

OHIO DEPARTMENT OF HEALTH

246 North High Street
Post Office Box 118
Columbus, Ohio 43216-0118

Telephone (614) 466-3543
www.odh.state.oh.us



BOB TAFT
Governor

J NICK BAIRD, M D
Director of Health

October 29, 2002

Josephine M. Piccone, Deputy Director
Office of State and Tribal Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Mrs. Piccone:

Enclosed is a copy of the final revisions to the Ohio Department of Health Chapter 3701:1-49, Radioactive Material Standards - Well Logging effective October 20, 2002. The final regulations correspond to the following equivalent amendments to NRC's regulations: Energy Compensation Sources for Well Logging and Other Regulatory Clarifications-Part 39 (RATS ID # 2000-1).

We have incorporated the comments cited in your letter dated January 3, 2002 regarding our proposed version of these regulations.

We believe that adoption of these revisions satisfies the compatibility and health and safety categories established in the Office of State and Tribal Programs (STP) Procedure SA-200.

If you have any questions, please feel free to contact me at 614-644-2727.

Sincerely yours,

A handwritten signature in black ink that reads "Roger L. Suppes". The signature is written in a cursive style.

Roger L. Suppes, Chief
Bureau of Radiation Protection

Enclosures:
As stated

SP07

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Ohio Administrative Code

Chapter 3701:1-49 Radioactive Material Standards - Well Logging

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3701:1-49-01 **Definitions.**

Terms defined in rule 3701:1-38-01 of the Administrative Code shall have the same meaning when used in this chapter except terms redefined within a given rule for use within that rule only, and additionally, as used in this chapter of the Administrative Code:

- (A) "Energy Compensation Source" (ECS) means a small sealed source, with an activity not exceeding 3.7 MBq (one hundred microcuries), used within a logging tool, or other tool components, to provide a reference standard to maintain the tool's calibration when in use.
- (B) "Field Station" means a facility where licensed material may be stored or used and from which equipment is dispatched to temporary job sites.
- (C) "Fresh Water Aquifer", for the purpose of this chapter, means a geologic formation that is capable of yielding fresh water to a well or spring.
- (D) "Injection Tool" means a device used for controlled subsurface injection of radioactive tracer material.
- (E) "Irretrievable Well Logging Source" means any sealed source containing licensed 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.
- (F) "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 rule 3701:1-49-19 of the Administrative Code.
- (G) "Logging Supervisor" means an individual who uses licensed material or provides personal supervision in the use of licensed material at a temporary job site and who is responsible to the licensee for assuring compliance with the requirements of the Ohio Revised Code Chapter 3748 and rules promulgated thereunder and the conditions of the license.
- (H) "Logging Tool" means a device used subsurface to perform well logging.
- (I) "Personal Supervision" means guidance and instruction by a logging supervisor, who is physically present at a temporary job site, who is in personal contact with logging assistants, and who can give immediate assistance.
- (J) "Radioactive Marker" means licensed material used for depth determination or direction orientation. For purposes of this chapter, this term includes radioactive collar markers and radioactive iron nails.

- (K) "Reasonable Effort" means effort commensurate with an assessment, performed by the licensee and approved by the department, of the health and safety risks of a lost source considering the geological and hydrological location of the source, the source type, and risks and costs of attempted source retrieval.
- (L) "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.
- (M) "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.
- (N) "Subsurface Tracer Study" means the release of unsealed licensed material or a substance labeled with licensed 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.
- (O) "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.
- (P) "Temporary Job Site" means a place where licensed materials are present for the purpose of performing well logging or subsurface tracer studies.
- (Q) "Tritium Neutron Generator Target Source" means a tritium source used within a neutron generator tube to produce neutrons for use in well logging applications.
- (R) "Uranium Sinker Bar" means a weight containing depleted uranium used to pull a logging tool toward the bottom of a well.
- (S) "Well" means a drilled hole in which well logging may be performed. As used in this chapter, "well" includes drilled holes for the purpose of oil, gas, mineral, groundwater, or geological exploration.
- (T) "Well Logging" means all operations involving the lowering and raising of measuring devices or tools which contain licensed material or are used to detect licensed materials 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.

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3701:1-49-02 Purpose and scope.

Chapter 3701:1-49 of the Administrative Code covers requirements for the issuance of a license authorizing the use of licensed materials including sealed sources, radioactive tracers, radioactive markers, and uranium sinker bars in well logging in a single well. This chapter also prescribes radiation safety requirements for persons using licensed materials in these operations. The provisions and requirements of this chapter is in addition to, and not in substitution for, other requirements of the Administrative Code promulgated pursuant to Chapter 3748 of the Revised Code. The requirements set out in this chapter do not apply to the issuance of a license authorizing the use of licensed 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.

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Application for a specific license for well logging.

- (A) A person, as defined in rule 3701:1-38-01 of the Administrative Code, shall file an application for a specific license authorizing the use of licensed material in well logging on a form provided by the director. Each application for a license, must be accompanied by the fee prescribed in rule 3701:1-38-02 of the Administrative Code.
- (B) The department will approve an application for a specific license for the use of licensed material in well logging if the applicant meets the following requirements:
- (1) The applicant shall satisfy the general requirements specified in rule 3701:1-40-15 of the Administrative Code for byproduct and accelerator produced material, in 10 C.F.R. 40.32 as specified in appendix B to rule 3701-39-02.1 of the Administrative Code for source material or NORM, and in 10 C.F.R. 70.33 as specified in appendix D to rule 3701-39-02.1 of the Administrative Code special nuclear material, as appropriate, and any special requirements contained in this chapter.
 - (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 the:
 - (a) Initial training;
 - (b) On-the-job training;
 - (c) Annual safety reviews provided by the licensee;
 - (d) Means the applicant will use to demonstrate the logging supervisor's knowledge and understanding of and ability to comply with the department's rules and licensing requirements and the applicant's operating and emergency procedures; and
 - (e) 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.
 - (3) The applicant shall submit to the department written operating and emergency procedures as described in rule 3701:1-49-19 of the Administrative Code or an outline or summary of the procedures that includes the important radiation safety aspects of the procedures.
 - (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 rules, license requirements, and the applicant's operating and emergency procedures are followed. Inspection

records must be retained for three years after each annual internal inspection.

- (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.
 - (6) If an applicant wants to perform leak testing of sealed sources, the applicant shall identify the manufacturers 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 the:
 - (a) Instruments to be used;
 - (b) Methods of performing the analysis; and
 - (c) Pertinent experience of the person who shall analyze the wipe samples.
 - (7) If the applicant does not perform the leak testing, leak tests shall be performed only by a company specifically licensed to perform the tests.
- (C) Each license is issued with the condition that the licensee shall, at any time before expiration of the license, upon the department's request, submit written statements, signed under oath or affirmation, to enable the department to determine whether or not the license should be modified, suspended, or revoked.

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Agreement with well owner or operator.

- (A) A 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 which party shall be responsible for meeting the following requirements:
- (1) The radiation monitoring required in paragraph (A) of rule 3701:1-49-22 of the Administrative Code will be performed;
 - (2) If the environment, any equipment, or personnel are contaminated with licensed material, they must be decontaminated before release from the site or release for unrestricted use;
 - (3) If a sealed source becomes lodged in the well, a reasonable effort will be made to recover it. However, a person may not attempt to recover a sealed source in a manner which, in the licensee's opinion, could result in its rupture; and
 - (4) If the sealed source is classified as irretrievable after reasonable efforts at recovery have been expended, the following requirements must be implemented within thirty days:
 - (a) Each irretrievable well logging source must be immobilized and sealed in place with a cement plug;
 - (b) A means to prevent inadvertent intrusion on the source, unless the source is not accessible to any subsequent drilling operations; and
 - (c) 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 seven inches (seventeen centimeters) square and 1/8-inch (three millimeters) thick. The plaque must contain:
 - (i) The word "CAUTION";
 - (ii) The radiation symbol (the color requirement in paragraph (A) of rule 3701:1-38-18 of the Administrative Code need not be met);
 - (iii) The date the source was abandoned;
 - (iv) The name of the well owner or well operator, as appropriate;
 - (v) The well name and well identification number(s) or other designation;
 - (vi) An identification of the sealed source(s) by radionuclide and quantity;

(vii) The depth of the source and depth to the top of the plug; and

(viii) An appropriate warning, such as, "DO NOT RE-ENTER THIS WELL."

(B) The licensee shall retain a copy of the written agreement for three years after the completion of the well logging operation.

(C) 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 paragraphs (A)(1) through (A)(4) of this rule.

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Labels, security, and transportation precautions.

- (A) The licensee may not use a source, source holder, or logging tool that contains licensed material unless the smallest component that is transported as a separate piece of equipment with the licensed material inside bears a durable, legible, and clearly visible marking or label. The marking or label must contain the radiation symbol specified in paragraph (A) of rule 3701:38-18 of the Administrative Code without the conventional color requirements, and the wording "DANGER (or CAUTION) RADIOACTIVE MATERIAL."
- (B) The licensee may not use a container to store licensed 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 paragraph (A) of rule 3701:38-18 of the Administrative Code and the wording "CAUTION (or DANGER), RADIOACTIVE MATERIAL, NOTIFY CIVIL AUTHORITIES (or NAME OF COMPANY)."
- (C) The licensee may not transport licensed material unless the material is packaged, labeled, marked, and accompanied with appropriate shipping papers in accordance with rules set out in Chapter 3701:1-50 of the Administrative Code.
- (D) The licensee shall store each source containing licensed material in a storage container or transportation package. The container or package must be locked and physically secured to prevent tampering or removal of licensed material from storage by unauthorized personnel. The licensee shall store licensed material in a manner which will minimize danger from explosion or fire.
- (E) The licensee shall lock and physically secure the transport package containing licensed material in the transporting vehicle to prevent accidental loss, tampering, or unauthorized removal of the licensed material from the vehicle.

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Radiation detection instruments.

- (A) The licensee shall keep a calibrated and operable radiation survey instrument capable of detecting beta and gamma radiation at each field station and temporary job site to make the radiation surveys required by rules 3701:1-49-03 through 24 of the Administrative Code and by Chapter 3701:1-38 of the Administrative Code. To satisfy this requirement, the radiation survey instrument must be capable of measuring 0.001 mSv per hour (0.1 millirem per hour) through at least 0.5 mSv per hour (fifty millirem per hour).
- (B) 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.
- (C) The licensee shall have each radiation survey instrument required under paragraph (A) of this rule calibrated:
 - (1) After instrument servicing and at intervals not to exceed six months;
 - (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
 - (3) So that an accuracy within plus or minus twenty percent of the calibration standard can be demonstrated on each scale.
- (D) The licensee shall retain calibration records for a period of three years after the date of calibration for inspection by the department.

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Leak testing of sealed sources.

- (A) Each licensee who uses a sealed source shall have the source tested for leakage periodically. The licensee shall keep a record of leak test results in units of microcuries and retain the record for inspection by the department for three years after the leak test is performed.
- (B) The wipe of a sealed source must be performed using a leak test kit or method approved by the department, the United States nuclear regulatory commission, a NARM licensing state for NARM, or an 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 one hundred eighty five Bq (0.005 microcurie) of radioactive material on the test sample and must be performed by a person approved by the department, the United States nuclear regulatory commission, a NARM licensing state for NARM, or an agreement state to perform the analysis.
- (C) Sealed sources must be tested at the following frequencies:
- (1) Each sealed source (except an energy compensation source (ECS)) must be tested at intervals not to exceed six months. In the absence of a certificate from a transferor that a test has been made within the six months before the transfer, the sealed source may not be used until tested.
 - (2) Each ECS that is not exempt from testing in accordance with paragraph (E) of this rule must be tested at intervals not to exceed three years. In the absence of a certificate from a transferor that a test has been made within the three years before the transfer, the ECS may not be used until tested.
- (D) If a sealed source is found to be leaking the licensee shall:
- (1) If the test conducted pursuant to paragraphs (A) and (B) of this rule reveals the presence of one hundred eighty five Bq (0.005 microcurie) or more of removable radioactive material, the licensee shall remove the sealed source from service immediately and have it decontaminated, repaired, or disposed of by an United States nuclear regulatory commission or agreement state licensee or a NARM licensing state licensee for NARM that is authorized 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 United States nuclear regulatory commission or agreement state licensee or a NARM licensing state licensee for NARM that is authorized to perform these functions.
 - (2) The licensee shall submit a report to the department within five days of receiving the test results. The report must describe the equipment involved in the leak, the test results, any contamination which resulted from the leaking source, and the corrective actions taken up to the time the report is made.

(E) The following sealed sources are exempt from the periodic leak test requirements set out in paragraphs (A) through (D) of this rule:

- (1) Hydrogen-3 (tritium) sources;
- (2) Sources containing licensed material with a half-life of thirty days or less;
- (3) Sealed sources containing licensed material in gaseous form;
- (4) Sources of beta- or gamma-emitting radioactive material with an activity of 3.7 MBq (one hundred microcuries) or less; and
- (5) Sources of alpha- or neutron-emitting radioactive material with an activity of three hundred seventy kBq (ten microcuries) or less.

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Physical inventory.

Each licensee shall conduct a semi-annual physical inventory to account for all licensed material received and possessed under the license. The licensee shall retain records of the inventory for three years from the date of the inventory for inspection by the department. The inventory must indicate the quantity and kind of licensed material, the location of the licensed 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.

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3701:1-49-09

Records of material use.

(A) Each licensee shall maintain records for each use of licensed material showing:

- (1) The make, model number, and a serial number or a description of each sealed source used;
- (2) In the case of unsealed licensed 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;
- (3) The identity of the logging supervisor who is responsible for the licensed material and the identity of logging assistants present; and
- (4) The location and date of use of the licensed material.

(B) The licensee shall make the records required by paragraph (A) of this rule available for inspection by the department. The licensee shall retain the records for three years from the date of the recorded event.

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3701:1-49-10

Design and performance criteria for sealed sources.

- (A) A licensee may use a sealed source in well logging applications if the sealed source:
 - (1) Is doubly encapsulated;
 - (2) Contains licensed material whose chemical and physical forms are as insoluble and non-dispersible as practical; and
 - (3) Meets the requirements of paragraph (B), (C), or (D) of this rule.
- (B) 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 10 CFR 39.41 (b) as specified in appendix A of to this rule, or the requirements in paragraph (C) or (D) of this rule.
- (C) 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 10 CFR 39.41 (c) as specified in appendix A of to this rule.
- (D) For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source for use in well logging applications if:
 - (1) The sealed source's prototype has been tested and found to maintain its integrity after each of the following tests:
 - (a) The test source must be held at minus forty degrees Centigrade for twenty minutes, six hundred degrees Centigrade for one hour, and then be subject to a thermal shock test with a temperature drop from six hundred degrees Centigrade to twenty degrees Centigrade within fifteen seconds.
 - (b) A five kilogram steel hammer, 2.5 centimeter in diameter, must be dropped from a height of one meter onto the test source.
 - (c) The test source must be subject to a vibration from twenty five Hz to five hundred Hz at five g amplitude for thirty minutes.
 - (d) A one gram hammer and pin, 0.3 centimeter pin diameter, must be dropped from a height of one meter onto the test source.
 - (e) The test source must be subjected to an external pressure of twenty four thousand six hundred pounds per square inch absolute (1.695×10^7 pascals).
- (E) The requirements in paragraph (A), (B), (C), and (D) of this rule do not apply to sealed sources that contain licensed material in gaseous form.

(F) The requirements in paragraph (A), (B), (C), and (D) of this rule do not apply to energy compensation sources (ECS). Energy compensation sources must be registered with the director under rule 3701:1-46-49 of the Administrative Code, or with the United States nuclear regulatory commission or an agreement state under regulations equivalent to rule 3701:1-46-49 of the Administrative Code.

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§ 39.41

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(3) The identity of the logging supervisor who is responsible for the licensed material and the identity of logging assistants present; and

(4) The location and date of use of the licensed material.

(b) The licensee shall make the records required by paragraph (a) of this section available for inspection by the Commission. The licensee shall retain the records for 3 years from the date of the recorded event.

§ 39.41 Design and performance criteria for sources.

(a) A licensee may use a sealed source for use in well logging applications if—

(1) The sealed source is doubly encapsulated;

(2) The sealed source contains licensed material whose chemical and physical forms are as insoluble and nondispersible as practical; and

(3) Meets the requirements of paragraph (b), (c), or (d) of this section.

(b) 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 paragraph (c) or (d) of this section.

(c) 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."

(d) For a sealed source manufactured after July 14, 1989, a licensee may use the sealed source, for use in well logging applications, if—

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

(i) *Temperature test.* 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.

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

(iii) *Vibration test.* The test source must be subject to a vibration from 25 Hz to 500 Hz at 5 g amplitude for 30 minutes.

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

(v) *Pressure test.* The test source must be subject to an external pressure of 1.695×10^7 pascals [24,600 pounds per square inch absolute].

(e) The requirements in paragraphs (a), (b), (c), and (d) of this section do not apply to sealed sources that contain licensed material in gaseous form.

(f) The requirements in paragraphs (a), (b), (c), and (d) of this section do not apply to energy compensation sources (ECS). ECSs must be registered with the Commission under § 32.210 of this chapter or with an Agreement State.

[65 FR 20345, Apr. 17, 2000]

§ 39.43 Inspection, maintenance, and opening of a source or source holder.

(a) 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.

(b) 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

3701:1-49-11

Inspection, maintenance, and opening of a source or source holder.

- (A) 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 three years after the defect is found.
- (B) 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 three years after the defect is found.
- (C) 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 rule 3701:1-49-19 of the Administrative Code has been approved by the director pursuant to paragraph (B)(3) of rule 3701:1-49-03 of the Administrative Code, the United States nuclear regulatory commission or by an agreement state. For NARM, the procedure must be approved by a NARM licensing state.
- (D) 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 director, the United States nuclear regulatory commission or an agreement state to perform this operation. For NARM, the approval must be from a NARM licensing state.
- (E) The opening, repair, or modification of any sealed source must be performed by persons specifically approved to do so by the director, the United States nuclear regulatory commission or an agreement state. For NARM, the approval must be from a NARM licensing state.

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2

10/10/2002

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3701:1-49-12

Subsurface tracer studies.

(A) 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 job sites.

(B) A licensee may not knowingly inject licensed material into fresh water aquifers unless specifically authorized to do so by the director.

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3701:1-49-15

Use of a sealed source in a well without a surface casing.

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 director pursuant to paragraph (B)(3) of rule 3701:1-49-03 of the Administrative Code, the United States nuclear regulatory commission or an agreement state. For NARM, the approval must be from a NARM licensing state.

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3701:1-49-16 Energy compensation sources.

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 3.7 MBq (one hundred microcuries).

- (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 rules 3701:1-49-07, 3701:1-49-08, and 3701:1-49-09 of the Administrative Code.
- (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 rules 3701:1-49-04, 3701:1-49-07, 3701:1-49-08, 3701:1-49-09, 3701:1-49-15, and 3701:1-49-26 of the Administrative Code.

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.3701:1-49-18 Training.

- (A) The licensee may not permit an individual to act as a logging supervisor until that person has:
 - (1) Completed training in the subjects outlined in paragraph (E) of this rule;
 - (2) Received copies of, and instruction in the:
 - (a) Rules contained in the applicable rules of 3701:1-38 of the Administrative Code and this chapter;
 - (b) License under which the logging supervisor will perform well logging; and
 - (c) Licensee's operating and emergency procedures required by rule 3701:1-49-19 of the Administrative Code;
 - (3) Completed on-the-job training and demonstrated competence in the use of licensed materials, remote handling tools, and radiation survey instruments by a field evaluation; and
 - (4) Demonstrated understanding of the requirements in paragraphs (A) (1) and (2) of this rule by successfully completing a written test.
- (B) The licensee may not permit an individual to act as a logging assistant until that person has:
 - (1) Received instruction in applicable rules of 3701:1-38 of the Administrative Code;
 - (2) Received copies of, and instruction in, the licensee's operating and emergency procedures required by rule 3701:1-49-19 of the Administrative Code;
 - (3) Demonstrated understanding of the materials listed in paragraphs (B) (1) and (2) of this rule by successfully completing a written or oral test; and
 - (4) Received instruction in the use of licensed materials, remote handling tools, and radiation survey instruments, as appropriate for the logging assistant's intended job responsibilities.
- (C) The licensee shall provide safety reviews for logging supervisors and logging assistants at least once during each calendar year.
- (D) The licensee shall maintain a record on 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. The training records must be retained until three years following the termination of employment. Records of

annual safety reviews must list the topics discussed and be retained for three years.

(E) The licensee shall include the following subjects in the training required in paragraph (A)(1) of this rule:

(1) Fundamentals of radiation safety including:

- (a) Characteristics of radiation;
- (b) Units of radiation dose and quantity of radioactivity;
- (c) Hazards of exposure to radiation;
- (d) Levels of radiation from licensed material;
- (e) Methods of controlling radiation dose (time, distance, and shielding); and
- (f) Radiation safety practices, including prevention of contamination, and methods of decontamination;

(2) Radiation detection instruments including:

- (a) Use, operation, calibration, and limitations of radiation survey instruments;
- (b) Survey techniques; and
- (c) Use of personnel monitoring equipment;

(3) Equipment to be used including:

- (a) Operation of equipment, including source handling equipment and remote handling tools;
- (b) Storage, control, and disposal of licensed material; and
- (c) Maintenance of equipment;

(4) The requirements of pertinent Ohio statutes and rules; and

(5) Case histories of accidents in well logging.

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3701:1-49-19

Operating and emergency procedures.

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

- (A) The handling and use of licensed materials including the use of sealed sources in wells without surface casing for protecting fresh water aquifers, if appropriate;
- (B) The use of remote handling tools for handling sealed sources and radioactive tracer material except low-activity calibration sources;
- (C) Methods and occasions for conducting radiation surveys, including surveys for detecting contamination, as required by paragraphs (C) through (E) of rule 3701:1-49-21 of the Administrative Code;
- (D) Minimizing personnel exposure including exposures from inhalation and ingestion of licensed tracer materials;
- (E) Methods and occasions for locking and securing stored licensed materials;
- (F) Personnel monitoring and the use of personnel monitoring equipment;
- (G) Transportation of licensed materials to field stations or temporary job sites, packaging of licensed materials for transport in vehicles, placarding of vehicles when needed, and physically securing licensed materials in transport vehicles during transportation to prevent accidental loss, tampering, or unauthorized removal;
- (H) Picking up, receiving, and opening packages containing licensed materials, in accordance with rule 3701:1-38-18 of the Administrative Code;
- (I) For the use of tracers, decontamination of the environment, equipment, and personnel;
- (J) Maintenance of records generated by logging personnel at temporary job sites;
- (K) 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 rule 3701:1-49-11 of the Administrative Code;
- (L) Identifying and reporting to the department defects and noncompliance as required by rule 3701:1-38-23 of the Administrative Code;
- (M) Actions to be taken if a sealed source is lodged in a well;
- (N) Notifying proper persons in the event of an accident; and

(O) Actions to be taken if a sealed source is ruptured including actions to prevent the spread of contamination and minimize inhalation and ingestion of licensed materials and actions to obtain suitable radiation survey instruments as required by paragraph (B) of rule 3701:1-49-06 of the Administrative Code.

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3701:1-49-20

Personnel monitoring.

- (A) 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 licensed radioactive materials, either a film badge, a thermoluminescent dosimeter (TLD), or other National Voluntary Laboratory Accreditation Program (NVLAP) - approved whole body monitor. Each film badge, TLD, or other NVLAP - approved whole body monitor must be assigned to and worn by only one individual. Film badges must be replaced at least monthly and TLDs replaced at least quarterly, and other dosimetry monitoring devices according to the processing schedule approved by NVLAP. After replacement, each film badge or TLD must be promptly processed.
- (B) The licensee shall provide bioassay services to individuals using licensed materials in subsurface tracer studies if required by the license.
- (C) The licensee shall retain records of film badge, TLD, other NVLAP - approved whole body monitor and bioassay results for inspection until the department authorizes disposition of the records.

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3701:1-49-21

Radiation surveys.

- (A) The licensee shall make radiation surveys, including but not limited to the surveys required under paragraphs (B) through (E) of this rule, of each area where licensed materials are used and stored.
- (B) Before transporting licensed materials, 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 licensed materials.
- (C) If the sealed source assembly is removed from the logging tool before departure from the temporary job site, the licensee shall confirm that the logging tool is free of contamination by energizing the logging tool detector or by using a survey meter.
- (D) 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.
- (E) The licensee shall make a radiation survey at the temporary job site before and after each subsurface tracer study to confirm the absence of contamination.
- (F) The results of surveys required under paragraphs (A) through (E) of this rule 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 three years after they are made.

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3701:1-49-22

Radioactive contamination control.

- (A) If the licensee detects evidence that a sealed source has ruptured or licensed materials have caused contamination, the licensee shall initiate immediately the emergency procedures required by rule 3701:1-49-19 of the Administrative Code.
- (B) If contamination results from the use of licensed material in well logging, the licensee shall decontaminate all work areas, equipment, and unrestricted areas.
- (C) 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.

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3701:1-49-23 **Security.**

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

- (B) 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 rule 3701:1-38-01 of the Administrative Code.

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3701:1-49-24

Documents and records required at field stations.

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

- (A) A copy of Chapters 3701:1-38 and 3701:1-49 of the Administrative Code;
- (B) The license authorizing the use of licensed material;
- (C) Operating and emergency procedures required by rule 3701:1-49-19 of the Administrative Code;
- (D) The record of radiation survey instrument calibrations required by rule 3701:1-49-06 of the Administrative Code;
- (E) The record of leak test results required by rule 3701:1-49-07 of the Administrative Code;
- (F) Physical inventory records required by rule 3701:1-49-08 of the Administrative Code;
- (G) Utilization records required by rule 3701:1-49-09 of the Administrative Code;
- (H) Records of inspection and maintenance required by rule 3701:1-49-11 of the Administrative Code;
- (I) Training records required by paragraph (D) of rule 3701:1-49-18 of the Administrative Code; and
- (J) Survey records required by rule 3701:1-49-21 of the Administrative Code.

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3701:1-49-25 Documents and records required at temporary job sites.

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

- (A) Operating and emergency procedures required by rule 3701:1-49-19 of the Administrative Code;
- (B) Evidence of latest calibration of the radiation survey instruments in use at the site required by rule 3701:1-49-06 of the Administrative Code;
- (C) Latest survey records required by paragraphs (B), (C), and (E) of rule 3701:1-49-21 of the Administrative Code;
- (D) The shipping papers for the transportation of radioactive materials required by Chapter 3701:1-50 of the Administrative Code; and
- (E) When operating under reciprocity a copy of the agreement state or United States nuclear regulatory commission license authorizing use of licensed materials.

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3701:1-49-26

Notification of incidents and lost sources; abandonment procedures for irretrievable sources.

- (A) The licensee shall immediately notify the department by telephone and subsequently, within thirty days, by confirmatory letter if the licensee knows or has reason to believe that a sealed source has been ruptured. The letter must designate the well or other location, describe the magnitude and extent of the escape of licensed materials, assess the consequences of the rupture, and explain efforts planned or being taken to mitigate these consequences.
- (B) The licensee shall notify the department of the theft or loss of radioactive materials, radiation overexposures, excessive levels and concentrations of radiation, and other accidents as required by rule 3701:1-38-21 and rule 3701:1-40-20 of the Administrative Code.
- (C) 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:
 - (1) Notify the department by telephone of the circumstances that resulted in the inability to retrieve the source; and
 - (a) Obtain department approval to implement abandonment procedures; or
 - (b) State or declare that the licensee implemented abandonment procedures before receiving department approval because the licensee believed there was an immediate threat to public health and safety; and
 - (2) Advise the well owner or operator, as appropriate, of the abandonment procedures under paragraphs (A) or (C) of rule 3701:1-49-04 of the Administrative Code; and
 - (3) Either ensure that abandonment procedures are implemented within thirty days after the sealed source has been classified as irretrievable or request an extension of time if unable to complete the abandonment procedures.
- (D) The licensee shall, within thirty days after a 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:
 - (1) Date of occurrence;
 - (2) A description of the irretrievable well logging source involved including the radionuclide and its quantity, chemical, and physical form;
 - (3) Surface location and identification of the well;

- (4) Results of efforts to immobilize and seal the source in place;
- (5) A brief description of the attempted recovery effort;
- (6) Depth of the source;
- (7) Depth of the top of the cement plug;
- (8) Depth of the well;
- (9) The immediate threat to public health and safety justification for implementing abandonment if prior department approval was not obtained in accordance with paragraph (C)(1)(b) of this rule;
- (10) Any other information, such as a warning statement, contained on the permanent identification plaque; and
- (11) State and federal agencies receiving copy of this report.

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