may not permit an individual to act as a logging supervisor until that person:

8.19.1.1 Has completed training in the subjects outlined in RHA 8.19.5;

8.19.1.2 Has received copies of, and instruction in:

8.19.1.2.1 The requirements contained in the applicable sections of Parts III, VI and VIII of these regulations;

8.19.1.2.2 The license under which the logging supervisor will perform well logging; and

8.19.1.2.3 The licensee's operating and emergency procedures required by RHA 8.20;

8.19.1.3 Has completed on-the-job training and demonstrated competence in the use of radioactive material, remote handling tools, and radiation survey instruments by a field evaluation; and

8.19.1.4 Has demonstrated understanding of the requirements in RHA 8.19.1.1 and 8.19.1.2 by successfully completing a written test.

8.19.2 The licensee may not permit an individual to act as a logging assistant until that person:

8.19.2.1 Has received instructions in applicable sections of Parts III and VI of these regulations;

8.19.2.2 Has received copies of and instruction in, the licensee's operating and emergency procedures required by RHA 8.20;

8.19.2.3 Has demonstrated understanding of the materials listed in RHA 8.19.2.1 and 8.19.2.2 by successfully completing a written or oral test; and

8.19.2.4 Has received instruction in the use of radioactive material, remote handling tools, and radiation survey instruments, as appropriate for the logging assistant's intended job responsibilities.

8.19.3 The licensee shall provide safety reviews for logging supervisors and logging assistants at least once during each calendar year.

8.19.4 The licensee shall maintain a record for each logging supervisor's and logging assistant's training and annual safety review. The training records must include copies of written tests and dates of oral tests given after July 14, 1987. The training records must be retained until 3 years following the termination of employment. Records of annual safety reviews must list the topics discussed and be retained for 3 years.

8.19.5 The licensee shall include the following subjects in the training required in RHA 8.19.1.1:

8.19.5.1 Fundamentals of radiation safety including:

8.19.5.1.1 Characteristics of radiation;

8.19.5.1.2 Units of radiation dose and quantity of radioactivity;

8.19.5.1.3 Hazards of exposure to radiation;

8.19.5.1.4 Levels of radiation from radioactive material;

8.19.5.1.5 Methods of controlling radiation dose (time, distance, and shielding); and

8.19.5.1.6 Radiation safety practices, including prevention of contamination, and methods of decontamination;

8.19.5.2 Radiation detection instruments including:

8.19.5.2.1 Use, operation, calibration, and limitations of radiation survey instruments;

8.19.5.2.2 Survey techniques; and

8.19.5.2.3 Use of personnel monitoring equipment;

8.19.5.3 Equipment to be used including:

8.19.5.3.1 Operation of equipment including source handling equipment and remote handling tools;

8.19.5.3.2 Storage, control, and disposal of radioactive material; and

8.19.5.3.3 Maintenance of equipment.

8.19.5.4 The requirements of pertinent federal and state regulations.

8.19.5.5 Case histories of accidents in well logging.

**RHA 8.20 OPERATING AND EMERGENCY PROCEDURES**

Each licensee shall develop and follow written operating and emergency procedures that cover the following items:

8.20.1 The handling and use of radioactive materials including the use of sealed sources in wells without surface casings for protecting fresh water aquifers, if appropriate;

8.20.2 The use of remote handling tools for handling sealed sources and radioactive tracer material except low-activity calibration sources;

8.20.3 Methods and occasions for conducting radiation surveys, including surveys for detecting contamination, as required by RHA 8.22.3 through 8.22.5;

8.20.4 Minimizing personnel exposure including exposures from inhalation and ingestion of radioactive tracer materials;

8.20.5 Methods and occasions for locking and securing stored radioactive materials;

8.20.6 Personnel monitoring and the use of personnel monitoring equipment;

8.20.7 Transportation of radioactive materials to field stations or temporary jobsites, packaging of radioactive materials for transport in vehicles, placarding of vehicles when needed, and physically securing radioactive material in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal;

8.20.8 Receiving and opening packages containing radioactive materials in accordance with the Code of Federal Regulations, Title 10, Part 20.205 and RHA 3.26 of these regulations;

8.20.9 For the use of tracers, decontamination of the environment, equipment, and personnel;

8.20.10 Maintenance of records generated by logging personnel at temporary jobsites;

8.20.11 The inspection and maintenance of sealed sources, source holders, logging tools, injection tools, source handling tools, storage containers, transport containers, and uranium sinker bars as required by RHA 8.14.

8.20.12 Identifying and reporting defects and noncompliance to the Department;

8.20.13 Actions to be taken if a sealed source is lodged in a well;

8.20.14 Notifying proper persons in the event of an accident; and

8.20.15 Actions to be taken if a sealed source is ruptured including actions to prevent the spread of contamination and minimize inhalation and ingestion of radioactive material and actions to obtain suitable radiation survey instruments as required by RHA 8.9.2.

## **RHA 8.21 PERSONNEL MONITORING**

8.21.1 The licensee may not permit an individual to act as a logging supervisor or logging assistant unless that person wears, at all times during the handling of radioactive materials, a personnel dosimeter that is processed and evaluated by an accredited National Voluntary Laboratory Accreditation Program (NVLAP) processor. Each personnel dosimeter must be assigned to and worn by only one individual. Film badges must be replaced at least monthly and other personnel dosimeters replaced at least quarterly. After replacement, each personnel dosimeter must be promptly processed.

8.21.2 The licensee shall provide bioassay services to individuals using radioactive material in subsurface tracer studies if required by the license.

8.21.3 The licensee shall retain records of personnel dosimeters and bioassay results for inspection until the Department authorizes disposition of the records.

## **RHA 8.22 RADIATION SURVEYS**

8.22.1 The licensee shall make radiation surveys, including but not limited to the surveys required under RHA 8.22.2 through 8.22.5, of each area where radioactive materials are used and stored.

8.22.2 Before transporting radioactive material, the licensee shall make a radiation survey of the position occupied by each individual in the vehicle and of the exterior of each vehicle used to transport the radioactive materials.

8.22.3 If the sealed source assembly is removed from the logging tool before departure from the temporary jobsite, the licensee shall confirm that the logging tool is free of contamination by energizing the logging tool detector or by using a survey meter.

8.22.4 If the licensee has reason to believe that as a result of any operation involving a sealed source, the encapsulation of the sealed source could be damaged by the operation, the licensee shall conduct a radiation survey, including a contamination survey, during and after the operation.

8.22.5 The licensee shall make a radiation survey at the temporary jobsite before and after each subsurface tracer study to confirm the absence of contamination.

8.22.6 The results of surveys required under RHA 8.22.1 through 8.22.5 must be recorded and must include the date of the survey, the name of the individual making the survey, the identification of the survey instrument used, and the location of the survey. The licensee shall retain records of surveys for inspection by the Department for 3 years after they are made.

## **RHA 8.23 CONTAMINATION CONTROL**

8.23.1 If the licensee detects evidence that a sealed source has ruptured or radioactive material has caused contamination, the licensee shall initiate immediately the emergency procedures required by RHA 8.20.

8.23.2 If contamination results from the use of radioactive materials in well logging, the licensee shall decontaminate all work areas, equipment and unrestricted areas.

8.23.3 During efforts to recover a sealed source lodged in the well, the licensee shall continuously monitor, with an appropriate radiation detection instrument or a logging tool with a radiation detector, the circulating fluids from the well, if any, to check for contamination resulting from damage to the sealed source.

## **RHA 8.24 SURVEILLANCE OF OPERATIONS**

8.24.1 A logging supervisor must be physically present at a temporary jobsite whenever radioactive materials are being handled or are not stored and locked in a vehicle or storage place. The logging supervisor may leave the jobsite in order to obtain assistance if a source becomes lodged in a well.

8.24.2 During well logging, except when radiation sources are below ground or in shipping or storage containers, the logging supervisor or other individual designated by the logging supervisor shall maintain direct surveillance of the operation to prevent unauthorized entry into a restricted area, as defined in RHA 1.2 of these regulations.

## **RHA 8.25 DOCUMENTS AND RECORDS REQUIRED AT FIELD STATIONS**

8.25.1 Each licensee shall maintain the following documents and records at the field station:

8.25.1.1 A copy of Parts III, VI, and VIII of these regulations;

8.25.1.2 The license authorizing the use of radioactive materials;

8.25.1.3 Operating and emergency procedures;

8.25.1.4 The record of the radiation survey instrument calibration required by RHA 8.9;

8.25.1.5 The record of the leak test results required by RHA 8.10;

8.25.1.6 Physical inventory records required by RHA 8.11;

8.25.1.7 Utilization records required by RHA 8.12;

8.25.1.8 Records of inspection and maintenance required by RHA 8.14;

8.25.1.9 Training records required by RHA 8.19.4; and

8.25.1.10 Survey records required by RHA 8.22.

8.25.2 Records required by RHA 8.25.1.1 through 8.25.1.3 must be kept until the licensee terminates its well logging operations at the field station. Records required by RHA 8.25.1.4 through 8.25.1.10 must be kept for 3 years.

## **RHA 8.26 DOCUMENTS AND RECORDS REQUIRED AT TEMPORARY JOBSITES**

Each licensee conducting operations at a temporary jobsite shall maintain the following documents and records at the temporary jobsite until the well logging operation is completed:

8.26.1 Operating and emergency procedures as outlined in RHA 8.20;

8.26.2 Evidence of latest calibration of the radiation survey instruments in use at the site required by RHA 8.9;

8.26.3 Latest survey records required by RHA 8.22.2, 8.22.3, and 8.22.5;

8.26.4 The shipping papers for the transportation of radioactive materials required by the Code of Federal Regulations, Title 10, Part 71.5;

8.26.5 A copy of the U.S. Nuclear Regulatory Commission, an Agreement State, or Licensing State license authorizing the use of radioactive materials when operating under reciprocity pursuant to RHA 2.20 of these regulations.

## **RHA 8.27 NOTIFICATION OF INCIDENTS AND LOST SOURCES; ABANDONMENT PROCEDURES FOR IRRETRIEVABLE SOURCES**

8.27.1 The licensee shall immediately notify the Department by telephone and subsequently within 30 days by confirmatory letter if it knows or has reason to believe that a sealed source has been ruptured. This notice must designate the well or other location and describe the magnitude and extent of the escape of radioactive material, assess the consequences of the rupture, and explain efforts planned or being taken to mitigate these consequences.

8.27.2 The licensee shall notify the Department of the theft or loss of radioactive materials, radiation overexposures, excessive levels and concentrations of radiation, and certain other accidents as required by RHA 3.44, 3.45, and 3.46 of these regulations.

8.27.3 If a sealed source becomes lodged in a well, and when it becomes apparent that efforts to recover the sealed source will not be successful, the licensee shall:

8.27.3.1 Notify the Department by telephone of the circumstances that resulted in the inability to retrieve the source and request approval to implement abandonment procedures; or that the licensee implemented abandonment before receiving Departmental approval because the licensee believed there was an immediate threat to public health and safety; and

8.27.3.2 Advise the well owner or operator, as appropriate, of the abandonment procedures under RHA 8.5.1 or 8.5.3; and

8.27.3.3 Either ensure that abandonment procedures are implemented within 30 days after the sealed source has been classified as irretrievable or request an extension of time if unable to complete the abandonment procedures.

8.27.4 The licensee shall, within 30 days after the sealed source has been classified as irretrievable, make a report in writing to the Department. The licensee shall send a copy of the report to each appropriate state or federal agency that issued permits or otherwise approved of the drilling operation. The report must contain the following information:

8.27.4.1 Date of occurrence;

8.27.4.2 A description of the irretrievable well logging source involved, including radionuclide, quantity, chemical, and physical form;

8.27.4.3 Surface location and identification of the well;

8.27.4.4 Results of efforts to immobilize and seal the source in place;

8.27.4.5 A brief description of the attempted recovery effort;

8.27.4.6 Depth of the source;

8.27.4.7 Depth of the top of the cement plug;

8.27.4.8 Depth of the well;

8.27.4.9 The immediate threat to public health and safety justification for implementing abandonment if prior Departmental approval was not obtained in accordance with RHA 8.27.3.1 of this section.

8.27.4.10 Any other information (e.g. warning statement) contained on the permanent identification plaque; and

8.27.4.11 State and Federal agencies receiving copy of this report.